

# **Transmittal Letter for the Statewide Benchmarking Process Evaluation**



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**PUBLIC UTILITIES COMMISSION**

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**Transmittal Letter for Statewide Benchmarking Process Evaluation**  
**From Jean Lamming, DSM Evaluation Section, CPUC Energy Division**

In recent years California has focused on building benchmarking to motivate energy efficiency actions and provide transparency to those evaluating buildings for purchase or lease. Most prominent in this regard is Assembly Bill 1103. While not yet implemented at the time of this study, the bill requires building owners to provide building energy use data at the time of sale, financing, or lease of an entire building. At the local level, San Francisco's Existing Commercial Buildings Energy Performance Ordinance complements the state law. Where AB 1103 will trigger detailed disclosure between parties to major transactions, San Francisco's ordinance mandates annual public disclosure of a more limited set of metrics describing overall annual performance. The CPUC's D.11-04-005 on April 14, 2011 required the IOUs to benchmark 120,000 buildings across their territories<sup>1</sup> by the end of 2012.

Energy Division commissioned this benchmarking process evaluation in 2011 to examine the utility of building benchmarking in promoting energy efficiency, the value of existing and emerging benchmarking tools to California buildings, and other issues. Study findings indicate the potential for benchmarking and identify barriers and opportunities that raise questions for California stakeholders on how to best leverage the legislative, ratepayer, market and other resources at hand going forward.

**Market Response to Benchmarking**

**Energy Savings**

Perhaps most significantly, this study found that those who benchmarked buildings went on to take energy management actions in their buildings, such as reviewing building control strategies and setpoints, monitoring electricity, gas or steam use, and identifying areas for reducing energy. For the most part, they credited benchmarking with spurring these changes. This was a narrow but threshold area of inquiry in this study because some previous research had suggested that information gained via benchmarking does not necessarily lead to energy saving actions when offered in conjunction with a utility program.

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<sup>1</sup> This order excludes SoCalGas, but sets targets at 50,000 for PG&E and SCE, and 20,000 for SDG&E.

This study further found that some 84% of those who benchmarked their buildings said that they either had, or planned to, implement improvements, especially lighting, HVAC, energy management systems and controls, audits and feasibility studies, motors and refrigeration. For most respondents, the improvements were associated with programs offered by their utility. More than half agreed that their implementation of energy efficiency measures was or would be more comprehensive in the buildings they benchmark.

Based on these and other findings, the study suggests benchmarking leads to energy savings. That potential raises questions of which customers to target with benchmarking, which benchmarking tools are best, for which purposes, whether multiple benchmarking tools can be used in tandem, and how IOU programs best interface with benchmarking efforts.

These findings are derived from among 127 building owners, renters, property managers and vendors who had voluntarily sought out IOU benchmarking services - which could indicate they were already interested or motivated to benchmark for reasons identified below. The study also interviewed 48 non-participants, owners or renters of medium- to large commercial buildings, who had not used IOU benchmarking services.<sup>2</sup>

### **Motivations - Who Benchmarks and Why?**

The study found significantly that while building owners are the most likely group to benchmark in California they are not the only ones. Commercial real estate consultants and third party vendors, such as engineering firms or product suppliers, are a significant segment, as are renters, according to study findings. Further, the larger the building, or portfolio of buildings, the more likely the decision maker is to be a facilities manager, or property management firm, respectively.

Office buildings were the single largest building segment benchmarked in recent years in California, including large buildings and large portfolios of buildings. Vendors interviewed identified owners and managers of large office buildings as their most likely clients.

The study uncovered a mix of carrot and stick motivations for building benchmarking. State and local ordinances were a primary motivator, as well as the prerequisite of benchmarking to attain LEED or ENERGY STAR® labels. This latter is not surprising given the associated literature review suggested a continued interest in energy efficiency in the commercial real estate sector, including in green building designations like ENERGY STAR, LEED or Building EQ. At this time, LEED-certified buildings command a roughly 8 percent rent premium over standard buildings. A significant percent of those

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<sup>2</sup> The study participant sample derived from commercial customers who had registered for IOU benchmarking workshops. The non-participant sample were owners or renters of medium- and large-sized commercial buildings who had not used IOU workshops, or downloaded their energy use data from the IOU's automated portal.

surveyed reported a motivation to market their buildings, realize higher occupancy rates, or building asset values, and to use benchmarking in acquiring or selling buildings. About 18 percent of IOU workshop participants who went on to benchmark their buildings said their organizations were interested in obtaining a green building label. Findings even suggested benchmarking scores are used to assess performance and award bonuses to building engineers and property managers. In addition, SDG&E made benchmarking a prerequisite to use its rebate programs and findings reflected this.

In actual practice, interviewees who benchmarked most commonly used it to track the performance of one building over time by setting a baseline, and tracking energy performance after making equipment improvements. This is in line with the design of ENERGY STAR Portfolio Manager, which was by far the most commonly used tool – and stipulated in AB1103. Portfolio Manager is an operational tool, designed to produce an energy use intensity score – like a blood pressure or miles per gallon rating – for a building based on its energy use, square-footage and other factors, as compared to a national database of similar buildings, adjusted for climate. After tracking performance of a single building, the next most prominent use of benchmarking, participants reported, was to compare buildings within their portfolio, and third, to compare a building to others across the nation.

### **Barriers to Widespread Use of Benchmarking**

Most significantly, the study indicates that there is a strikingly low interest and awareness of benchmarking in general in California. This comes from the survey of non-participants – owners and renters of medium- and large-sized commercial buildings in California who have not self-selected to use IOU benchmarking workshops or technical services. Only 5% of these non-participants (four individuals) reported they had benchmarked a building in the last three years, and only 16 percent of them could identify benchmarking without prompting. While the sample was small at 47, it was comprised of the most likely benchmarking candidates due to the types and size of buildings they are affiliated with. These findings also correlate with data from the California Energy Commission and U.S. EPA, which show that roughly 3.5 percent of commercial buildings in California have been benchmarked, by evaluation team calculations. In contrast, about half of the building owners and renters who self-selected to register for an IOU benchmarking workshop went on to benchmark their building.

The study identified a number of barriers to individuals or firms benchmarking. These included the cost to collect data and monitor performance, lack of skill to use the ENERGY STAR software, lack of information, and that their building was not eligible for Portfolio Manager (e.g. less than 5,000 square-feet or not one of the building types covered by Portfolio Manager). This latter barrier, tied to Portfolio Manager itself, is related to a class of technical and tool-related barriers that the study team identified through interviews with national experts.

The list below highlights particular barriers identified in the report:

1. **Small Commercial Buildings** - While Portfolio Manager has broad market acceptance, some 85% of the commercial buildings in California cannot receive a 1-100 rating from Portfolio Manager because they are too small. With a couple of limited exceptions the rating within the tool is not applicable for buildings under 5,000 square-feet in size. Some larger buildings are excluded because of their type. In all, for various reasons, some 48% of the commercial floor space in California can't be rated by Portfolio Manager. These excluded customers using Portfolio Manager *are* able to track energy consumption over time, but comparison to other similar buildings is limited; they can only compare themselves to a national median energy use intensity (EUI) (energy use per square-foot). California and local resources, such as EUI data from the Commercial End Use Saturation Study (CEUS) or public disclosure in San Francisco, could provide additional perspective, but would not yield the simplified communication benefits available from a rating or score.
2. **Multi-Tenant Buildings** - In California, it's challenging for owners of multi-tenant buildings to benchmark them without authorization from the utility account holders in the building because privacy laws limit disclosure of customer usage data.
3. **Building Versus Meter** - Because the IOUs track energy use by meter, and not building, there is a potential for customers benchmarking their buildings to receive inaccurate benchmark scores, if they did not include all the meters associated with their building.<sup>3</sup> There is not always a one-to-one relationship between a building and meters, or accounts and buildings. The study team found an alarming number of California benchmarking scores clustering near the bottom or top ends of the benchmark scale, which could be a symptom of incorrect meter assignment, inconsistent documentation of building size, or of another problem. Commonwealth Edison in Illinois has reportedly found a way to address this problem through a more hands-on approach.
4. **Codes and Standards** - California's relatively stringent energy codes could skew California building benchmarking results toward the high end of the score spectrum because, though corrected for climate differences, ESPM benchmarks buildings against a national database. The study team did not have the data to answer this question. But it raises the issue of whether it might be more useful for California buildings to use a tool such as one under development by the California Energy Commission called Building Energy Asset Rating System (BEARS) or The Lawrence Berkeley Lab EnergyIQ tool that use a California-based database for comparison. Such a decision would have to weigh the benefits of the national market acceptance of Portfolio Manager, especially for national chains and real estate investment trusts that use the tool in multiple states.

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<sup>3</sup> Portfolio Manager does not ensure that data entered are ready for analysis. There is no site verification required for an Portfolio Manager score, though site verification is required for ENERGY STAR certification.

5. **Tracking Market Transformation** – While it might be useful to track the EUI (energy use per square-foot) of buildings in California over time, the study showed that the U.S. EPA won't release EUI for each building type by state due to confidentiality rules. In addition, scores of customers who use a California IOU's automated portals to download their energy use data are kept confidential by some of the IOUs.
6. **Data Quality** – Out-of-range benchmark scores observed during the study, most likely due to lack of quality control procedures on data entry combined with lack of a mechanism to determine when customers have completed inputting all the information required to obtain an accurate benchmark score or EUI, indicates a potential issue with data quality. If benchmark scores or EUIs were released or used for analysis without addressing data quality in some way, it could undermine the credibility of the benchmarking score.
7. **IOUs Performing Benchmarks or Making Estimates** – IOUs cannot benchmark customer buildings without authorization to use customer data, and access to non-energy data like building square-footage, occupancy, hours of operation, etc. (Vendors, property managers and others designated by the owner have access to customer energy use data.) Services such as Advantage IQ and Siemens can benchmark buildings for their clients without the IOUs knowing or getting credit toward CPUC targets, because they provide both billing and energy management services. In order to meet targets set by the CPUC, the IOUs plan to estimate building benchmark scores, and send them to customers in hopes of encouraging them to perform the benchmark themselves. The study was not able to assess the efficacy of this approach, which the IOUs call "proxy benchmarking." Only SCE seemed confident it could meet the CPUC's benchmarking targets by the end of 2012.

### **Possible Paths for Benchmarking Initiatives**

The report has identified significant resources in California related to building benchmarking, and suggested ways to better integrate them, and to leverage the opportunities discussed. One aspect is the benchmarking tools themselves. In addition to the national Portfolio Manager, there are two California-based tools. The study interviewed experts who highlighted the tension between the credibility and consensus around Portfolio Manager, despite its shortcomings, and the benefits for California buildings to using the more rigorous California tools.

- **BEARS** – The CEC is developing the building asset rating tool (BEARS) in response to AB 758 (the Comprehensive Energy Efficient Program for Existing Buildings) and its requirement for a system of energy assessments, ratings and building labels. BEARS will rely on a visit by a certified rater to model the projected energy performance of the building envelope and its major systems and equipment, which provides specific information for improving building energy use, but adds to cost of using the rating. (Portfolio Manager in contrast assesses the energy used in operation of

the building, and by benchmarking it against similar buildings shows whether the building needs a more diagnostic look.)

- **EnergyIQ** – Developed by Lawrence Berkeley National Lab with funding from PIER and California EPA, EnergyIQ is an operational rating tool similar to Portfolio Manager that relies on the relatively rich (as compared to the Portfolio Manager database) data from CPUC commercial market tracking and saturation studies. EnergyIQ can benchmark buildings and track energy use. A module under development will identify possible energy-saving actions, and the likely return on investment from them.

## Questions Going Forward

The findings identified a number of decision points for a path forward. In particular, the study pointed toward the opportunity to:

- Link benchmarking by Portfolio Manager to IOU audit and retro-commissioning programs which would perform the diagnostics and make energy improvement recommendations not done by operational rating tools;
- Couple Portfolio Manager with either BEARS or EnergyIQ in a progressive fashion.(e.g. an operational rating could identify buildings that are performing poorly and need a closer, asset rating assessment to pinpoint the cause.)
- Investigate the effectiveness of the IOU pending effort to estimate scores, and the cost benefit;
- Perform segmentation research to better understand which commercial customers are most likely to benchmark and benefit from it, to support IOU outreach and training efforts.

Other questions for California stakeholders include:

1. How can the IOUs and the CPUC make it easier for building owners and their agents to benchmark their buildings?
2. How can the various resources in California represented by the CEC, CPUC, IOUs, Lawrence Berkeley Lab, local efforts such as by the City of San Francisco, combine to support a shared vision for benchmarking?
3. How can the CPUC's commercial market tracking and saturation surveys further support benchmarking? (At least one of these studies is already collecting the meter numbers at the sites it surveys to better tie meters to buildings.) Also, can or should other CPUC measurement and evaluation involving onsite visits support proxy benchmarking?
4. What are the costs and benefits of adding a building attribute to IOU data bases to aggregate meter level energy use data to the building level? (Commonwealth Edison in Illinois is apparently able to give the building owner or representative monthly energy data aggregated to the level of the building by reporting monthly total kWh for the sum of all electric meters serving a building.)

5. What is the cost to the stakeholder of benchmarking with Portfolio Manager in comparison to BEARS, EnergyIQ, and two or more of these tools in combination?
6. How can stakeholders better understand and harness how the commercial real estate market in California uses benchmarking to calculate net operating income, and property value? This market could be a major for use of benchmarking.
7. How should we respond to new research on the job creation potential of building rating and disclosure, as well as ties to uptake of emerging technologies? (The Institute for Market Transformation shares articles on their new studies. <http://www.imt.org/> )





# **Statewide Benchmarking Process Evaluation**

## ***Volume 1: REPORT***

**April 2012**

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## Executive Summary

This process evaluation of the benchmarking initiatives of the four California investor-owned Utilities (IOUs) was undertaken jointly in 2011 by NMR Group and Optimal Energy on behalf of the California Public Utilities Commission (CPUC). The purposes of this study included to provide feedback on the appropriateness of the current and planned activities of the IOU benchmarking initiatives to meet CPUC goals and increase benchmarking<sup>1</sup> among the state's commercial buildings, to understand if and how benchmarking leads to energy savings and identify implications of this information for the IOU initiatives, and to better understand the appropriateness of ENERGY STAR Portfolio Manager<sup>2</sup> as a tool for benchmarking California commercial buildings.

The initiatives consist of six components, the most important of which are (1) holding workshops to help customers learn to benchmark buildings with ENERGY STAR Portfolio Manager; (2) developing and providing ongoing support for each utility's "Automated Benchmarking Service" (utility ABS) application<sup>3</sup>; (3) providing technical support to customers for Portfolio Manager as well as each utility's ABS; and (4) developing and delivering estimated benchmark scores<sup>4</sup> to customers who to the utilities' knowledge have not already benchmarked with Portfolio Manager. These estimated scores are meant both to encourage customers to benchmark with Portfolio Manager and to help the utilities meet their CPUC-set goals for buildings benchmarked.

The theory behind the utility benchmarking initiatives is that the support they provide will help to further the realization of the market transformation potential of universal benchmarking by encouraging customer use of Portfolio Manager and the utility ABSs to obtain information about their buildings' energy use. This information will then motivate customers to monitor their energy use, improve the benchmark scores or Energy Use Intensities (EUIs) of underperforming buildings, and practice continuous energy improvement or strategic energy management.

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<sup>1</sup> Throughout this study the term "benchmarking" is defined according to ENERGY STAR<sup>®</sup> as follows: "Energy use benchmarking is a process that either compares the energy use of a building or group of buildings with other similar structures or looks at how energy use varies from a baseline. It is a critical step in any building upgrade project, because it informs organizations about how and where they use energy and what factors drive their energy use. Benchmarking enables energy managers to determine the key metrics for assessing performance, to establish baselines, and to set goals for energy performance. It also helps them identify building upgrade opportunities that can increase profitability by lowering energy and operating costs, and it facilitates continuous improvement by providing diagnostic measures to evaluate performance over time." (ENERGY STAR. 2008. ENERGY STAR<sup>®</sup> Building Manual. April 2008. Accessed March 20, 2011 from [http://www.energystar.gov/index.cfm?c=business.EPA BUM\\_CH2\\_Benchmarking](http://www.energystar.gov/index.cfm?c=business.EPA BUM_CH2_Benchmarking).) The term "benchmark" is defined as follows according to PG&E staff interviewed for this study: A 'benchmark' is a metric used to quantify the relative energy performance of an entire facility. Benchmarking metrics include, but are not limited to, the EPA's 1-to-100 score, site or source energy use intensity (EUI), and equivalent greenhouse gas emissions. A simple 'benchmark' may be a comparison of a whole building's utility bills from one year to another. More sophisticated techniques attempt to normalize for factors that impact the raw billing data but are not a measure of the true energy performance of the facility, such as weather, facility type, occupancy type, and operating characteristics.

<sup>2</sup> ENERGY STAR Portfolio Manager is an online interactive energy management tool that allows users to track and assess energy and water consumption of their commercial building or portfolio of buildings, and benchmark the energy consumption to other similar buildings.

<sup>3</sup> Automated Benchmarking System refers to the software system provided by the EPA that allows utilities and other Energy Service Providers (ESPs) to electronically transfer data to and from Portfolio Manager via web services. Automated Benchmarking Service refers to the software system the utility or other ESP implements and offers to their customers using the EPA's Automated Benchmarking System. Utility ABSs reduce the time required by customers to benchmark, and facilitate customer monitoring of building energy use, by enabling customer energy use information to be electronically downloaded from the specific utility's database into Portfolio Manager.

<sup>4</sup> Also known as "utility-driven" or "proxy" benchmarking.

Below is a summary of the most important findings and recommendations. A summary of the complete findings and recommendations can be found in Section 7.

*Energy savings associated with benchmarking.* It appears that for a subset of customers who registered for utility benchmarking workshops and benchmarked with Portfolio Manager, the information obtained resulted in some energy savings. Among this group:

- Benchmarking resulted in subsequent building energy management actions.
- Benchmarking resulted in energy efficiency improvements in buildings.
- Benchmarking was associated with utility program participation.
- There were energy savings from benchmarking; a substantial portion of the savings was associated with programs, and it should be possible to measure the savings.

Since the participants studied had taken the first step of voluntarily making the decision to participate in the workshops, it is possible that they were already pre-disposed to making energy efficiency improvements. Thus, it may not be possible to extrapolate these results to customers who benchmark but did not volunteer to attend a utility energy efficiency workshop. The CPUC and utilities may wish to further explore the possibility of estimating the savings from measures implemented as a direct result of using the Portfolio Manager tool. These measures may be installed through a utility energy efficiency program or outside a utility energy efficiency program. In both cases, this savings would most likely require a much more detailed investigation of the activities undertaken in a sample of buildings, including establishing causality through investigating the role of benchmarking in the decision-making about these activities, than was possible to do in this study. It would benefit from detailed benchmarking data for each building, if available, and measure information at the individual building level, rather than in the aggregate as was requested in the participant survey. The CPUC may also wish to commission the development of a battery of questions for use in evaluations of commercial energy efficiency programs to assess the influence of benchmarking with Portfolio Manager on the decision to install rebated measures.

*Utility goals for buildings benchmarked.* For reasons that are outside of the utilities' control, the utilities are facing numerous challenges in meeting CPUC-established goals. It appears that three of the four utilities may not meet these goals. Among these challenges are: (1) the IOUs lack access to key information about customer buildings required to benchmark with Portfolio Manager; (2) unless a customer uses a utility ABS when benchmarking, the IOUs do not know whether or not a customer has benchmarked with Portfolio Manager, and thus cannot identify all buildings benchmarked in their service territories; and (3) the number of buildings for which IOUs are likely to be able to estimate a benchmark score may be considerably smaller than the goals themselves. Thus the CPUC may wish to consider relaxing the utilities' benchmarking goals.

*Privacy requirements.* Several interviewees suggested that the state's laws and regulations regarding the privacy of energy use data could constrain benchmarking of commercial buildings in the state. In an attempt to comply with current laws and regulations concerning privacy, IOUs have required owners of multi-tenant buildings to obtain authorization from each tenant with a meter in the building in order to use the utility ABSs with Portfolio Manager. It was the opinion of some interviewees that this impedes benchmarking by owners of multi-tenant buildings and constrains utilities' efforts to estimate proxy benchmark scores for customer buildings. It was the opinion of one interviewee that some of the regulatory decisions addressing customer privacy may have been issued outside the context of energy efficiency or pre-date the state's concerns

about energy efficiency and might be interpreted in more than one way. Given these observations, the CPUC may wish to consider assessing the clarity of the state's laws and regulations regarding the privacy of energy use in relation to benchmarking of commercial buildings, and clarifying relevant customer privacy requirements as appropriate in order to facilitate benchmarking of the maximum number of buildings in the state. As part of this effort, the CPUC may wish to take a more active role in understanding the issues and potential solutions around customer privacy for benchmarking, and collaborate with the IOUs, CEC, and other stakeholders to put the necessary regulatory framework in place that would enable an optimum solution. Limitations to benchmarking imposed by privacy requirements should also be taken into account in setting utility benchmarking goals.

*Availability of data for progress tracking.* EPA promises confidentiality to users of Portfolio Manager. Thus no state-specific building score or EUI data are available from ENERGY STAR Portfolio Manager for use in tracking market and initiative progress or for any future tracking that may be associated with AB 1103. In theory, the utilities have access to score and EUI data for buildings benchmarked by utility customers that use a utility ABS. However, some utilities' promises of confidentiality in their on-line Terms and Conditions of Use for ABS severely limit both the ABS data that can be collected by these utilities and the availability of these data for evaluation purposes. As a result, there is inconsistent availability for analysis of California scores, EUI and other benchmarking data via the utilities' ABSs. The limited ABS data currently collected by some utilities could be made more useful by expanding what is collected by each utility; however, there are costs and technical challenges associated with this. The CPUC and IOUs may wish to work together to facilitate development by the IOUs of consistent Terms and Conditions of Use for ABSs that meet CPUC needs for evaluation data, and to prioritize indicators to use for tracking initiative progress and progress toward the state's broader goals for benchmarking. Whether to require utilities to revamp their ABSs or CISs to enable tracking of specific indicators across all utilities is a policy decision that the CPUC may also wish to consider.

*Quality of benchmarking data available.* A substantial percentage of the benchmark scores and EUI data that are available from the utilities contain information which are inaccurate, either because they are incomplete or because of user error, and thus they are not suitable for use in market progress or other tracking. Benchmarking a building for the first time can be a long process, and it can take weeks or months for a customer to gather and enter all the building and meter information needed to provide an accurate score or EUI reflecting all the building's attributes and energy use. However, Portfolio Manager generates a benchmark score and/or EUI as soon as a minimum amount of data is entered—whether or not complete building and meter data have been entered. There is currently no expedient way via either Portfolio Manager or the utilities' ABSs to identify those scores/EUIs that are based on complete versus partial information, unless the facility has received ENERGY STAR certification, which requires professional verification.

Technically, it should be possible to render the score and EUI data suitable for tracking and analysis. Possible solutions include a modification to Portfolio Manager by EPA, to utilities' ABSs, or to both, that would flag whether scores/EUIs are based on complete building and meter data. One way to do this might be to ask users to indicate when entry of meter and building data is complete. There may also be other viable and effective approaches. The CPUC and IOUs may wish to explore with EPA the possibility of EPA making a modification to Portfolio Manager to



indicate the completeness of meter and building data, investigate the feasibility and cost of making some such modification to the utility ABSs, or both.

Another possible solution is for the IOUs to work more pro-actively with customers to confirm the meters associated with a building and the accuracy and completeness of the facility profile. The CPUC and IOUs may wish to investigate the feasibility and cost of working more pro-actively with customers this way.

*Rates of benchmarking.* The rate at which end-user participants reported having completed benchmarking at least one building in the three years prior to the survey was 45%. The rate at which customers most likely to qualify for and readily be able to benchmark with Portfolio Manager (i.e., medium and large customers who were sole tenants of commercial buildings) that had not taken part in IOU benchmarking workshops was just 5%—similar to an estimated 3.5% rate for all commercial buildings in the state calculated by the evaluation team using data from EPA<sup>5</sup> and the California Energy Commission.<sup>6</sup>

*Opportunities to improve IOU benchmarking initiatives.* The study offers evidence that the workshops have been effective at providing participants with the information and skills to benchmark their buildings or buildings of their clients on their own. The low rate of benchmarking found among non-participants compared to participants suggests that the workshops may be quite important to encouraging California customers to benchmark with Portfolio Manager. To encourage more benchmarking, and benchmarking by a wider variety of customers, the utilities may wish to consider offering benchmarking workshops more frequently and offering more workshops tailored to specific facility types or industries.

The IOUs provide technical support for Portfolio Manager as well as for their own ABSs. The audiences for this support are not particularly computer savvy. Technical support received mixed reviews. Customer usage of technical support is likely to grow as more customers benchmark. With the possible exception of SCE, the resources for utility technical support appear to be barely adequate to meet current customer needs, and will likely need to grow as more customers benchmark.

The study found that customers are looking to benchmarking to help them identify equipment to replace or other actions to take that could help improve a building's energy use. Yet the benchmark score in itself does not provide guidance on actions that could help improve a building's energy use. The utilities may wish to give further thought to the initiative design to help customers take action after benchmarking. Some possibilities include tightening the link between the benchmarking support provided through the initiatives and utility audit or retro-commissioning programs, or developing a supplemental report to Portfolio Manager that identifies possible efficiency opportunities and relevant program information and contacts. This might be achieved with the supplemental use of a new module for the LBNL's EnergyIQ benchmarking tool or another tool. Any such exploration should be mindful of the possibility of market confusion arising from conflicting scores obtained through different tools, and of the value of the ENERGY STAR label in the eyes of customers and in the commercial building marketplace, lest it be eroded.

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<sup>5</sup> Energy Star Snapshot, "Measuring progress in the C&I sectors", released Spring, 2011. Data runs through December 31, 2010.

<sup>6</sup> Brooks, Martha. 2009. "Rating the Energy Performance of CA Commercial Buildings." Presentation made at the Committee Workshop to Discuss Draft Regulations to Implement AB 1103, August 13. Accessed February 27, 2012 from [http://www.energy.ca.gov/ab1103/documents/2009-08-13\\_workshop/presentations/Martha\\_Brook\\_Presentation.pdf](http://www.energy.ca.gov/ab1103/documents/2009-08-13_workshop/presentations/Martha_Brook_Presentation.pdf).

# 1 Introduction

## 1.1 Purpose of the Study

Important recent state and local legislation indicate that California is increasingly looking to the benchmarking of buildings as a vital tool for improving the energy efficiency of a wide variety of commercial and government buildings. For example, California Assembly Bill 1103 (AB 1103) mandates disclosure of a building's energy usage data and ENERGY STAR® Portfolio Manager (Portfolio Manager) benchmark score of the previous year to prospective buyers of a commercial building, to prospective lessees of an entire building, and to lenders financing an entire building.<sup>7</sup> San Francisco recently passed an ordinance requiring owners of commercial buildings of at least 10,000 square feet to conduct an energy audit every five years and benchmark the energy performance annually.<sup>8</sup> Decision 09-09-047 of the California Public Utility Commission (CPUC) directs the four California investor-owned utilities (IOUs) to offer support for customer benchmarking of commercial buildings and sets numerical goals for benchmarking of commercial buildings for three of the four IOUs in the 2010-2012 program cycle.<sup>9</sup>

Decision 09-09-047 states that the CPUC “enthusiastically support[s] increased attention to ‘benchmarks’ as a way to both inform and motivate building owners to undertake energy improvements.” The assumption behind the goals set forth in this Decision and other California benchmarking legislation is that by providing building owners with information about the energy use of their building(s), the owners will be motivated to undertake energy improvements and will follow through on these improvements. Previous research suggests, however, that the provision of information through benchmarking does not necessarily lead building owners to take actions to save energy in their buildings, even when offered in conjunction with a utility program.<sup>10</sup>

Given the state's focus on commercial building benchmarking, the CPUC believes it is critical to study a variety of questions related to benchmarking commercial buildings in the state in order to increase the likelihood that the IOUs' efforts in support of benchmarking will ultimately lead to energy savings, and to better understand the appropriateness of ENERGY STAR® Portfolio Manager as a tool for benchmarking California buildings.

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<sup>7</sup> California Assembly Bill 1103. Accessed December 13, 2011.

[http://www.energy.ca.gov/AB1103/documents/ab\\_1103\\_bill\\_20071012\\_chaptered.pdf](http://www.energy.ca.gov/AB1103/documents/ab_1103_bill_20071012_chaptered.pdf).

<sup>8</sup> Guevarra, Leslie. “SF Requires Energy Audits, Benchmarking for Commercial Buildings.” *Greenbiz.com*, Accessed February 10, 2011, <http://www.greenbiz.com/news/2011/02/10/sf-requires-energy-audits-benchmarking-commercial-buildings>.

<sup>9</sup> Decision 09-09-047, California Public Utilities Commission (adopted September 24, 2009). Accessed December 13, 2011. <http://docs.cpuc.ca.gov/Published/Graphics/107829.pdf>.

<sup>10</sup> Vaidya, R., Reynolds, A., Azulay, G., Barclay, D. and B. Tolkin. 2009. “ENERGY STAR® Portfolio Manager and Utility Benchmarking Programs: Effectiveness as a Conduit to Utility Energy Efficiency Programs.” In Proceedings of the 2009 International Energy Program Evaluation Conference. Accessed from <http://www.iepec.org/2009PapersTOC/papers/084.pdf#page=1>.

## 1.2 Research Goals

This study was undertaken jointly by NMR Group, Inc. and Optimal Energy, and was designed to address six broad research goals. These were to:

1. Understand and clarify the program theory and tacit assumptions on which the utility benchmarking initiatives rest.
2. Provide feedback on the appropriateness of the current and planned activities of the IOU benchmarking initiatives to meet goals set by the CPUC and increase benchmarking among the state's commercial buildings.
3. Understand the progress made toward benchmarking, especially with ENERGY STAR Portfolio Manager becoming the norm among the state's commercial building owners and facilities managers.
4. Understand if and how benchmarking leads to energy savings and identify implications of this information for the IOU initiatives.
5. Assess plans for proxy benchmarking and obtain a qualitative understanding of customer experience with and response to proxy benchmark scores.
6. Identify ways in which the IOU initiatives could be improved.

## 1.3 Research Needs and Questions

In support of the goals listed above, the evaluation team set out to answer a substantial set of research needs and questions. Over the course of the research, the evaluation team found that not all of the questions could be answered due to non-existent data, a lack of access to data, or the lack of availability of benchmark scores to the public. The research questions below are organized by whether or not the evaluation team was able to make any headway toward an answer in this study.<sup>11</sup>

## 1.4 Research Needs and Questions Addressed in the Study

- 1) Overview of benchmarking with Portfolio Manager (3.2, Overview of Benchmarking with ENERGY STAR Portfolio Manager)
  - a) Identify and catalogue the uses of Portfolio Manager (3.2.4, Uses of Portfolio Manager)
  - b) Identify and catalogue the challenges of Portfolio Manager
    - i) What are the most common problems with Portfolio Manager? (3.2.5, Challenges Associated with Portfolio Manager)
  - c) Identify and catalogue the use and potential impact of alternative benchmarking tools (3.2.9, Alternative Benchmarking Tools)
  - d) Research the importance and potential impact of ENERGY STAR labeling and rating systems on energy consumption and commercial real estate values (3.2.10, ENERGY

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<sup>11</sup> For ease of understanding and to improve the organization of this report, these have been reordered and renumbered from the original NMR and Optimal Energy Statements of Work.



- STAR Labeling & Rating Systems, Energy Consumption & Commercial Real Estate Values)
- 2) Perform evaluability assessment (6, Evaluability Assessment)
    - a) Review and assess available benchmarking data and performance metrics to answer the research questions:
      - i) What benchmarking data is available for analysis by CPUC evaluation teams? Could this be improved, and how?
      - ii) Assess what primary data should be collected to address the questions:
        - (1) What is the potential of benchmarking as a tool to track progress of building energy use intensities over time, for tracking of energy efficiency potentials, or serving as market effects indicators? What performance metrics would be useful to track for benchmarking implementation?
        - (2) In anticipation of building labeling, are there some parameters that should be gathered and tracked?
  - 3) Describe the initiatives and how they are administered and delivered, including program theory (5.1.1, Benchmarking Theory, Initiative Logic, and Initiative Goals)
  - 4) Describe the types of customers using benchmarking (5.1, Describe the Types of Customers Using Benchmarking)
    - a) Characterize the types of customers using benchmarking, and the different ways they use benchmarking
      - i) Is it a single business, a multiple store or franchise, a region or nationwide chain, a city, county or other government entity, or a property management business? Each of these entities will likely use benchmarking differently
      - ii) Property / Rental / Real Estate uses of benchmarking.
  - 5) Describe how customers are using benchmarking (5, Other Research Questions)
    - a) Describe benchmarking implementation by customers
      - i) How often are benchmark scores updated? To what extent is benchmarking a useful tool for ongoing energy efficiency tracking and management?
      - ii) Timing and uses of benchmarking services
      - iii) Is benchmarking moot after measure decision is made?
      - iv) Is the score used as a tool for tracking the actual savings from implementing measures?
  - 6) Use of internal versus external benchmarking (5.3, Use of Internal versus External Benchmarking)
    - a) What is the relative use of internal versus external benchmarking?
  - 7) Customer experiences with benchmarking participation (5.4, Customer Experiences with Benchmarking Participation)
    - a) What has been the experience, including successes, challenges and lessons learned, of the Automated Benchmarking System?

- b) What has been the experience, including successes, challenges and lessons learned, of proxy benchmarking?
- 8) Describe benchmarking participation motivations and barriers (3.2, Overview of Benchmarking with ENERGY STAR Portfolio Manager and 5.5, Describe Benchmarking Participation Motivations and Barriers)
  - a) Why do some building owners/operators decline benchmarking?
  - b) Importance of ENERGY STAR label/rating
    - i) What is the perceived importance of the ENERGY STAR Rating?
- 9) Assess the effectiveness of benchmarking at eliciting energy savings from commercial customers (5.6, Effectiveness of Benchmarking at Eliciting Energy Savings)
  - a) How effective is customer-driven benchmarking at
    - i) Encouraging participation in utility programs?
    - ii) Encouraging more comprehensive retrofits?
    - iii) Encouraging better operations and maintenance practices?
- 10) Assess the effectiveness of the benchmarking initiatives and identify opportunities for improvement (5.7, Effectiveness of Initiatives and Opportunities for Improvement)
  - a) How effective is the benchmarking support in driving customers to benchmark their buildings?
  - b) What are the successes and challenges of implementation of customer-driven benchmarking, and how could the implementation be improved?
  - c) What are the successes and challenges of implementation of utility-driven proxy benchmarking, and how could the implementation be improved?
  - d) Are there savings from benchmarking, and if so, how far should we go in trying to characterize them?

#### **1.4.1 Research Needs and Questions that Could Not be Addressed in the Study**

- 11) How effective is proxy benchmarking at
  - a) Encouraging participation in utility programs?
  - b) Encouraging more comprehensive retrofits?
  - c) Encouraging better operations and maintenance practices?
- 12) Review the algorithms for estimating savings associated with the use of Portfolio Manager
- 13) Research how customers can access benchmarking data without disclosing specific and confidential customer data
- 14) Research whether public access to benchmarking data increases program participation and energy efficiency

## 2 Research Approach

### 2.1 Review and Assessment of Initiative Materials

The evaluation team reviewed a range of documents and data to inform the assessment of the initiative administration, delivery, and participation, as well as the evaluability assessment. The review also informed development of the discussion guides for in-depth interviews and the telephone survey instruments. The documents and data reviewed included:

- Initiative support materials, including workshop presentations and marketing materials, workshop evaluation reports, and brochures and technical manuals for the utilities' Automated Benchmarking Services (utility ABSs)<sup>12</sup>;
- research related to benchmarking with ENERGY STAR® Portfolio Manager (Portfolio Manager) and relevant to the focus of this effort;
- data and performance metrics from the benchmarking initiatives and from the utilities' ABSs;
- data and performance metrics available from the benchmarking initiatives; and
- data and performance metrics available from the utilities' ABSs.

### 2.2 In-depth Interviews

The primary purpose of the in-depth interviews was to understand perspectives on and experiences with commercial building benchmarking and with the utility benchmarking initiatives. A secondary purpose was to inform the development of telephone surveys of customers, including the sample design and survey instruments. As of January 2012, the evaluation team had conducted in-depth interviews with the first five key groups listed in Table 2-1 below.

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<sup>12</sup> "Automated Benchmarking System" refers to the software system provided by the EPA that allows utilities and other Energy Service Providers (ESPs) to electronically transfer data to and from Portfolio Manager via web services. "Automated Benchmarking Service," or "ABS" or "utility ABS," refers to the system the utility or other ESP implements and offers to their customers using the EPA's Automated Benchmarking System. Utility ABSs reduce the time required by customers to benchmark, and facilitate customer monitoring of building energy use, by enabling customer energy use information to be electronically downloaded from the specific utility's database into Portfolio Manager. Since each utility's customer information system is different, each utility has developed its own custom version of ABS. EPA's Automated Benchmarking System is configured to connect with any utility or service provider's ABS.

Table 2-1: In-Depth Interviews

Completed Interviews			
Group	# of Separate Interviews Conducted	# of Individuals Interviewed*	Total Duration of Interviews in Hours
<b>Initiative Staff:</b> Personnel involved in various aspects of delivery of benchmarking initiatives (management, IT/tech support, and marketing)	7	12	21.5
<b>The US Environmental Protection Agency (EPA):</b> Representatives of ENERGY STAR Portfolio Manager	2	2	2.5
<b>Stakeholders:</b> Key benchmarking stakeholders, including CEC staff, national laboratory staff, staff supporting implementation of municipal benchmarking legislation	3	3	2.75
<b>Profiled Customers:</b> Key holders of large portfolios of commercial buildings known to be involved in benchmarking <sup>13</sup>	5	6	3.75
<b>Participant Customers:</b> Customers who have received benchmarking training/support through the benchmarking initiatives (interviewed to inform the development and refinement of telephone survey questions) <sup>14</sup>	3	3	1
<b>Total</b>	20	26	31.5

\* Some interviews were conducted jointly with multiple individuals.

## 2.3 Telephone Surveys

Two telephone surveys, one of initiative “participants” and one of “non-participants” were fielded to obtain quantitative information from a representative sample of important subgroups of customers to help answer research questions focused around “customer-driven” benchmarking.

### 2.3.1 Participant Survey

“Participants” were defined as individuals, including but not limited to utility customers, who had registered for a utility benchmarking workshop between January 1, 2010 and the date of the data request submitted to the IOUs (September 13, 2011). Workshop instructors and IOU staff were excluded from the participant group.

Respondents to the participant survey were subdivided into three user type groups. These groups were determined based on information gleaned from the interviews and on a review of the workshop registration data. Respondents were allocated to subgroups based on their responses to survey screening questions.<sup>15</sup> The subgroups were:

- End-users (owners, renters, or property managers) who have benchmarked buildings in the past three years (EB).

<sup>13</sup> Profiled customers are described in Section 2.4.

<sup>14</sup> These three in-depth interviews were conducted with the sole purpose of informing the design of the telephone survey. These interviewees were asked early versions of the telephone survey questions, and their responses were used only to inform the revision of the survey questions and the design of the survey sampling plans.

<sup>15</sup> Screening questions can be found in Appendix B.

- End-users (owners, renters, or property managers) who have NOT benchmarked buildings in the past three years (EN).
- Vendors who have benchmarked buildings for customers in the past three years (VB).

A total of 127 qualified respondents completed the participant survey out of a population of 1,884 organizations with individuals registered for utility workshops during the time period in question. The margin of error for the EB group is  $\pm 12.2\%$  at the 90% confidence level; for EN,  $\pm 12.0\%$ ; for VB,  $\pm 12.5\%$ .

The results of the participant survey are representative only of workshop participants. While workshop participation is open to all, customers receive notification of workshops based on contact information available to the utility. Customers for whom utilities have individual contact information may not be representative of all utility customers with buildings that could be benchmarked with Portfolio Manager.

### 2.3.2 Non-participant Survey

“Non-participants” were defined as current utility commercial customers who, to the utilities’ knowledge, were not registered users of any of the utilities’ ABSs<sup>16</sup> and had not participated in any of the utilities’ benchmarking workshops. Not all commercial customers are in a position to benchmark buildings using Portfolio Manager. For example, with a few exceptions, buildings smaller than 5,000 square feet cannot be benchmarked with Portfolio Manager. As described in Section 3.2.8, customer privacy requirements pose challenges to benchmarking of multi-tenant buildings. To both increase the likelihood that the customers in the non-participant group would actually be in a position to benchmark one or more buildings with Portfolio Manager and keep down survey costs, only customers who were sole tenants of a building<sup>17</sup> (either owner-occupiers or renters) and were identified in the IOU customer database as medium (i.e. with a max kW between 100 and 500) or large (i.e. with a max kW of greater than 500) commercial were eligible for selection. To ensure statewide representation, customers were selected randomly from among the databases of PG&E, SCE, and SDG&E.<sup>18</sup>

A total of 48 qualified respondents from a population of 17,781 organizations with telephone contact information completed the non-participant survey. The margin of error is  $\pm 11.9\%$  at the 90% confidence level.

For more details about the telephone survey methodology, see Appendix B.

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<sup>16</sup> Customers must register to use ABS to electronically transfer their utility energy use information into Portfolio Manager.

<sup>17</sup> As suggested by the address compared to other addresses in the database.

<sup>18</sup> Since SCE and SoCalGas provide electric and gas service, respectively, to the same customers, customers were selected from only one of these utilities’ customer databases.

## **2.4 Overview of Profiled Customers**

Five of the in-depth interviews were conducted with representatives of organizations that were identified by the IOUs as having benchmarked large portfolios of commercial buildings in California. The organizations were chosen in order to understand the perspectives of a range of building types and users of Portfolio Manager, with at least one from each utility service territory. They included a municipal government, a bank, a real estate investment trust (REIT), a federal agency, and an engineering services company. The interviewees and their organizations' use of benchmarking are described below. Observations from these customer interviews are used as illustrations in various parts of this report.

Each of the five interviewees has managerial responsibilities for benchmarking multiple commercial buildings. Four of the interviewees work directly for the owners of the properties, while one interviewee serves as a consulting chief engineer, working on-site in buildings that are owned by other companies. The interviewees' experience with benchmarking ranged from four months to over two years. The minimum number of buildings each had benchmarked was 20; the maximum was over 400. The minimum aggregate square footage was 200,000; the maximum (excluding buildings benchmarked by the consultant) was 15 million square feet. While a majority of the interviewees' building space is office space, some of these organizations are also responsible for a wide range of other space types, including industrial and recreational.

### **2.4.1 Interviewee One: Municipal Government**

Interviewee number one has worked as an energy manager for a municipal government for over two years. An assistant who helps with benchmarking also participated in the interview. While the municipal government talked to their local utility about benchmarking approximately two years ago, they started using Portfolio Manager to benchmark buildings fairly recently, in July 2011.

The municipality has 200 buildings, 80 of which have been benchmarked using Portfolio Manager. The total square footage of city-owned facilities is over 7 million square feet. The primary activities include fire stations, police stations, offices, warehouses and storage, restaurants and food services, libraries, animal care centers, vehicle repair shops, sport complexes, as well as third party run sites, such as museums and convention centers. All of the facilities are in one IOU's service territory.

### **2.4.2 Interviewee Two: Engineering Services Company**

Interviewee number two works for an engineering services company which employs chief engineers who work on location for building owners. The interviewee works as a mechanical professional engineer (PE) and has benchmarked 20 to 30 buildings. However, working with chief engineers of buildings, he has verified benchmarking for approximately 400 buildings for annual submissions to maintain ENERGY STAR certification status. He began benchmarking buildings for customers in 2009. The company services millions of square feet of facilities, with

an average of over 100,000 square feet per building. The majority of their buildings are office buildings, sometimes with residential space, and some retail buildings. Most of the firm's customers use Portfolio Manager in order to obtain or maintain ENERGY STAR status for their building(s). Some of their California customers are also benchmarking to meet the requirements of AB 1103. The interviewee uses Portfolio Manager because that is what he is instructed to use and because its use is required for ENERGY STAR certification.

#### **2.4.3 Interviewee Three: Federal Agency**

Interviewee number three is a Facility Manager System Specialist for a federal agency and works on water and energy projects as well as mandated sustainability projects. The agency started benchmarking two years ago. The interviewee's geographic area, with 20 buildings, is currently the only area in the entire agency to benchmark buildings. The federal agency has 200 buildings nationally. The twenty buildings that have been benchmarked total 200,000 square feet. Their primary use is for office space and recreation. All of the buildings are in one utility's service territory.

#### **2.4.4 Interviewee Four: REIT**

Interviewee number four is the Director of Sustainability at a commercial real estate investment trust (REIT) with 145 buildings totaling 15 million square feet of property, consisting mostly of commercial office space, industrial space, and a little restaurant space. The buildings span the service territories of multiple California utilities. The interviewee is responsible for LEED certification, recycling, energy efficiency, water efficiency and electric vehicle charging. The organization began to benchmark buildings in September 2010. According to the interviewee, a vendor tried to benchmark buildings for the REIT prior to this, but was unable to make progress. Thus far, the REIT has benchmarked 87 buildings with full energy data for all meters. Currently, all of the meters owned by the REIT have been incorporated into building benchmarks, but in some buildings tenants have their own meters and not all have shared their meter data.

#### **2.4.5 Interviewee Five: Bank**

Interviewee number five works as an Assistant Vice President in charge of environmental stewardship at a bank. The interviewee is responsible for greenhouse gas reporting, carbon footprint reporting, and using Portfolio Manager. The bank started benchmarking its high-rise buildings several years ago, while the interviewee began benchmarking bank branches two-and-a-half years ago.

The bank has 400 buildings in California, with a total of 4.7 million square feet. Three hundred fifty-seven of the bank's 400 buildings have been benchmarked to date. The primary building activities are associated with operating the retail locations of bank branches, and office buildings with data centers. The bank's facilities are located in three of the four IOUs' service territories as well as in the service territories of other smaller utility providers.



### 3 Benchmarking with Portfolio Manager

#### 3.1 Overview of Commercial Building Benchmarking

##### Summary of Key Findings in this Section

- ❖ According to ENERGY STAR, “energy use benchmarking is a process that either compares the energy use of a building or group of buildings with other similar structures or looks at how energy use varies from a baseline.”<sup>20</sup> This study focuses on benchmarking based on determining the energy use intensity (EUI) of facilities and rating such intensity relative to either a facility’s designed performance standard or to the EUI of similarly-situated facilities. ENERGY STAR Portfolio Manager is an online interactive energy management tool that allows users to track and assess energy and water consumption of their commercial building or portfolio of buildings. Portfolio Manager is designed for use by building owners or tenants, or their designated representatives. Utilities cannot benchmark buildings for customers using Portfolio Manager, they can only encourage their customers to do so.
- ❖ It appears that a substantial portion of the state’s commercial buildings—as much as 84% of buildings and 48% of commercial floor space as of 2003—do not qualify to be benchmarked with ENERGY STAR Portfolio Manager.

This overview of benchmarking of commercial buildings is based on a review of key benchmarking literature,<sup>19</sup> benchmarking tool documentation, information provided by the IOUs in response to data requests, in-depth interviews, and telephone survey data.

##### 3.1.1 Operational Rating Versus Asset Rating Tools

According to ENERGY STAR, “energy use benchmarking is a process that either compares the energy use of a building or group of buildings with other similar structures or looks at how energy use varies from a baseline.”<sup>20</sup> This study focuses on benchmarking based on determining the energy use intensity<sup>21</sup> (EUI) of facilities and rating such intensity relative to either a facility’s designed performance standard or to the EUI of similarly-situated facilities. To make comparisons meaningful, benchmarking tools normalize a number of critical factors that drive energy consumption. These factors include but are not limited to local climate conditions, occupancy, hours of operation, age of structures, plug loads and others. Methodologies for assessing and rating energy efficiency can take multiple forms. Although terminologies vary, ratings typically fall into two categories: (1) operational rating tools, which are based on the energy consumed during the operation of a building, and (2) asset rating tools, which are based on the hard assets in a building, such as particular types of equipment.

<sup>19</sup> For a listing of literature reviewed, see Appendix A.

<sup>20</sup> ENERGY STAR. 2008. ENERGY STAR® Building Manual. April 2008. Accessed March 20, 2011 from [http://www.energystar.gov/index.cfm?c=business.EPA BUM\\_CH2\\_Benchmarking](http://www.energystar.gov/index.cfm?c=business.EPA BUM_CH2_Benchmarking).

<sup>21</sup> According to the U.S. EPA, “EUI, or energy use intensity, is a unit of measurement that describes a building’s energy use. EUI represents the energy consumed by a building relative to its size.” (U.S. EPA. “What is EUI?” Accessed April 11, 2012 from <http://www.energystar.gov/index.cfm?fuseaction=buildingcontest.eui>.)



### **3.1.1.1 Asset Ratings**

Asset ratings assess the theoretical energy performance of the physical envelope and major systems of a facility under standard conditions, using energy modeling software and diagnostic tests. Under this rating system, a facility's energy use is estimated and then compared to the projected energy efficiency of a reference building based on observed architectural and building systems characteristics. Most asset ratings are generated using complex software tools, but ratings could also be generated through energy audits and on-site testing to estimate energy performance. Unlike operational ratings, asset ratings can provide information about specific equipment or areas of a building that could help improve building energy use. The proposed California Building Energy Asset Rating System (BEARS) tool, which is currently under development, is an example of an asset rating benchmarking tool. Other examples include EPA's Target finder tool that enables architects and building owners to set energy consumption targets needed to receive an EPA energy performance score during the building design phase.<sup>22</sup> The Home Energy Rating System (HERS) is an example of a residential asset rating tool.<sup>23</sup>

### **3.1.1.2 Operational Ratings**

Operational ratings use a combination of basic information about a building and 12 months of energy consumption data to determine a building's EUI at a particular point in time and, where available, to rate the building's energy efficiency against similar types of buildings in a state or nation. Operational rating systems provide an indication of actual energy use and account for factors such as hours of use, occupancy, plug loads, maintenance of equipment and other behavioral factors. Operational rating tools typically do not provide enough information to help identify specific improvements needed in a particular building. However, they can help those responsible for multiple buildings to pinpoint specific buildings in a portfolio of buildings for further investigation. Operational tools typically do not require a site visit, which is normally required for asset rating tools. ENERGY STAR Portfolio Manager is an operational rating benchmarking tool.<sup>24</sup><sup>25</sup> Another example of an operational benchmarking tool is ASHRAE's Building Energy Quotient (BEQ) tool.<sup>26</sup>

This study focuses on operational benchmarking with ENERGY STAR Portfolio Manager.

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<sup>22</sup> See [http://www.energystar.gov/index.cfm?c=new\\_bldg\\_design.bus\\_target\\_finder](http://www.energystar.gov/index.cfm?c=new_bldg_design.bus_target_finder)

<sup>23</sup> Dunskey, Phillipe, Jeff Lindberg, Eminé Piyalé-Sheard and Richard Faesy. 2009. "Valuing Building Energy Efficiency Through Disclosure And Upgrade Policies: A Roadmap For The Northeast U.S." November. A Dunskey Energy Consulting report in collaboration with Vermont Energy Investment Corporation for Northeast Energy Efficiency Partnerships. Accessed January 14, 2012 from [http://neep.org/uploads/policy/NEEP\\_BER\\_Report\\_12.14.09.pdf](http://neep.org/uploads/policy/NEEP_BER_Report_12.14.09.pdf).

<sup>24</sup> Lissauskas, Sara. 2012. "Building Energy Rating Systems: Operational Ratings." Presentation made at AESP-NEEC Annual Conference, Westborough, MA, November 1.

<sup>25</sup> Sarno, Carolyn. 2012. "Building Energy Rating." Presentation made at AESP-NEEC Annual Conference, Westborough, MA, November 1.

<sup>26</sup> See; <http://www.buildingeq.com/>

### 3.2 Overview of Benchmarking with ENERGY STAR Portfolio Manager

ENERGY STAR Portfolio Manager (Portfolio Manager) is an online interactive energy management tool that allows users to track and assess energy and water consumption of their commercial building or portfolio of buildings. The tool helps facility owners and operators to identify under-performing buildings relative to peer buildings, prioritize buildings for energy efficiency investment, track energy improvements, and obtain EPA recognition for superior energy performance of buildings. To help facility owners and operators assess the energy performance of buildings, Portfolio Manager rates qualified buildings on a scale of 1 to 100. A score of 75 means that the energy performance of a user's building is better than 75 percent of all similar buildings nationwide.<sup>27</sup> Buildings that are unable to receive a score can obtain a measure of energy use intensity, or EUI.

EPA representatives interviewed for this study described their perspective on the role of benchmarking with Portfolio Manager. The theory behind Portfolio Manager is that by providing decision-makers with an understanding of how the whole building consumes energy and delivers services, and how it compares to similar buildings across the nation, to other buildings owned by the same owner, or both, they will be more likely to (1) pursue energy efficiency opportunities and (2) choose the most comprehensive and cost-effective approach to energy efficiency. To this end, Portfolio Manager provides a foundation for the pursuit of comprehensive building energy efficiency and a portal to program offerings to help users in this pursuit. As the IOUs are local program administrators, EPA sees their role as offering connections between IOU customers, Portfolio Manager, and IOU program offerings.

Building types eligible to for the Portfolio Manager 1-to-100 rating system currently include:

- Offices
- Banks/Financial Institutions
- Courthouses
- Data Centers
- Hospitals (General Medical and Surgical)
- Hotels
- Houses of Worship
- K–12 Schools
- Medical Offices
- Municipal Wastewater Treatment Plants
- Residence Halls/Dormitories
- Retail Stores
- Senior Care Facilities
- Supermarkets

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<sup>27</sup> See [http://www.energystar.gov/index.cfm?c=evaluate\\_performance.bus\\_portfoliomanager](http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager).

- Warehouses (refrigerated and non-refrigerated)

EPA has recently modified Portfolio Manager to allow users to enter building types that are not currently eligible for a percentile score, including multi-family properties, auto dealers, and many municipal facilities. Mixed use facilities are supported as well.

According to the EPA, 7,561 California buildings were benchmarked as of October 31, 2011. Cumulatively, 18,266 California buildings have been scored using Portfolio Manager as of December 31, 2010, an increase of 45% from 2009. Of the California buildings scored, 2,328 (13%) are ENERGY STAR certified, which requires an on-site review by a professional engineer or registered architect.<sup>28</sup>

Buildings that are unable to obtain a score are typically small or have other less common parameters—and as described below they appear to represent a substantial portion of commercial buildings in the state. Examples of less common parameters include buildings that:

- Are 5,000 square feet in area or smaller. According to an estimate based on 2003 CEUS data, 68% of California commercial buildings are less than 5,000 square feet (or less than 1,000 square feet in the case of banks and Houses of Worship).<sup>29</sup>
- Generally have operating hours of 30 hours per week or less.

Altogether, 2003 CEUS data indicate that as of that date, 84% of California commercial buildings did not qualify to be rated using ENERGY STAR Portfolio Manager. This translates into 48% of the floor area of the state's commercial buildings as of 2003.<sup>29</sup> While ENERGY STAR Portfolio Manager may have somewhat expanded the variety of buildings that can receive a 1-to-100 score with this software since these figures were calculated, since the square footage requirements are unchanged it is unlikely that this percentage is much lower today.

When applying for the ENERGY STAR label, which requires benchmarking with Portfolio Manager, buildings must meet the following occupancy requirements:

- Offices must have more than 50% average annual occupancy.
- Hotels must have at least 55% average annual occupancy (i.e. less than 45% vacancy).
- K-12 Schools must operate for at least 8 months of the year.
- Residence halls/Dormitories must contain at least 5 rooms.
- Houses of Worship must have at least 25 seats and no more than 4,000 seats.
- Senior Care Facilities cannot have an Average Number of Residents that exceeds the Resident Capacity.
- Municipal Wastewater Treatment Plants must have:
  - Average daily wastewater flow greater than 0.6 million gallons per day (MGD).

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<sup>28</sup> Energy Star Snapshot, "Measuring progress in the C&I sectors", released Spring, 2011. Data runs through December 31, 2010.

<sup>29</sup> Brooks, Martha. 2009. "Rating the Energy Performance of CA Commercial Buildings." Presentation made at the Committee Workshop to Discuss Draft Regulations to Implement AB 1103, August 13. Accessed February 27, 2012 from [http://www.energy.ca.gov/ab1103/documents/2009-08-13\\_workshop/presentations/Martha\\_Brook\\_Presentation.pdf](http://www.energy.ca.gov/ab1103/documents/2009-08-13_workshop/presentations/Martha_Brook_Presentation.pdf).

- Average influent biological oxygen demand (BOD5) level greater than 30 and less than 1000.
- Average effluent BOD5 level greater than 0.

For a complete list of minimum operating characteristics, see

[http://www.energystar.gov/index.cfm?c=eligibility.bus\\_portfoliomanager\\_eligibility](http://www.energystar.gov/index.cfm?c=eligibility.bus_portfoliomanager_eligibility).

### 3.2.1 Who Can Benchmark? “Customer-driven” Benchmarking with Portfolio Manager

Portfolio Manager is designed for use by building owners, tenants, or their designated representatives. Designated representatives may include third-party bill aggregators, such as Advantage IQ, property management firms, or engineering firms, all of whom have customer authorization to benchmark on their behalf and have access to the necessary customer data to do so. Utilities, however, do not have this authorization or access to information and thus are not in a position to benchmark customers’ buildings with Portfolio Manager. The reasons for this include Portfolio Manager’s provision of confidentiality to users, and its need for detailed information about the building and building operations that can only be obtained from the customer or tenants. (For example, to provide a benchmark score, Portfolio Manager requires that users input information on the various uses to which a building is put, the square footage, and information specific to each building type, such as the number of employees, the operating hours, the number of hotel rooms, hospital beds, or seats, etc.)

Because of this, utilities can only *encourage* their customers to benchmark their buildings with Portfolio Manager and assist them by automating the upload of energy usage data into Portfolio Manager. Short of making benchmarking a requirement to participate in commercial programs—which is the approach currently taken by SDG&E—utilities cannot force customers to benchmark. In no case can they use Portfolio Manager to benchmark on behalf of a customer. It is for this reason that the IOUs refer to benchmarking with Portfolio Manager as “customer-driven benchmarking.”

### 3.2.2 Entering Data Into Portfolio Manager

Portfolio Manager offers four ways for users to enter data about buildings and building energy use. These are:

- 1) *Single building manual entry*. Users manually enter building parameters, such as square footage and hours of use, as well as monthly energy consumption data, one building at a time.
- 2) *Bulk data upload using Building Import Templates*. Users upload building parameters and monthly energy consumption data for 10 or more buildings of the same type at a time using an Excel template from Portfolio Manager.

- 3) *Bulk data upload – Update Multiple Meter Entries Template.* Users upload monthly energy consumption data for multiple meters and meter entries at the same time using an Excel template from Portfolio Manager.
- 4) *Automated Benchmarking System.* Automated Benchmarking System refers to the software system provided by the EPA that allows utilities and other Energy Service Providers (ESPs) to electronically transfer data to and from Portfolio Manager via web services.
- 5) *Automated Benchmarking Services (ABS).* Automated Benchmarking Services, or ABS, refers to the software system the utility or other Energy Service Provider (ESP)<sup>30</sup> implements and offers to their customers using the EPA's Automated Benchmarking System. Utility and ESP ABSs reduce the time required by customers to benchmark, and facilitate customer monitoring of building energy use, by enabling customer energy use information to be electronically downloaded from the specific utility or ESP's database into Portfolio Manager. Since each utility or ESP's customer information system and use of ABS is different, each must develop its own custom implementation version of ABS. This is what the IOUs have done. These organizations' ABSs cannot plug directly into Portfolio Manager; however, the EPA provides XML-based Web Services (the Automated Benchmarking System) that allow exchange of building and energy consumption data with Portfolio Manager. Throughout this report "ABS" refers to the IOUs' Automated Benchmarking Services; "Automated Benchmarking System" or "EPA's ABS" refers to the Automated Benchmarking System developed by the EPA that makes it possible for the utilities and other service providers to electronically transfer customer energy use data to Portfolio Manager.

Because customers enroll in their utility's ABS via Portfolio Manager, they may not always be aware that they are using the utility's ABS as well as Portfolio Manager.

- a. *Non-utility energy service provider-based Automated Benchmarking Services (ABS).* For users working with energy service providers such as Advantage IQ and Siemens, these organizations' versions of ABS allow the energy service providers to integrate benchmarking into the software or reporting that the companies' customers routinely use for planning, tracking, and managing energy costs. These companies typically manage the entire facility profile for the customer, not just the energy meters.
- b. *Utility-based Automated Benchmarking Services (ABS).* For users who are billed directly by utilities such as PG&E, SCE, SDG&E or SoCalGas, the utility versions of ABS allow the users to upload monthly energy consumption data for each meter from the utility into Portfolio Manager. Users can log in to Portfolio Manager to check the

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<sup>30</sup> Examples of non-utility energy service providers include AdvantageIQ and Siemens, who provide billing as well as energy management services for commercial building owners.

building benchmark score or EUI, which will be updated automatically each month with utility energy consumption data with no further action on the part of the user.<sup>31</sup>

### 3.2.3 Steps in Benchmarking with Portfolio Manager

While this report is not intended to be an exhaustive explanation of how Portfolio Manager computes a rating, the basic steps used to do so include the following:<sup>32</sup>

1. Users enter building data into Portfolio Manager, including energy consumption and specific operational parameters. Important parameters include building type, size, location, hours of operation, occupancy, percent of floor space heated/cooled, number of PCs, servers and other plug load devices.
  - a. These parameters are independent variables in the Portfolio Manager regression model.
2. Portfolio Manager computes an actual Source Energy Use Intensity from the metered energy data.
  - a. Source EUI is the sum of source energy across all meters in the building divided by the gross floor area.
3. Portfolio Manager computes a *predicted* Source Energy Intensity.
  - a. Predicted Source EUI is computed using a regression equation for the specific building types. For each building type noted above, Portfolio Manager conducts linear regressions on Commercial Buildings Energy Consumption Survey (CBECS) data to examine the operating characteristics of similar buildings in CBECS and compares them to the subject building. Note that buildings being benchmarked with Portfolio Manager are *not* compared to other buildings that have been entered into and benchmarked with Portfolio Manager.
  - b. For each operating parameter entered by the user, the centered value is computed. The centered value is the difference between the user-entered value and the median value<sup>33</sup> contained in the CBECS population.
  - c. The terms in the regression equation are summed to yield a predicted source EUI. The prediction reflects the expected energy use for the building, given its specific operational constraints.
4. Portfolio Manager computes an energy efficiency ratio. The energy efficiency ratio is:
  - a. Actual Source EUI / Predicted Source EUI.

<sup>31</sup> “Service Providers Offer Automated Benchmarking,” accessed December 2, 2011, [http://www.energystar.gov/index.cfm?c=spp\\_res.pt\\_spps\\_automated\\_benchmarking](http://www.energystar.gov/index.cfm?c=spp_res.pt_spps_automated_benchmarking) and interview with EPA staff, November 22, 2011.

<sup>32</sup> Based on “ENERGY STAR® Performance Ratings Technical Methodology.” Accessed March 22, 2012 from [http://www.energystar.gov/ia/business/evaluate\\_performance/General\\_Overview\\_tech\\_methodology.pdf](http://www.energystar.gov/ia/business/evaluate_performance/General_Overview_tech_methodology.pdf).

<sup>33</sup> Effective 11/7/2011. See Email correspondence 9/13/2011. Previously, Portfolio Manager used the mean value for this purpose.

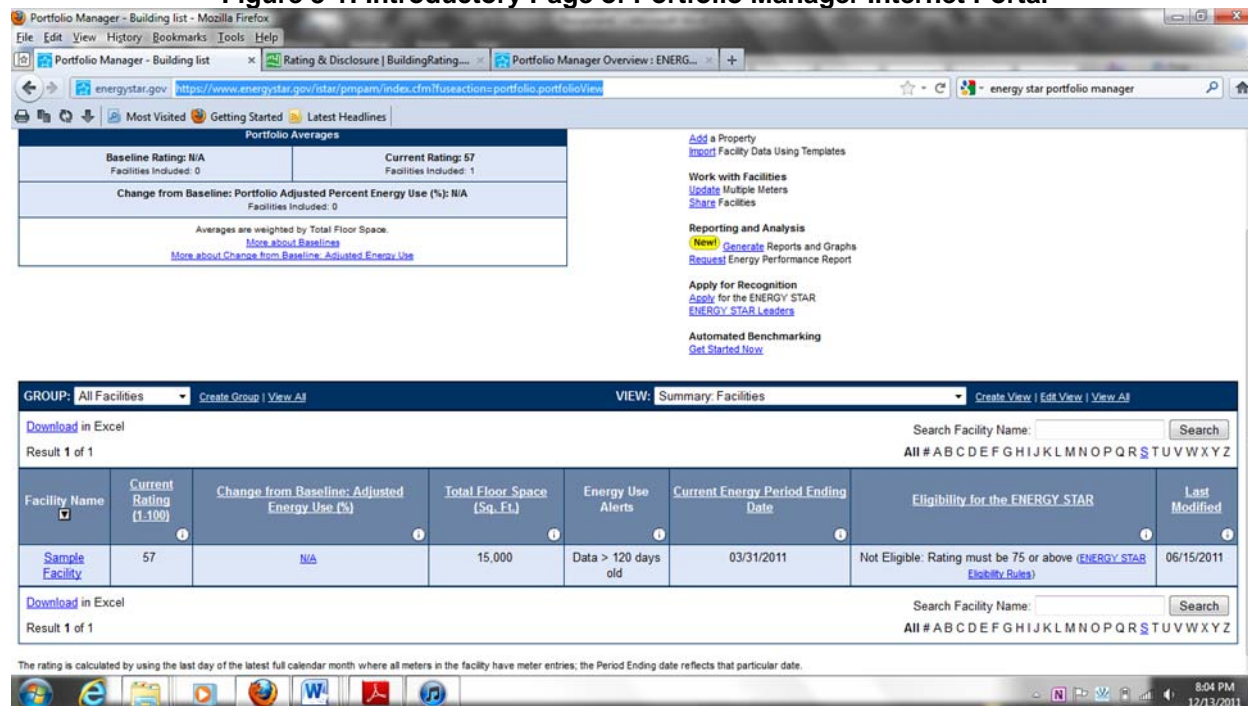


- b. The energy efficiency ratio reflects how much energy a building uses relative to its predicted energy use. A lower ratio indicates that a building uses less energy; a higher ratio indicates higher energy usage.
5. Portfolio Manager compares the efficiency ratio to a Lookup Table that maps each energy efficiency ratio to a cumulative percent in the population. The lookup table identifies whether the energy efficiency ratio for a building is bigger or smaller than the ratios of similar buildings. The lookup table returns a rating on a scale of 1-to-100.

Note that buildings being benchmarked with Portfolio Manager are *not* compared to other buildings that have been entered into and benchmarked with Portfolio Manager. If users have entered partial information about their facility or want to add facilities, registered users access their Portfolio Manager account through the following internet portal (<https://www.energystar.gov/istar/pmpamindex.cfm?fuseaction=portfolio.portfolioView>).

Introductory pages of this web site, shown in Figure 3-1, provide general information about existing facilities. For example, the start page provides baseline ratings and current ratings for a portfolio of facilities as well as current ratings of individual facilities. This feature allows users to track performance over time.

**Figure 3-1: Introductory Page of Portfolio Manager Internet Portal**



Both new and returning users can access step-by-step instructions to enter facility data. As customers “step” through the pages of Portfolio Manager, instruction prompts describe the type of information needed to obtain a score and where the information needs to be entered into Portfolio Manager. As shown in Figure 3-2, when adding a new facility to Portfolio Manager, for example, users check off the following:

Figure 3-2: Example of Instruction Prompts in Portfolio Manager

**Portfolio Manager - Mozilla Firefox**

File Edit View History Bookmarks Tools Help

Portfolio Manager x Rating & Disclosure | BuildingRating... Portfolio Manager Overview : ENERG...

energystar.gov https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=portfolio.showAddProperty

Most Visited Getting Started Latest Headlines

**PORTFOLIO MANAGER**

ACCOUNT INFORMATION CONTACTS FREQUENTLY ASKED QUESTIONS CONTACT US HELP LOGOUT

Home > My Portfolio > Add a Property

**Add a Property**

**Property Type**

What kind of property would you like to add?

- ☐ A single facility for which my organization owns or manages 90% or more of the floor area. (e.g. entire office building, entire K-12 school, entire hotel, entire senior care community)
- ☐ A portion of a single facility for which my organization owns or manages less than 90% of the floor area.
- ☐ A hospital composed of a single facility or collection of facilities.
- ☐ A municipal wastewater treatment plant or water treatment and distribution utility
- ☐ A campus or other collection of multiple facilities at the same geographic location. [What is this?](#)

CANCEL CONTINUE

https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=mfm.showMain

8:30 PM 12/13/2011

This process continues until all of the required data has been satisfactorily entered. When users believe they have satisfactorily entered all the pertinent information, users submit a request for a score. At this point, Portfolio Manager generates an operational score as briefly described above, as well as other benchmarking metrics. Note that Portfolio Manager does not verify information for accuracy, nor does it verify whether all meters for a facility have been entered and whether they have been entered correctly. However, there are a number of both building and meter-level alerts that indicate potential errors and may prevent the user from obtaining a score.

Not all buildings that can be benchmarked in Portfolio Manager will obtain a score. Portfolio Manager requires that users enter a minimum amount of data, and that data adheres to specific parameters, before a building qualifies to receive a score. Complete data are not always available for every building. Nonetheless, all users receive weather normalized and non-weather normalized Energy Use Intensity (EUI) values (kbtu/square foot) and annual energy consumption (kbtu) for their building regardless of whether their building qualifies to obtain a score. Users who get an EUI but not a score for their building still count as having benchmarked the building, because they can compare their building's EUI to that of a similar building type.

Additional information regarding the statistical methodology used by Portfolio Manager can be found at:

[http://www.energystar.gov/ia/business/evaluate\\_performance/General\\_Overview\\_tech\\_methodology.pdf](http://www.energystar.gov/ia/business/evaluate_performance/General_Overview_tech_methodology.pdf) and [http://www.energystar.gov/index.cfm?c=evaluate\\_performance.bus\\_portfoliomanager\\_model\\_tech\\_desc](http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_model_tech_desc) at



### 3.2.4 Uses of Portfolio Manager

#### Summary of Key Findings in this Section

- ❖ *Identified reasons why customers might want to benchmark are:*
  - *To comply with local or state disclosure regulations mandating scheduled disclosures, such as the San Francisco Existing Building Energy Performance Ordinance, and triggered disclosures such as AB 1103.*
  - *To satisfy voluntary disclosure programs, such as obtaining a green building label, through ENERGY STAR or LEED certification.*
  - *To enable participation in utility energy efficiency programs or obtain a rebate.*
  - *To save energy.*
  - *To obtain value from ongoing tracking and monitoring.*
  - *In response to corporate environmental policy.*
  - *To realize higher occupancy rates, higher lease rates, and increases in building asset values.*
  - *To identify energy efficiency measures.*
  - *To help determine if buildings' energy bills can be reduced.*
  - *To improve profitability.*
  - *To enhance the building owner's or tenant's "green" image for marketing or PR purposes.*
- ❖ *Results from closed-ended questions suggest that voluntary disclosures (66%), triggered disclosures (43%), and qualifying for an energy efficiency program or rebate (40%) were important reasons that participants benchmarked. Results from open-ended questions suggest that saving energy (18%), obtaining value from on-going tracking and monitoring (14%), and complying with corporate environmental policy (11%) were also important drivers for this group.*
- ❖ *The most common use of Portfolio Manager reported by the IOUs is to raise awareness about energy efficiency opportunities by providing customers with a performance score relative to other similar buildings nationwide. Another important use is for meeting the goals for buildings to be benchmarked within the utility service territories.*

#### 3.2.4.1 Customers' Perspective

Among the questions this study seeks to answer is why customers use Portfolio Manager. The literature review suggests that there are three primary, externally driven reasons that customers use Portfolio Manager: "triggered," "scheduled," and "voluntary" benchmarking. These are listed in detail below.

- **Scheduled disclosures:** An example of a scheduled disclosure is the San Francisco Existing Commercial Building Energy Performance Ordinance, which mandates disclosure of building benchmarking data on an annual basis.
- **Triggered disclosures:** A triggered disclosure is "triggered" by a building event; AB 1103 is an example of a triggered disclosure, as it requires disclosure at the point of a whole building lease, sale, or re-finance. In California some buildings owners are benchmarking buildings in anticipation of state law or local ordinances requiring triggered disclosures.

- Voluntary disclosures: ENERGY STAR and LEED are examples of voluntary disclosure programs, in which the building owner/operator is disclosing information as part of a program to gain recognition for high performing buildings.

The interviews and surveys conducted for the study yielded some additional reasons why customers might want to benchmark voluntarily:

- To enable participation in utility energy efficiency programs or obtain a rebate. (Benchmarking with Portfolio Manager is currently a requirement for SDG&E Commercial program participation.)
- To save energy.
- To obtain value from ongoing tracking and monitoring.
- In response to corporate environmental policy (i.e., carbon reduction initiatives and/or energy savings goals). In the PG&E service area, for example, 516 customers (out of 2630 Portfolio Manager workshop registrants) indicated on their workshop evaluation forms that their employers were actively pursuing at least one environmental goal.
- To realize higher occupancy rates, higher lease rates, and increases in building asset values. (This reason is related to green building labeling programs, which are reported to have resulted in higher lease and occupancy rates and enhanced building asset values.)
- To identify energy efficiency measures.
- To help determine if buildings' energy bills can be reduced.
- To improve profitability.
- To enhance the building owner's or tenant's "green" image for marketing or PR purposes.

The telephone survey sought to measure the rate at which the sampled populations benchmarked for these reasons, and to identify additional reasons for benchmarking. Table 3-1 shows the frequency with which these and other reasons were offered in the telephone survey in response to open-ended and closed-ended questions. The frequency with which each reason is offered varies depending on whether the reasons were in response to closed-ended questions or to open-ended questions that were later coded and categorized. Results from the closed-ended questions<sup>34</sup> suggest that voluntary disclosures (i.e., to qualify for ENERGY STAR or LEED certification) (66%), triggered disclosures (AB 1103)(43%), and qualifying for an energy efficiency program or rebate (40%) were among the most important reasons that participants benchmarked. However, when asked what aspects of benchmarking most interested their organizations, participants who had benchmarked gave open-ended answers that suggest that saving energy (18%), obtaining value from on-going tracking and monitoring (14%), and complying with corporate environmental policy (11%) were also important drivers of benchmarking for this group.

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<sup>34</sup> The closed-ended survey questions were V1c, V1d and V1e. A full listing of answers for each can be found in Appendix A. Note that since the table above is based on a regrouping of coded answers to these questions, the answer categories in Appendix A will not match those in Table 3-1 in all cases.

**Table 3-1: Uses/Reasons for Benchmarking\***

	EB		EN		
	Open-ended	Closed-ended	Open-ended		
Voluntary disclosures	18% <sup>θ</sup>	66%	9%		
Triggered disclosures (AB 1103)	3%	43%	--		
To enable participation in utility energy efficiency programs/qualify for a rebate	7% <sup>θ</sup>	40%	8%		
To save energy	18% <sup>θ</sup>		20%		
To obtain value from ongoing tracking and monitoring.	14% <sup>θ</sup>		10%		
In response to corporate environmental policy	11% <sup>ζ</sup>		--		
To realize higher occupancy rates, higher lease rates, and increases in building asset values	7% <sup>ζ</sup>		--		
To identify energy efficiency measures	3%		2%		
To help determine if buildings' energy bills can be reduced	5%		4%		
To improve profitability	1%		6%		
To enhance the building owner's or tenant's "Green" image for marketing or PR purposes	1%		--		

<sup>ζ</sup> Significantly different from EN at the 90% confidence level.

<sup>θ</sup> Significantly different from non-participants who did not benchmark at the 90% confidence level.

\* For more information, see Table B-18.

The experiences of profiled customers offer illustrations of some of the drivers listed above. The municipal government interviewee noted that their organization started using Portfolio Manager for benchmarking in order to prioritize buildings for audits by their local utility. The organization had an energy efficiency block grant and the use of Portfolio Manager was promoted by the grant program. Both the AB 1103 requirements and the municipality's own long term goals drive the use of benchmarking:

*What is really driving what we're doing are our green vision goals . . . [the] goal to reduce energy usage by 50% by 2022 . . . [and] 100 percent renewable energy for the remaining energy we use by 2022.*

The engineering services vendor noted that one of his customers with a larger portfolio (48 buildings) signed on to the Building Owners and Managers Association's "7-Point Challenge" in pursuit of their goal of a ten percent energy improvement each year. In this interviewee's experience, however, this customer was an exception: most clients benchmark to achieve certification and then forget about it. The interviewee noted that benchmarking required by AB 1103 is driven by financial activity—when a building is sold, benchmarking plays a role.

The federal agency interviewee noted that the agency had set goals for benchmarking. A short-term goal for benchmarking is to obtain ENERGY STAR certification for a building and publicize it. They accomplished that in 2011 and it was "a great PR thing." The medium-term goal is to keep updating the scores with ABS, understand the data, and identify payoffs for energy efficiency improvements. The long-term goal is to work with Washington to educate

others and roll benchmarking out to other areas of the agency. In this interviewee's view, an important benefit of benchmarking is that it helps justify requests for financial support for energy conservation projects.

The bank's short term objective was to get all buildings benchmarked. The medium term objective was to see how well each building performed compared to others, and the long term objective was to get buildings to the level needed for ENERGY STAR certification. The bank is "very committed" to the benchmarking process and was motivated to benchmark because of the knowledge that it provides information in terms of how the buildings are doing and identifies buildings that are performing poorly. ENERGY STAR certification was a particularly important motivator for the bank to benchmark its buildings.

### 3.2.4.2 California Utility Perspective

Table 3-2 below shows a comparison of the various uses of Portfolio Manager as reported by the California IOUs.

**Table 3-2: Uses of Portfolio Manager From the California IOUs' Perspective**

Use of Portfolio Manager from the California IOU's perspective	Literature Review <sup>35</sup>	PG&E	SCE	SCGas	SDG&E
Market Transformation tool (Education & build customer awareness)	XX	XX <sup>36</sup>	XX		XX <sup>37</sup>
Energy assessment and comparative analysis	XX	XX	XX	XX	XX
Help customers to obtain ES & LEED certification <sup>38</sup>	XX	XX	XX		
Integrate into program offerings		XX <sup>39</sup>	See Note <sup>40</sup>	XX <sup>41</sup>	XX
Motivate customers to improve energy performance of building	XX	XX	XX		
Assist customers to comply with legislation and city ordinances		XX	XX		
"Set goals and energy baselines, track [customer's] building performance over time"	XX	XX	XX		
"To benchmark Commercial buildings" <sup>42</sup>				XX	XX

As Table 3-2 demonstrates, the California IOUs use Portfolio Manager for a variety of reasons. Most commonly the IOUs report using Portfolio Manager to raise awareness about energy

<sup>35</sup> Review of Industry White papers – See Appendix.

<sup>36</sup> PG&E IR 028\_Benchmarking summary.

<sup>37</sup> See SDG&E IR#2

<sup>38</sup> See California IOU's data request response #8

<sup>39</sup> Although not mandatory, customers are encouraged to benchmark facilities. Portfolio Manager/ABS is a prominent feature of LGP programs

<sup>40</sup> Integration of BM into CEI and RCx programs under development.

<sup>41</sup> CEI program only, SCG IR#2, see 2010 PIP embedded.

<sup>42</sup> SCG IR #8

efficiency opportunities by providing customers with a performance score relative to other similar buildings nationwide. Another, perhaps more important, reason not explicitly mentioned by the IOUs, but alluded to in interviews with IOU initiative staff, was to meet the benchmarking goals set by the CPUC (i.e., PG&E and SCE are each required to benchmark 50,000 buildings, and SDG&E is required to benchmark 20,000 buildings, by the end of 2012).<sup>43</sup>

### 3.2.5 Benefits Associated with Portfolio Manager

Interviewees noted some valuable positive attributes of Portfolio Manager. These include:

- Portfolio Manager offers a reasonable balance between the rigor of the tool versus the ease of data input. For example, for an office building, it requires about six pieces of user-supplied data plus utility data. This facilitates quick feedback. ABS additionally allows for information to be automatically uploaded and updated.
- Everyone can relate to a 1-100 score.
- Portfolio Manager is readily available, it costs nothing to use, and it enjoys widespread, voluntary adoption by the market.
- It is questionable whether the other operational or asset rating tools, such as those described in Section 3.2.9, can be scaled to the level of use of Portfolio Manager, which provides support for hundreds of thousands of customers.
- The ENERGY STAR brand has national recognition and credibility. This gives it value and great potential for spillover effects.

### 3.2.6 Challenges Associated with Portfolio Manager

#### Summary of Key Findings in this Section

- ❖ *Top challenges associated with Portfolio Manager from the customer perspective were: (1) collecting all the data required and (2) getting the data entered into and accepted for use by Portfolio Manager. Other challenges identified include:*
  - *Data gathering is time consuming.*
  - *Data not readily accessible or known, with customers often unaware of how many meters are associated with their location, or of the identifier(s) used to authorize the meter.*
  - *Lack of time to continue benchmarking facilities over time.*
  - *Cost to collect information and continue monitoring energy performance.*
  - *Lack of confidence that savings will materialize and energy efficiency investment will satisfy payback criteria.*
  - *Portfolio Manager software was confusing or difficult to use.*
- ❖ *From the IOU perspective, the top challenges are:*

<sup>43</sup> Decision 09-09-047, California Public Utilities Commission (adopted September 24, 2009). Accessed December 13, 2011. <http://docs.cpuc.ca.gov/Published/Graphics/107829.pdf>.

- *Limited flexibility to address unique characteristics of buildings.*
  - *Impediments to obtaining an accurate score, including requiring a high level of attention to detail and accurate input by customers using the tool; difficulties benchmarking buildings with multiple addresses, such as high-rises and condominiums; and lack of compatibility with utility customer information systems.*
  - *Customers lack familiarity with Portfolio Manager and the interface is not very usable.*
  - *Customer confusion with regard to space attributes.*
  - *Applicability to California.*
  - *Customer confidentiality promised by EPA.*
  - *Limited building types.*
  - *Does not identify areas for improvement.*
  - *Scores are vulnerable to gaming.*
- ❖ *Although Portfolio Manager does have a number of limitations with respect to selecting similarly situated buildings in California, the screening process does provide building owners and tenants with important information over time*

The review of the literature suggests that the top challenges associated with Portfolio Manager from the customer or user perspective are (1) collecting all the data required and (2) getting the data entered into and accepted for use by Portfolio Manager.

Other challenges associated with the use of Portfolio Manager from the customer's perspective that were identified through the literature review include the following:<sup>44</sup>

- Data gathering is time consuming;
- Data not readily accessible or known, with customers often unaware of how many meters are associated with their location, or of the name or number of the meter;
- Lack of time to continue benchmarking facilities over time;
- Cost to collect information and continue monitoring energy performance;
- Lack of confidence that savings will materialize and energy efficiency investment will satisfy payback criteria; and
- Portfolio Manager software was confusing, difficult to use.

In response to data requests, the IOUs provided a listing of challenges to—and issues with—the use of Portfolio Manager from their perspective, shown in Table 3-3.

**Table 3-3: Reported Challenges to Use of Portfolio Manager from IOUs' Perspective**

Challenges	PG&E	SCE	SCGas	SDG&E
Limited flexibility	X			
Accuracy	X			
Unfamiliarity with Portfolio Manager			X	X

<sup>44</sup> See list of documents reviewed (Appendix A).

User confusion with regard to space attributes <sup>45</sup>	X	X		
Applicability to California		X		
Customer confidentiality		X		
Limited building types		X		

Interviews with initiative staff and with stakeholders provide insight into the nature of some of these challenges and revealed some additional issues.

### Limited flexibility

- Portfolio Manager is not the only tool that could be improved by better addressing the unique characteristics of buildings. However, this specialization would require users to enter more data. Benchmarking data collection forms cannot both be simpler and address everything.

### Accuracy

- Inputting accurate information to benchmark a building with ABS, Portfolio Manager or any other benchmarking tool can require a high level of attention to detail from the customer. It is not uncommon for there to be 20 or more different electric and gas services for one commercial account number. For a customer to input everything accurately into Portfolio Manager, they would have to include every meter and know with which building each is associated. This could be a challenge for a customer benchmarking their own building, and even more so for a vendor benchmarking on behalf of a customer.
- The quality of the Portfolio Manager score is completely dependent on what the user inputs. For example: If square footage is not recorded accurately, the score and the EUI will not be accurate.
- Buildings with multiple addresses are more subject to inaccurate Portfolio Manager scores. If there is more than one address associated with a building, not all the data for the building will be picked up by ABS, since the utilities provide service by meter, with street and sub-street address for each meter, not by building. Such situations may occur particularly in the case of condos and tall high rises. The customer would have to give all the addresses for a building to get an accurate score. Missing even 5% of the addresses for a single building would throw off the score.
- Utility systems don't always work well for providing information at the building level for Portfolio Manager. Utilities are not set up to transmit data at a building level. Thus it is not always possible for utilities to provide a complete picture for an individual building via Portfolio Manager/ABS in every case.

### Applicability to California

- It seems reasonable to expect that because of California's energy efficiency regulations, such as Title 20 and 24, it would be easy for California buildings to look great in Portfolio Manager. This could lead building owners to think that their building is performing better

<sup>45</sup> Typically, this refers to the correct entry of certain attributes of building space into PORTFOLIO MANAGER. For example, has the user correctly entered the square footage of office space, including storage space located in offices?



than their peers—which may be true nationally but not so relative to their in-state peers. This may thus lead them to think that they do not need to try harder to improve energy efficiency.

- Users don't always get the most appropriate energy use rating for their building because the building is being compared to national building stock, and to a large population of buildings that are only "sort of" like the building in question. (It is the evaluation team's understanding, however, that Portfolio Manager reduces the number of buildings in the comparison sample by screening out dissimilar facilities, ensuring that energy use comparisons are made against groups of buildings that are reasonably alike. Portfolio Manager screens buildings against a variety of metrics such as building type, square footage, weather conditions, operating hours, occupancy, etc.)
- In addition to not being specific to California, the U.S. Energy Information Administration's Commercial Buildings Energy Consumption Survey (CBECS) data, on which Portfolio Manager relies, are less rich in information about commercial buildings than California's Commercial End-Use Survey (CEUS) data.

### **Customer Confidentiality**

- EPA promises confidentiality to users of Portfolio Manager. Utilities thus have no access to the benchmarking information of users of Portfolio Manager who are not also utility ABS users. Utilities are nonetheless expected to provide technical support for Portfolio Manager to these users. This lack of access to user data can make it harder to diagnose a customer's difficulties with Portfolio Manager.

### **Limited building types**

- Portfolio Manager is not designed for smaller buildings. As described in Section 3.1, a substantial portion—close to half or more, depending on how the figure is calculated—of commercial buildings in California are either too small to qualify for a 1 to 100 benchmark score in Portfolio Manager, or are not in the set of buildings that can get such a score using Portfolio Manager. That so much of the state's commercial building stock is not eligible to obtain a score limits the meaning of the score in the marketplace.

### **Additional Issues**

- Portfolio Manager is not the only benchmarking tool with an interface that could be more user-friendly—according to one interviewee who was familiar with many benchmarking tools, this is true of all the tools.
- Portfolio Manager does not identify areas for improvement. For this reason it is of limited usefulness in energy decision-making.
- Portfolio Manager scores are vulnerable to gaming. With the exception of buildings that undergo ENERGY STAR certification, EPA does not monitor what the customer inputs into Portfolio Manager, nor does it enforce compliance with requirements for producing an accurate score. AB 1103 also does not address monitoring and enforcement of how customers use Portfolio Manager to produce benchmark scores. This is a problem because without monitoring and enforcement, benchmarking with Portfolio Manager is vulnerable to



gaming. For example, a customer who wants a good benchmark score could simply enter only half the meters associated with the building and they would be assured of a high score. There is currently no way to know if gaming is going on, but some utility staff suspect it is because of the large number of 100 scores. These should be rare, but are not.

### 3.2.7 Planned Improvements to Portfolio Manager

❖ *The EPA is in the process of overhauling Portfolio Manager and its Automated Benchmarking System, which interfaces with the utility ABSs. Thus many of the technical issues with Portfolio Manager and EPA's Automated Benchmarking System described in Section 3.2.6 may soon be addressed.*

Many of the technical issues with Portfolio Manager and EPA ABS described in Section 3.2.6 may soon be addressed. EPA is in the process of overhauling Portfolio Manager and its own ABS to interface with the utility ABSs. There are a number of technical issues with Portfolio Manager that the utilities expect to be resolved when Portfolio Manager releases the new version of their ABS in 2013. The changes should make it possible for more customers to obtain a score, and utilities are expecting this to somewhat reduce calls to tech support. The Portfolio Manager overhaul is also expected to improve usability through a more user-friendly interface.<sup>46</sup>

In summary, planned changes include the following:

- Improved database architecture that will make it easier to support Portfolio Manager and ABS.
- Upgraded user interfaces to increase system use stability and improve navigation.
- Upgraded web services.
- Transition from Simple Object Access Protocol (SOAP)-based services to Representational State Transfer (REST)-based services which will increase EPA's ability to maintain systems that interact with ABS.
- Easier schema<sup>47</sup> definitions.
- Quicker response times.
- Easier integration of information between utility back office systems and Portfolio Manager (i.e. with little or no manual re-entry of building data into Portfolio Manager).

EPA reports that prototype systems are scheduled to be released in April 2012 and operational in 2013.<sup>48</sup>

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<sup>46</sup> See [https://www.energystar.gov/istar/has/documents/ENERGY\\_STAR\\_ABS\\_Upgrade\\_Proposal.pdf](https://www.energystar.gov/istar/has/documents/ENERGY_STAR_ABS_Upgrade_Proposal.pdf) accessed February 10, 2012.

<sup>47</sup> An XML schema describes the structure of an XML document.

<sup>48</sup> See; [https://www.energystar.gov/istar/has/documents/ENERGY\\_STAR\\_ABS\\_Demo\\_Webinar\\_20111213.pdf](https://www.energystar.gov/istar/has/documents/ENERGY_STAR_ABS_Demo_Webinar_20111213.pdf) accessed January, 2012.

### 3.2.8 Challenges Associated with the Use of Utility ABSs and EPA's Automated Benchmarking System

#### Summary of Key Findings in this Section

- ❖ *Challenges associated with the IOUs' ABSs were:*
  - *Owners of multi-tenant buildings must obtain authorization from each tenant with a meter in the building in order to use utility ABSs with Portfolio Manager.*
  - *Certain SCE meter data must be re-entered or re-uploaded because of data incompatibility.*
  - *Portfolio Manager requires data at the building level. Utility Customer Information Systems are typically based on individual meters and are not set up to recognize building as a characteristic of an account. The relationship between meters and buildings is complex and not one-to-one. There can be more than one meter per building, or in the case of some campuses, more than one building per meter. There is typically more than one meter per account for commercial spaces, and there can be one or more accounts per building, depending on building ownership and occupancy patterns.*
- ❖ *Challenges associated with the EPA's Automated Benchmarking System were:*
  - *Limited flexibility for customizing the graphical user interface within Portfolio Manager*
  - *Limitations of Automated Benchmarking System web services (e.g., deletion/de-authorization is not included in database schema for the ABS data, so IOUs must manually process customers' deletion/de-authorization of specific meters, etc.)*
  - *Lack of technical support*
  -
- ❖ *Only a single customer-level account number can be entered by a customer. Customers with several legal entities in IOU billing systems must submit third party authorization forms to receive data under a single Portfolio Manager/ABS account, or set up multiple Portfolio Manager accounts.*

As described in Section 3.2.2, EPA's Automated Benchmarking System for Portfolio Manager is a "back-end" system that allows utilities (upon customer approval) to upload actual historical energy consumption data into Portfolio Manager and continue to update this data as new bills become available. The Automated Benchmarking System and utility ABSs are designed to streamline the Portfolio Manager process and relieve users from having to collect billing and usage history and manually enter these data into Portfolio Manager.

As initiative staff explained in the course of interviews, each utility's ABS is different from the others' because it needs to interface with a different utility billing system as well as with Portfolio Manager's ABS.

In general, before enrolling in utility ABSs users need to make sure that:<sup>49</sup>

- All energy meters have been added to the facility profile in Portfolio Manager.

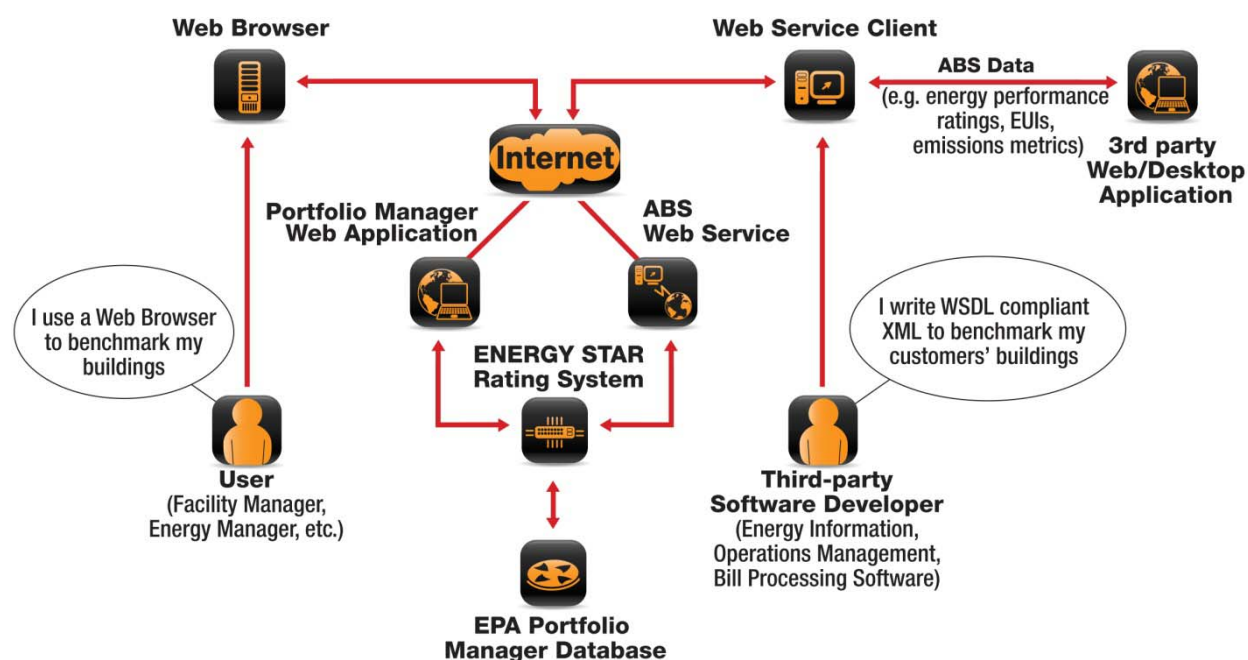
<sup>49</sup> Specific requirements vary by utility.

- All Service ID numbers identifying the building's meters have been collected.
- The city name for the address of the facility in Portfolio Manager matches the city name of the service location for each of the meters being enrolled in ABS.
- Address information is correct for each facility. (If multiple addresses are associated with the facility, each one must be entered into Portfolio Manager.)<sup>50</sup>
- Any previously entered meter data that had been entered into Portfolio Manager manually has been manually deleted from all records.<sup>51</sup>
- Data release authorization has been obtained from customers if necessary (e.g., as in the case where the user is not the customer of record).

It is up to the user to ensure that all the data for which they are responsible have been entered to generate an accurate benchmark score with Portfolio Manager.

A challenge reported by many ABS ESPs is understanding how EPA's eight Automated Benchmarking System web services should be organized and integrated with a third party's customer information system. This system design step is a critical aspect of a successful and efficient integration of EPA's Automated Benchmarking System with a third party's usage and billing data.<sup>52</sup> Schematically, the Automated Benchmarking System framework is highlighted below.

**Figure 3-3: ENERGY STAR Benchmarking System Web Service**  
**ENERGY STAR Benchmarking System Web Service**



<sup>50</sup> Not applicable for PG&E.

<sup>51</sup> Not applicable for PG&E or SCE ABSs.

<sup>52</sup> See: [http://www.energystar.gov/ia/partners/spp\\_res/neprs/ABS\\_Design\\_Overview\\_V3.4.pdf](http://www.energystar.gov/ia/partners/spp_res/neprs/ABS_Design_Overview_V3.4.pdf)

The benchmarking literature indicates that from the customer's perspective, challenges associated with the use of the utilities' ABSs and the Automated Benchmarking Service include many of the same challenges as with the use of Portfolio Manager. This is due to the fact that from the customer's perspective, ABS is an added "feature" to Portfolio Manager when available from the serving utility or service provider. Nevertheless, most reports of challenges experienced by users focus primarily on identification of meters on the premises, collecting "Service IDs" or other identifying data for meters and exchanging data seamlessly.

These same challenges were also among those identified by utilities. From the utilities' perspective, challenges include but are not limited to:<sup>53</sup>

### **IOU ABSs**

- Protecting customer privacy while meeting the rules for providing data. Customer privacy requirements result in owners of multi-tenant buildings needing to obtain authorization from each tenant with a meter in the building in order to use ABS with Portfolio Manager (all IOUs). In the opinion of one interviewee, this impedes benchmarking of multi-tenant buildings.
- Certain meters (those that SCE generates via the XML data for aggregation) cannot be automatically updated via ABS every month, so meter data must be re-entered or re-uploaded to update the benchmark score/EUI. (SCE)
- Benchmarking requires data at the building level; utility Customer Information Systems are not set up to recognize a building as a characteristic of an account. The relationship among meters, accounts and buildings is complex and not one-to-one. There can be more than one meter per building, or in the case of some campuses, more than one building per meter. There is typically more than one meter per account for commercial spaces, and there can be one or more accounts per building, depending on building ownership and occupancy patterns.<sup>54</sup> (All IOUs)

### **EPA's Automated Benchmarking Service**

- Limited flexibility for customizing the graphical user interface within Portfolio Manager.
- Limitations of Automated Benchmarking Service web services (e.g., lack of technical support, etc.).
- Because deletion/de-authorization is not included in XML schema for the ABS data, IOUs must manually process customers' deletion/de-authorization of specific meters. This adds costs and errors.
- Only a single customer-level account number can be entered by a customer due to Portfolio Manager Automated Benchmarking System limitations. Customers with several legal entities in IOU billing systems must submit third-party authorization forms in order to receive ABS

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<sup>53</sup> See IRs #18, set 1.0

<sup>54</sup> Supplemental information about the relationships between accounts and meters was provided by C. Torok, Itron, personal communication, March 23, 2012.

data under a single Portfolio Manager/utility ABS account, or set up multiple Portfolio Manager accounts.<sup>55</sup>

As described in Section 3.2.7, many of the technical issues with EPA's ABS may soon be addressed as part of an overhaul of Portfolio Manager and EPA's ABS by EPA.

### 3.2.9 Alternative Benchmarking Tools

#### Summary of Key Findings in this Section

- ❖ *The California BEARS tool is still under development and as a consequence there are no BEARS data for analysis.*
- ❖ *BEARS is a proposed asset rating tool that develops a model-based estimate of energy use for the building using data gathered from an on-site visit by a certified rater.*
- ❖ *Once BEARS is developed, IOUs could support the implementation of AB 758 by fielding pilot tests of asset rating tools and starting to build BEARS into efficiency programs. This would need to be done with great care so as not to conflict or overlap with IOU support for Portfolio Manager, or introduce confusion into the marketplace with the availability of different results from different tools.*
- ❖ *Both CalArch and EnergyIQ are operational rating tools. According to interviewees familiar with the tools, CalArch has been superseded by EnergyIQ, which is a tool based on more recent CEUS data. EnergyIQ can be used to benchmark buildings, track energy use, and identify possible energy-saving actions and likely return-on-investment (ROI). Utility energy use data cannot yet be uploaded automatically into EnergyIQ. The CEC is planning to link EnergyIQ with the AB 1103 website in order to increase consumer awareness.*
- ❖ *Interviews identified pros and cons of requiring the use of Portfolio Manager as part of AB 1103. Pros: The ENERGY STAR brand has credibility, which gives it value and great spillover effects. Different tools can be used on the same building and can complement each other. Cons: There are different ways to benchmark; each has strengths and weaknesses. That AB 1103 specified Portfolio Manager may lessen the likelihood that building owners will use multiple tools to benchmark.*

The evaluation team was requested to identify and catalogue the use and impact of alternative benchmarking tools, primarily the California Commercial Building Energy Asset Rating System (BEARS) tool. However, the California BEARS tool is still under development and as a consequence there are no BEARS data for analysis.

Below is a description of plans for the BEARS tool, likely uses, and possible issues related to the tool, along with similar information about other California-specific benchmarking tools. The information is based on interviews with representatives of three organizations (the California Energy Commission, a national laboratory, and an organization providing implementation support related to San Francisco's Green Building Ordinance) that are key stakeholders in the benchmarking of commercial buildings in California.

<sup>55</sup> Not applicable to PG&E.

### **3.2.9.1 BEARS**

BEARS is a proposed California-specific asset rating tool that is currently being developed by the California Energy Commission. It is meant to fulfill “the AB 758 requirement for development of a system of energy assessments, ratings and building labeling for nonresidential buildings” in California.<sup>56</sup> BEARS develops a model-based estimate of energy use for the building using data gathered from an on-site visit. As with the Home Energy Rating System (HERS), BEARS will require a certified rater. BEARS is being developed as open source software. It was the understanding of one interviewee that the BEARS rating will be a technical scale relative to a net-zero building.

Interviewees offered the following observations about BEARS:

- As currently planned, BEARS will require the use of a certified rater for a building to obtain a score. On one hand, this could impede widespread adoption of this California-specific asset rating benchmarking tool. On the other hand, the use of BEARS could conceivably be accelerated by being offered in conjunction with utility programs that already require an on-site audit. There may also be a way to have different levels of BEARS ratings (e.g., preliminary versus professional, or self-reported versus on-site audit) that require less versus more cost commitment while maintaining credibility.
- The ENERGY STAR label is widely recognized in the commercial building community and elsewhere; BEARS does not enjoy this recognition.

Interviewees suggested that the IOUs could support the implementation of AB 758 by fielding pilot tests of asset rating tools and starting to build BEARS into efficiency programs. It was noted that this would need to be done with great care so as not to conflict or overlap with IOU support for Portfolio Manager, or introduce confusion into the marketplace with tools that give different results. Some possible roles were identified for the use of BEARS in utility energy efficiency programs:

- Programs could provide incentive dollars for customers to obtain a BEARS rating and then to act on the BEARS rating to make improvements to their buildings.
- BEARS could be useful as a tool for benchmarking smaller buildings.
- Vendors could offer door-to-door ratings of small buildings using BEARS.
- The IOUs could help the CEC co-fund the development of BEARS open-source software.

### **3.2.9.2 CalArch and EnergyIQ**

CalArch is a California-specific operational benchmarking tool created in 2003. It has been superseded by EnergyIQ, a benchmarking tool incorporating both California Commercial End-Use Survey (CEUS) data and national CBECS data. EnergyIQ can be used to benchmark buildings, track energy use, and identify possible energy-saving actions and likely return-on-

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From [http://www.energy.ca.gov/ab758/Proposed\\_Program\\_Delivery-phase1.html](http://www.energy.ca.gov/ab758/Proposed_Program_Delivery-phase1.html) accessed November 10, 2011.



investment (ROI).<sup>57</sup> According to one interviewee quite familiar with EnergyIQ, while the tool has already been released, a final module is under development. This module will use a calibrated model for each building type in CEUS to model the effect of each action and estimate a potential savings range associated with it. Users will then be able to generate a list of potential actions for a particular building and the possible savings associated with the action. The module should be available at the end of 2011.

Unlike Portfolio Manager, there is no automatic upload of utility energy use data yet available for EnergyIQ. The CEC is planning to link EnergyIQ with the AB 1103 website in order to increase consumer awareness.

In the opinion of one interviewee, the Energy IQ tool does a good job of graphically illustrating opportunities for improving energy efficiency in commercial buildings.

### ***3.2.9.3 Other California-specific Benchmarking Tools***

One stakeholder interviewee noted that custom benchmarking metrics and tools have been developed for data centers, labs and clean rooms for California, and expressed the opinion that these customer tools are better than Portfolio Manager for benchmarking specialized buildings. However, these tools lack 24/7 support and may have other disadvantages.

### ***3.2.9.4 National Versus California Benchmarking Tools***

There was some disagreement among stakeholder interviewees regarding the wisdom of AB 1103's requirement for the use of Portfolio Manager.

One interviewee expressed concern about the development of California-specific benchmarking tools. While this interviewee believes that there is value to providing more context to the energy use of buildings that are not well addressed by Portfolio Manager, and acknowledged that Portfolio Manager is not a perfect tool, they noted that there is power in having consensus about using Portfolio Manager. The ENERGY STAR brand has credibility, which gives it value and great spillover effects. For example, some of the largest users of benchmarking are large firms that manage properties on a regional or national basis. The interviewee was recently told by the sustainability lead at a sophisticated national property management firm that four of the eight markets in which they work, including California, had adopted mandatory benchmarking disclosure policies requiring the use of Portfolio Manager. This firm decided to benchmark all their buildings across the nation with Portfolio Manager, not just those in the affected markets, so that they would be prepared for future legislation. Thus, the policies affected twice as many markets as they were adopted in. Had California adopted a custom local tool, this firm might have benchmarked only those buildings in affected markets, and the spillover might not have occurred.

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For additional information about these tools, see <http://poet.lbl.gov/cal-arch/> and <http://energyiq.lbl.gov/>.

At the same time, another interviewee felt that it is important to be open-minded with regard to the tools and methodology for benchmarking. There are different ways to benchmark, and each has strengths and weaknesses; different tools could complement each other. In this interviewee's opinion, utilities should be open and flexible about tools and methods to use. They considered it to be unfortunate that AB 1103 specified Portfolio Manager.

### 3.2.10 ENERGY STAR Labeling & Rating Systems, Energy Consumption & Commercial Real Estate Values

- ❖ *A review of the literature suggests that interest in energy efficiency in the Commercial Real Estate sector continues to increase; albeit at a slower pace than five years ago. Increased awareness of such matters appears to have manifested into more companies adopting corporate-wide sustainability goals. Among these goals, companies are actively seeking to acquire a well-recognized green building designation such as ENERGY STAR or LEED.*
- ❖ *The literature shows that occupancy and rental rates in green buildings are higher, and operating expenses lower, than those in standard buildings. As of 2008, occupancy rates for LEED- and ENERGY STAR-certified buildings were about 4 percentage points higher than for standard buildings. Currently, the rent premium for LEED-certified buildings is roughly 8 percent, while there appears to be no rent premium for ENERGY STAR-certified buildings. Together, these results provide evidence that asset values of green buildings are higher relative to standard buildings. The literature suggests that while the premium commanded by green buildings has decreased somewhat since the financial crisis, the value of green buildings is starting to be reflected back into transaction values.*

Despite a soft real estate market in the U.S., a review of the literature suggests that interest in energy efficiency in the Commercial Real Estate (CRE) sector continues to increase; albeit at a slower pace than five years ago. The forces behind investors' interest primarily stem from a growing awareness about the impacts of climate change, impending federal and state air emission regulations, energy insecurity and the volatility of fossil fuel prices. Increased awareness of such matters has manifested into more companies adopting corporate-wide sustainability goals. Among these goals, companies are actively seeking to acquire a well-recognized green building designation such as ENERGY STAR or LEED. Adding to this mix, CRE owners are also discovering that energy efficiency has the potential to improve building asset values relative to standard buildings through higher occupancy and rental rates. According to several real estate publications:

- The U.S. market for “green” commercial and institutional buildings is growing but supply is limited. A 2008 McGraw-Hill Construction survey found that markets for green CRE has



risen from 2% in 2005 (\$2 Billion) to about 12% in 2008. The uptrend in market value is expected to continue increasing to 25% in 2013 – roughly \$70 billion nationwide.<sup>58</sup>

- Occupancy rates are higher for green buildings and operating expenses lower, resulting in increased net operating income ( Table 3-4).<sup>59</sup>

**Table 3-4: Occupancy Rates for Green Buildings as of Q1 2008**

Occupancy rates	
ENERGY STAR certified	Non-ENERGY STAR certified
91.5%	87.9%
LEED certified	Non-LEED certified
92%	87.9%

Source: CoStar Group, “Commercial Real Estate and the Environment” and Mercer Energy Efficiency and Real Estate: Opportunities for Investors, [www.mercer.com](http://www.mercer.com).

- Green CRE is commanding rent premiums in a number of markets. In the mid-2000s, rent premiums ranged from 6% (ENERGY STAR-certified building) to as high as 31% (LEED-certified). Since the financial collapse in 2008, LEED certified buildings have continued to command rent premiums, although at lower overall rents. For ENERGY STAR-certified buildings, however, rents are equal to standard, non-labeled buildings.<sup>60</sup>
- The value of Green is starting to be reflected back into transaction values, although it has been difficult of late to convince real estate appraisers to verify asset value premiums of green buildings due to the lack of recent local comparable sales. Sale prices for Green CRE in the mid-2000s were generally 31% (ENERGY STAR-certified building) and 35% (LEED-certified) higher than standard buildings.<sup>61</sup> More recent data suggest asset value premiums for ENERGY STAR-certified building are non-existent, while the premium for LEED-certified buildings has narrowed to roughly 8 percent, as shown in Table 3-5 below.<sup>62</sup>

<sup>58</sup> Miller, Norman, et al, *Does Green Still Pay Off?* Journal of Sustainable Real Estate, June, 2010, <http://www.costar.com/JOSRE/doesGreenPayOff.aspx>.

<sup>59</sup> Miller, Norman, et al, *Does Green Still Pay Off?* Journal of Sustainable Real Estate, June, 2010, <http://www.costar.com/JOSRE/doesGreenPayOff.aspx>, CERES and Mercer, “Energy efficiency and real estate: Opportunities for investors”, 2010, accessed February 6, 2012 from [www.mercer.com](http://www.mercer.com).

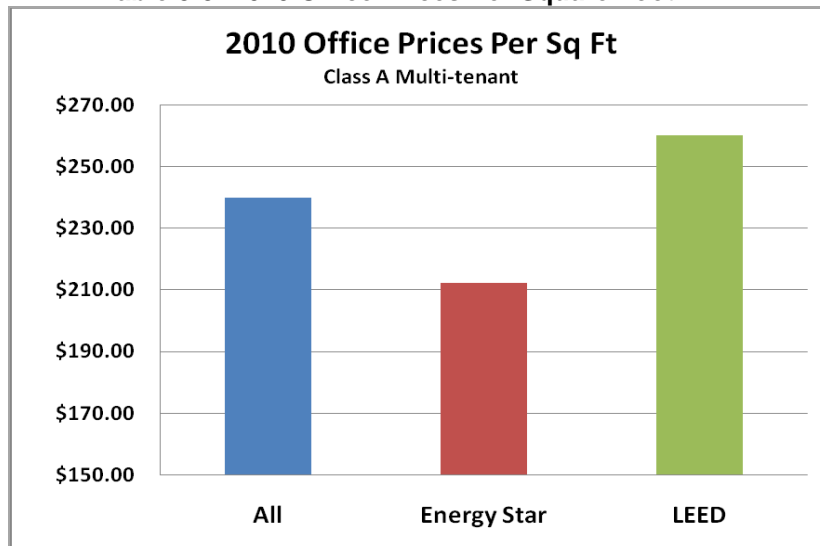
California Sustainability Alliance, “Greening California’s Leased Office Space: Challenges and Opportunities”, pgs 35-6, Table 10 and 11, May 5, 2009. Accessed February 6, 2012 from [http://sustainca.org/sites/default/files/GreenLeases\\_report\\_050509.pdf](http://sustainca.org/sites/default/files/GreenLeases_report_050509.pdf).

<sup>60</sup> Miller, Norman, et al, *Does Green Still Pay Off?* Journal of Sustainable Real Estate, June, 2010, <http://www.costar.com/JOSRE/doesGreenPayOff.aspx>, Fuerst, F., et al, “Green Noise or Green Value, Measuring the Price Effects of Environmental Certification in Commercial Buildings”, School of Real Estate and Planning, Henley Business School, April 25, 2009. CERES and Mercer, “Energy efficiency and real estate: Opportunities for investors”, 2010.

<sup>61</sup> Fuerst, F. and McAllister, P. “New evidence on the Green Building Rent and Price Premium”, Working papers in Real estate and Planning, July, 2009.

<sup>62</sup> Miller, Norman, et al, *Does Green Still Pay Off?* Journal of Sustainable Real Estate, June, 2010, <http://www.costar.com/JOSRE/doesGreenPayOff.aspx>, CERES and Mercer, “Energy efficiency and real estate: Opportunities for investors”, 2010.

California Sustainability Alliance, “Greening California’s Leased Office Space: Challenges and Opportunities”, pgs 35-6, Table 10 and 11, May 5, 2009. Energy efficiency and real estate: Opportunities for investors, CERES, et al. 2010, pg. 10.

**Table 3-5: 2010 Office Prices Per Square Foot<sup>63</sup>**

Although the commercial real estate market has softened since the mid-2000s, the research indicates that CRE investors are beginning to respond again to their tenants' requests – this time to achieve corporate sustainability objectives. With a well-recognized building designation affixed to their buildings, CRE investors are able to prove such improvements have, in fact, been instituted and that they have done their part in helping tenants pursue their objectives. And with these building improvements, the research suggests that while CRE investors are no longer able to command the premiums of the mid-2000s, their properties are at least avoiding the discounts associated with standard buildings.

<sup>63</sup> Source: Miller, Norman, et al, Does Green Still Pay Off? Journal of Sustainable Real Estate, June, 2010, <http://www.costar.com/JOSRE/doesGreenPayOff.aspx>.

**Figure 3-4: Common Features of Green Buildings**

Source: <http://www.epa.gov/oaintrnt/projects/>

Green buildings often incorporate the following features but are not necessarily required in a building to obtain a designation from EPA, US Green Building Council or ASHRAE:

- Careful site selection to minimize impacts on the surrounding environment and increase alternative transportation options.
- Energy conservation to ensure efficient use of natural resources and reduced utility bills.
- Water conservation to ensure maximum efficiency and reduced utility bills.
- Responsible stormwater management to limit disruption of natural watershed functions and reduce the environmental impacts of stormwater runoff.
- Waste reduction, recycling, and use of "green" building materials.
- Improved indoor air quality through the use of low volatile organic compound products and careful ventilation practices during construction and renovation.
- Reduced urban heat island effect to avoid altering the surrounding air temperatures relative to nearby rural and natural areas.

## 4 Utility Benchmarking Initiative Descriptions and Program Theory

### Summary of Key Findings in this Section

- ❖ *The evaluation team found that logic models had not yet been created for the initiatives, and no formal descriptions of program theory were available. (This may be due to the fact that the benchmarking initiatives do not have formal “program” or “subprogram” status.) The evaluation team interviewed initiative staff and EPA staff, and reviewed initiative documents and relevant literature, to develop detailed initiative descriptions and short descriptions of program theory for both the initiatives and for benchmarking with Portfolio Manager.*
- ❖ *The utility benchmarking initiatives are “non resource [sic] initiative[s] designed to educate and motivate customers to benchmark their facilities.”<sup>64</sup> To this end, the utilities offer the following six forms of support for benchmarking. Of these, the first five are “customer-driven” and the sixth is utility-driven, or “proxy” benchmarking.*
  1. *Automated Benchmarking Service (utility ABS),*
  2. *Technical support for Portfolio Manager and utility ABS,*
  3. *Benchmarking workshops,*
  4. *Participation in benchmarking working groups and policy development,*
  5. *Evaluating California Energy Commission (CEC) and other energy benchmarking tools, and*
  6. *Technical development, marketing design, and delivery of proxy benchmarking data to customers.*
- ❖ *Education and information for customers to benchmark their commercial buildings using Portfolio Manager is provided through items 2 and 3, the benchmarking workshops and technical support. Motivation to benchmark is provided through item 1, ABS, which is a key enabler for policy development and is meant to lower the substantial barrier of the time needed to collect and enter data into Portfolio Manager, and item 6, the delivery of proxy benchmark scores to customers. Proxy score delivery also serves to promote awareness of building benchmarking. (Mandatory initiatives such as AB 1103, and voluntary building labeling programs such ENERGY STAR, are of course also important motivators for building owners and operators to benchmark buildings.) Detailed information about each of these offerings can be found in Section 4, Utility Benchmarking Initiative Descriptions and Program Theory.*
- ❖ *The initiative theory was described by staff at PG&E, SCE and SoCalGas as follows: Customers will become aware of benchmarking through utility outreach as well as other sources. Their knowledge of benchmarking and awareness of its benefits will increase when they take utility benchmarking workshops. By using the benchmarking tools supported or provided through the initiatives (Portfolio Manager and ABS, respectively) to obtain information about their commercial buildings’ energy use, customers will be motivated to monitor their energy use and improve the*

<sup>64</sup> Decision 09-09-047, California Public Utilities Commission (adopted September 24, 2009). Accessed December 13, 2011. <http://docs.cpuc.ca.gov/Published/Graphics/107829.pdf>.

*scores or EUIs of buildings that are not performing well compared to an internal or external benchmark. The improvements could involve any or all of the following: developing an energy plan, choosing to participate in a utility energy efficiency program, and making adjustments to settings or other behavioral changes. These changes in turn are expected to lead to energy savings in the buildings benchmarked. Over time, the positive feedback obtained by customers tracking benchmark scores may encourage them to undertake still more energy efficiency activities, possibly participate in more utility programs. The value placed on ENERGY STAR certification should further reinforce this mechanism. This theory hews closely to the description of the theory behind offering Portfolio Manager, as described by EPA interviewees.*

- ❖ *While SDG&E offers the same six forms of support as the other utilities, SDG&E also requires that customers wishing to participate in commercial programs for which benchmarking is relevant benchmark with Portfolio Manager.*
- ❖ *SCE has developed a methodology for calculating proxy benchmark scores for a subset of their commercial customers. SCE piloted the delivery of proxy scores to 1,700 customers in September 2011 and October 2011 began a full-scale implementation of the approach, beginning with approximately 3,500 buildings. PG&E is working on a methodology and expects to begin sending proxy scores to selected commercial “customers” (or building accounts) in 2012. SDG&E and SoCalGas were still exploring methodologies for calculating proxy benchmark scores at the time of this study.*

To help develop a description of the IOU benchmarking initiatives and underlying program theory, the evaluation team relied on review of a range of documents and on in-depth interviews with IOU staff responsible for benchmarking initiative management, IT, and marketing. The documents reviewed included the IOUs’ responses to the initial project data request, IOU Program Implementation Plans, and IOU benchmarking websites; documents provided to the evaluation team by the CPUC; and the ENERGY STAR Portfolio Manager website. This research was conducted in September 2011, so the description and program theory are current as of that date.

## 4.1 Background

Per the utility Commercial Program Implementation Plans for 2010-2012, the California IOUs’ benchmarking initiatives are “non resource [sic] initiative[s] designed to educate and motivate customers to benchmark their facilities.” Currently, none of the California IOUs claims or reports either direct or indirect energy savings from benchmarking with Portfolio Manager.

<sup>65</sup> Southern California Edison. “2010-2012 Energy Efficiency Plans.” March 2009.

<sup>66</sup> Pacific Gas and Electric Company. “2010-2012 Energy Efficiency Portfolio Program Implementation Plan, Statewide Program, Commercial Program.” March 2, 2009.

<sup>67</sup> San Diego Gas & Electric Company. “2010-2012 Energy Efficiency Programs. Statewide Commercial Energy Efficiency Program, Program Implementation Plan.” Accessed December 16, 2011. <http://eega.cpuc.ca.gov/Main2010PIPs.aspx>

<sup>68</sup> Southern California Gas Company. “2010-2012 Energy Efficiency Programs. Statewide Commercial Energy Efficiency Program, Program Implementation Plan.” Accessed December 16, 2011. <http://eega.cpuc.ca.gov/Main2010PIPs.aspx>

The utility efforts are focused on “customer-driven” benchmarking, which involves providing support to utility customers to benchmark their commercial buildings with Portfolio Manager, and utility-driven or “proxy” benchmarking. The IOU benchmarking initiatives include six forms of support for benchmarking. Of these, the first five are “customer-driven” and the sixth is utility-driven or “proxy” benchmarking.

1. Automated Benchmarking Service (utility ABS),
2. Technical support for Portfolio Manager and utility ABS,
3. Benchmarking workshops,
4. Participation in benchmarking working groups and policy development,
5. Evaluating California Energy Commission (CEC) and other energy benchmarking tools, and
6. Technical development, marketing design, and delivery of proxy benchmarking data to customers.

## 4.2 Benchmarking Theory, Initiative Logic, and Initiative Goals

During interviews, the utility initiative staff were asked to describe the role of benchmarking in commercial energy efficiency and the “program theory” on which their utilities’ benchmarking initiatives were based—that is, how the initiatives were expected to educate and motivate customers to benchmark their facilities, and how benchmarking was to eventually result in energy savings. They were also asked to describe what they saw as the explicit and implicit short-term, intermediate, and long-term goals of their utilities’ initiatives.

Three of the four utilities—PG&E, SCE, and SoCalGas—described similar perspectives on the role of benchmarking in commercial energy efficiency, the theory behind their utilities’ benchmarking initiatives, and goals of the initiatives. These perspectives are very much in alignment with the perspective on the role of benchmarking with Portfolio Manager shared by EPA staff in interviews.

*PG&E perspective.* PG&E initiative staff see benchmarking with Portfolio Manager as (1) a way to encourage customers to participate in PG&E commercial programs and (2) a way for customers who track benchmark scores over time to validate that the energy efficiency measures they undertook have worked. The staff’s perspective is that when customers who benchmark their buildings see that one is not performing as well as others, they will be more likely to participate in a PG&E commercial energy efficiency program. Positive feedback obtained by customers tracking benchmark scores can also encourage them to undertake more energy efficiency activities and participate in more programs. Staff noted that the value placed on ENERGY STAR and LEED certification of buildings should further reinforce this mechanism.

As Table 4-1 shows, PG&E is one of three utilities for which the CPUC has set a goal for a specific number of buildings to be benchmarked in the utility’s service territory by the end of the 2010-2012 program cycle. As did the other utilities with such goals, PG&E staff included these

among what they see as the short-term goals for the initiative. Staff described other initiative goals as well. These were:

- Enhancing PG&E's ABS to reduce user and system errors, increase the ability of users to complete benchmarking with Portfolio Manager and ABS in particular situations, and provide access to a wider range of ABS data for analysis. (See Section 6.1.1 for information on the PG&E ABS data currently available and Section 6.3 for information on PG&E ABS data soon to be available. This was a \$78,000 project that was completed in October 2011.)
- Working with stakeholders to ensure that AB 1103 works for all (for example, addressing data privacy issues that limit availability of benchmark scores.)
- Providing input to EPA to improve Portfolio Manager and make it more user-friendly.
- Developing an approach to proxy benchmarking to meet the requirement to benchmark 50,000 PG&E customer buildings by the end of the 2010-2012 program cycle.
- Get building owners, managers, and others to the point where they look to the whole building Portfolio Manager score like they might ideally look to their blood pressure or their vehicle's fuel economy: as an indication of the fitness of the building, to be used for managing, tracking, and valuing performance at a high level. Staff noted that just because people can measure mileage or blood pressure does not mean that they will manage it, but "you can't manage what you don't measure." The end goals for the initiative are that individual participants will use benchmarking to practice continuous energy improvement or strategic energy management, and to realize the market transformation potential of universal benchmarking, where building energy performance is valued and benchmarking metrics are understood similar to the public's current and increasing understanding and value of fuel efficiency for vehicles.

**Table 4-1: Initiative Goals, Savings Claims & Participation Requirements**

	<b>PG&amp;E</b>	<b>SCE</b>	<b>SDG&amp;E</b>	<b>SoCalGas</b>
Benchmarking a requirement for program participation?	No	No	Yes	No
Claims direct savings?	No	No	No	No
Claims savings?	No	No	No	No
CPUC-set goal for 2010-2012	Benchmark 50,000 buildings	Benchmark 50,000 buildings	Benchmark 20,000 buildings	None

*SCE perspective.* In the view of the SCE initiative staff, the benchmarking tools provided or supported through SCE's initiative are key to influencing commercial customers to develop an energy plan and monitor building energy use, which in turn leads to savings. SCE also uses some initiative offerings, such as the workshop, to inform customers about other commercial energy efficiency programs in which they can participate. The CPUC also set a goal for a specific number of buildings to be benchmarked in SCE's service territory by the end of the 2010-2012 program cycle, and SCE staff included this among the short-term goals for the initiative. Other initiative goals described by staff were:



- Educating customers on the benefits of benchmarking and on benchmarking as an ongoing process, not just a one-time activity.
- Supporting the eventual implementation of AB 1103.
- Ensuring that efficient, protected, automated benchmarking services are available for customer use.
- Supporting and encourage the use of Portfolio Manager.

SCE staff mentioned that over the long term they would like to do more with the initiative. For example, in the future they hope to use the information to identify low-performing buildings and target them for participation in energy efficiency programs. They would also like to investigate the relationship between the score and the programs or services that would be most appropriate for customers with that score. One idea is that data from SCE's ABS could be combined with other customer data to predict the most appropriate programs or services for the customer.

*SoCalGas perspective.* As SoCalGas staff see it, the initiative should increase awareness of the benefits of benchmarking and how it can inform the customer decision-making process among both among customers and utility staff. By helping customers obtain information about their buildings' energy use through the support provided by the initiative, the utility will influence customers' energy efficiency decision-making. (SoCalGas staff noted that their benchmarking initiative initially required customers wishing to participate in SoCalGas' commercial programs to benchmark their building(s) with Portfolio Manager. They dropped this requirement when they received considerable pushback from customers.) Unlike the other utilities, the CPUC has not set a goal for a specific number of buildings to be benchmarked in SoCalGas' service territory. Goals for the initiative described by staff were:

- Both among SoCalGas staff and among customers, increase awareness of the benefits of benchmarking and how it can inform the customer decision-making process.
- Support customer use of Portfolio Manager and SoCalGas' ABS, including providing customers with the knowledge to use these tools.
- Increase the number of customers using SoCalGas' ABS.
- Inform customers of AB 1103 requirements and help them prepare for these.
- Comply with CPUC Decision 09-09-047.

*SDG&E perspective.* SDG&E has taken a different approach to benchmarking from the other three utilities. SDG&E assumed from the start of their efforts that their benchmarking goal would not be met if they relied on customers benchmarking their buildings voluntarily. In an effort to ensure that they would meet their goal of 20,000 buildings to be benchmarked in the SDG&E service territory by the end of 2012, they require that customers wishing to participate in commercial programs for which benchmarking with Portfolio Manager is relevant either benchmark the building(s) prior to receiving a rebate or other benefit of program participation, or show that their building(s) cannot be benchmarked with Portfolio Manager. After they set the requirement, they found that benchmarking with Portfolio Manager is not so simple for

customers, and so they started offering workshops and developed FAQs, forms that customers can fill out prior to benchmarking to ensure that they have all the necessary information at hand, and other supporting materials for benchmarking.

The only initiative goal described by SDG&E staff was meeting the CPUC's goals for the number of buildings to be benchmarked in the utility's service territory by the end of the program cycle.

### **4.3 Initiative Budgets, Staffing and Participation Requirements**

Table 4-2, Initiative Budget, Staffing & Participation Requirements, compares budgets, staffing and the relationship between benchmarking and other IOU commercial energy efficiency programs for the four utilities. As Table 4-2 shows, the initiative budgets vary widely, from a high of \$4.8 million for the three-year period 2010 to 2012 at SCE, to \$315,000 for the same period at SDG&E, and an undetermined amount at SoCalGas. While the amount expected to be spent on the initiative during the three-year period has been estimated by PG&E, neither PG&E nor SoCalGas have dedicated budgets for the initiatives. Even where there is a dedicated budget, staff supporting other programs may also provide support for various aspects of the benchmarking initiative without their time being formally counted in the initiative budget. Program staffs' estimates of the amount of staff time devoted to the initiatives ranged from .62 FTE shared between SDG&E and SoCalGas and 1.7 FTE at SCE.

**Table 4-2: Initiative Budget, Staffing & Participation Requirements**

	<b>PG&amp;E</b>	<b>SCE</b>	<b>SDG&amp;E</b>	<b>SoCalGas</b>
Initiative FTE (excluding tech support)	Estimated to be approximately 0.85 averaged across 2010-2012 (does not include IT)	Approximately 1.05 FTE for project management, analyst support, & contract management. Unidentified time for marketing strategy, collateral materials & consultant support	About 0.25 (shared, with majority of time to SDG&E)	
Tech support FTE	Estimated to be approximately 0.35 averaged across 2010-2012 (does not include IT)	Approximately .65 FTE (PM plus consultant) for ABS development. Unidentified time for lower level support person on ABS maintenance/updates & customer support, email and toll free hotline, customer communication time for Customer Account Representatives and Customer Call Center resources	About 0.37 (shared, with majority of time to SDG&E. Includes ABS and tech support)	
Total FTE (estimated)	Estimated to be approximately 1.2 averaged across 2010-2012 (does not include IT)	A minimum of 1.7 FTEs, plus unidentified time contribution from support resources (does not include IT's maintenance and periodic updates to ABS)	About 0.62 (shared)	
Initiative Budget (2010-2012)	Estimated to be approximately \$2.3 million	\$4.8 million	\$315 of CEI total 2010-2012 budget was allocated to Benchmarking Initiatives. Excludes staff tech support time.	No dedicated budget. Funds are unspecified percentage of Deemed Savings administrative budget (\$1.9 million for 2010-2012).

With the exception of SDG&E, benchmarking is not a requirement for utility commercial program participation. While some of utility commercial program offerings may include benchmarking elements such as Retro-commissioning and Continuous Energy Improvement, and may even provide the funding for the initiative as at SDG&E and SoCalGas, these efforts are separate from the support for customer benchmarking of buildings offered through the benchmarking initiative.

SDG&E requires customers wishing to participate in its commercial energy efficiency programs to either benchmark their building(s) with Portfolio Manager and submit evidence of their score or EUI, or show why they cannot benchmark their building(s) with Portfolio Manager. This must take place before SDG&E will provide program services to or process a rebate for a customer. The commercial energy efficiency sub-programs that require benchmarking include Calculated, Deemed, Integrated Audits, Direct Install, Continuous Energy Improvement, and Energy Savings Bid. It also applies to the third-party programs LEEP, HEEP, Mobile Energy Clinic, and Retro-commissioning. (The details of the requirement vary slightly from program to program.) SDG&E customers need only benchmark a building once, and if they want to participate in another of these programs later for the same building, they don't have to benchmark again.

## **4.4 Support for “Customer-Driven Benchmarking”**

### **4.4.1 Automated Benchmarking Services**

As described in more detail in Section 3.2.2, EPA has developed an XML-based Automated Benchmarking System for “third-party Energy Service Providers,” including but not limited to utilities, to securely exchange building usage and energy consumption data with Portfolio Manager at the customers' request.<sup>69</sup> Since EPA's Automated Benchmarking System requires a connection to the Energy Service Provider's unique customer information system in order to function, each IOU has had to create its own Automated Benchmarking Service (utility ABS) to serve as a framework for exchanging data between Portfolio Manager's Automated Benchmarking System and the utility's customer information system. Both Portfolio Manager and the utilities' customer information systems are subject to change over time, so in establishing their ABSs the IOUs commit to maintaining their functionality as well.

*Uses of ABS.* Collecting data from energy bills each month to input into Portfolio Manager is a challenge for customers, and is even more so when multiple buildings have to be benchmarked by a customer. EPA's Automated Benchmarking System and the utility ABSs were developed as a practical way to make benchmarking easier, more accurate, and less burdensome for customers. In addition to relieving customers of the drudgery and time required to collect and input energy use data manually and reducing the likelihood of data entry errors, once a customer has set up a Portfolio Manager account and successfully benchmarked a building or portfolio of buildings,

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<sup>69</sup> ENERGY STAR Portfolio Manager Automated Benchmarking System help manual. Accessed October 8, 2011. <https://www.energystar.gov/istar/has/help/vhnjs.htm>.

the utility ABSs will automatically upload future energy use data for the building(s) into Portfolio Manager on a monthly basis. Customers can review their benchmark scores periodically to check on their buildings' performance. In cases where a score cannot be generated for a building, the customers can check their EUI, which provides them with an understanding of building energy performance and can also be used as a comparison tool. Absent changes in meters or tenancy, the only work required of customers to accomplish this is to log on to Portfolio Manager to obtain the most recent score(s) or EUI(s).

*Users of utility ABSs.* Interviews with customers and program staff and a review of workshop registration information provide the following profile of utility ABS users.

- i. Building owners or tenants, including:
  - a) Utility customers whose primary interest in benchmarking is for facilities that they own. The facilities could be owner-occupied or owned by a realty company and leased to tenants.
  - b) Utility customers whose primary interest is in benchmarking facilities that they lease from the owner.
- ii. Facility or Property Management companies who manage buildings on behalf of utility customers, but do not own them.
  - a) Both Property Management and Facility Management companies may represent many utility customers. Utility staff may have relationships with these organizations rather than with the customers/building owners themselves.
- iii. Commercial real estate consultants.
- iv. Third party vendors, such as engineering firms or ESCOs.

*Portfolio Manager Data Captured with Utility ABSs.* At this time, the primary function of the utilities' ABSs is to "push" customer energy use data associated with each meter to Portfolio Manager. In order to benchmark with Portfolio Manager, customers must input some basic information about their businesses and their building(s) manually into Portfolio Manager, including space type(s) and corresponding attributes which may include characteristics such as square footage, number of operating hours per week, and number of workers on the main shift. Where the utilities' own ABS Terms and Conditions of Use allow, it is possible for the IOUs to capture this information for customers using their ABSs. As Table 4-3 shows, SCE currently captures much of this information, including the name and address of the building benchmarked, the space type, the year built, fuel and meter type, identifying information for meters associated with the building, the campus with which the building or meter is affiliated (if applicable), and building scores and EUIs for each building. PG&E just completed a major overhaul of its ABS in October 2011 that increased the amount of information captured about ABS users' buildings and scores beyond that of SCE, but previously only captured a subset of this information. (For details on key information from utility ABS that is currently captured by SCE and is planned for capture by PG&E see Table 6-1.) This \$578,000 overhaul by PG&E will also reduce the number of instances in which customers must call tech support in order to complete benchmarking. SDG&E

and SoCalGas capture relatively little of this information from their customers and do not currently have plans to capture more. For more detail on the utility ABS data captured by SCE and PG&E, see Section 6.3.

**Table 4-3: Utility Automated Benchmarking Systems**

	PG&E	SCE	SDG&E	SoCalGas
Provides ABS	√	√	√	√
Collects/plans to collect substantial volume of ABS data <sup>70</sup>	√	√		

#### 4.4.2 Technical Support

Table 4-4 lays out the technical support offerings of each utility. All the utilities offer some form of a “help desk” for their ABSs as well as Portfolio Manager. All provide customers with access to tech support through an email address at minimum. Customers or third parties benchmarking buildings on behalf of an owner send their questions to the utility help desk by email, and the staff person assigned to the help desk follows up with the customer by email or telephone. In preparation for an expected increase in tech support calls due to proxy benchmarking, SCE has trained the customer service representatives at the SCE call centers supporting energy efficiency program offerings to respond to basic questions about Portfolio Manager and the utility’s ABS. If the call center customer service representative cannot answer a customer’s question, they forward the question to a more knowledgeable SCE staff person. As shown in Table 4-2, the staff resources devoted to tech support for customers range from .10 full-time equivalent (FTE) at PG&E to .65 FTE at SCE plus unspecified SCE call center staff time. SDG&E and SoCalGas share tech support resources. PG&E noted that they aspire to increase tech support to 1 FTE, but currently lack the resources to make this commitment.

**Table 4-4: Utility Technical Support for Portfolio Manager and Utility ABS**

	PG&E	SCE	SDG&E	SoCalGas
Email with email or telephone follow up	√	√	√	√
Telephone support	In ABS console, not toll-free	Toll-free number	--	--
Call center support	--	30 Customer Service Representatives with training & collateral materials to assist with basic benchmarking questions	--	--

#### 4.4.3 Benchmarking Workshops

Table 4-5 shows the details of the benchmarking workshops offered by the four utilities.

*Workshop format, availability, and attendance.* Each utility offers in-person benchmarking workshops to anyone who wishes to attend, whether or not they have a building to benchmark. The standard workshops are each a half-day long, with the “introductory” workshop often offered in the morning followed by the “advanced” workshop in the afternoon. Workshops are free of charge and include refreshments. They are typically held either at the utility energy

<sup>70</sup> See Table 6-1 for a partial listing of ABS data collected by each utility.

centers or at other utility facilities. If demand is sufficient, the utilities will also hold them at customer sites. Workshops vary in frequency from as little as once a quarter (SoCalGas) to as often as four times per month (PG&E). PG&E offers an abridged version of the introductory workshop on demand via the web,<sup>71</sup> while the other utilities are looking into creating on-demand web-based versions of the workshops to help reach customers who cannot travel to an in-person workshop.

All the utilities have found that since the delay in implementing AB 1103, demand for the workshops has declined.

*Workshop topics.* The introductory workshops include overviews of benchmarking in California and relevant local ordinances, explain benchmarking and the ENERGY STAR performance rating scale, and describe Portfolio Manager and the utility's ABS. They also explain how to benchmark the different eligible space types with Portfolio Manager. Three of the four utilities' workshops describe the utility's commercial programs and how to get more information about these; one utility, SCE, does this for all four utilities' programs, on the rationale that larger customers with buildings outside of the SCE service territory could benefit from awareness of other California utilities' commercial program offerings.

All four utilities' introductory workshops include a hands-on exercise using Portfolio Manager. Customers are requested to arrive with the information necessary to benchmark one building. Customers who complete this workshop emerge having established an account with Portfolio Manager and with their utility's ABS and having either benchmarked a building, determined what they need to finish the process, or benchmarked an example building if they have none of their own.

The utilities' advanced workshops address what to do after benchmarking, including identifying what actions to take, how to frame the information and opportunities when presenting them to management, and what utility programs are available to help customers.

Three of the four utilities use the same firm and instructor to conduct workshops. The fourth utility uses a different firm and instructor. However, information from one of the interviews and a review of the workshop contents make it clear that the utilities coordinate the workshop contents despite not using the same firm.

*Workshop marketing.* According to initiative staff, the workshops are not marketed to specific customer segments. Initiative staff at all the utilities have found that the workshops tend to be larger when they are open to all interested parties and not focused on a specific building type or types. The utilities rely on the following channels for getting the word out about the workshops: email blasts to customers and to local government partners, personal contact by account

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<sup>71</sup> "Benchmarking with EPA's ENERGY STAR® Portfolio Manager." Accessed January 6, 2012. <http://pec.articulate-online.com/p/3099224115/DocumentViewRouter.aspx?Cust=30992&DocumentID=8ad8f5b9-3848-4860-a707-78adbb3ad311&Popped=True&InitialPage=player.html>



executives, presentations at association meetings by utility staff, utility web pages, and the energy centers' seminar calendars.

As described in section 4.4.1 above, a substantial proportion of participants in each workshop consists of contractors and energy consultants who may not be in charge of specific buildings. (Because of the difficulty of assessing the role of a workshop participant from the company affiliation, we do not have an estimate of the proportion of workshop registrants representing utility customers versus consultants, ESCOs, or contractors.)

*Marketing materials.* The marketing materials provided by the utilities to the evaluation team included workshop announcement emails, fact sheets, benchmarking how-to guides, benchmarking websites, and brochures specific to each utility's benchmarking initiative. While all the materials provided were of professional quality and seemed clear and easy to follow, some of SoCalGas' materials stood out as particularly useful. Specifically, these were the utility's benchmarking "decision tree," a two-page document which helps users determine if a particular building is eligible for an ENERGY STAR 1-to-100 score r, and the data collection sheets for each building type to help customers prepare to benchmark a particular building. (SDG&E had documents similar to these, but they were specific to the programs that triggered the benchmarking requirement.)

Table 4-5: IOU Workshops

	PG&E	SCE	SDG&E	SoCalGas
Workshop budget (includes food, facilities, trainers, marketing)	\$160,000 for 2011	Included in total budget in Table 4-2	Included in the \$315k allocated to benchmarking from CEI program budget for 2010-2012	\$16k for workshops & \$4k for printing & marketing for total of \$20k (excluding labor) over period assumed to be 2010-2012
Half-day introductory workshop	√	√	√	√
Half-day advanced workshop	√	Under development. There is a half-day “follow-up” workshop.	√	√
Workshops free of charge	√	√	√	√
Refreshments provided	√	√	√	√
Number of workshops held Jan. 2010-July 2011	87	21	22	14
Number of separate workshop locations Jan. 2010-July 2011	17	2	unknown	unknown
Workshop registrants Jan. 2010-July 2011 (excluding IOU staff) <sup>72</sup>	1,262	329	738	204
Organizations represented by workshop registrants Jan. 2010-July 2011 (excluding IOUs) <sup>73</sup>	923	265	529	168
Additional workshop locations for individual companies & local gov’t	Offered on-site if at least 20 attendees & through LGPs as need arises	Offered on-site if at least 10 attendees		
Instructor	EEFG, Inc.	ICF, Inc.	EEFG, Inc.	EEFG, Inc.
Workshop contents coordinated with other IOUs	√	√	√	√
Utility’s own commercial programs described in workshop	√	√	√	√
Other utilities’ commercial programs described in workshop slides		√		
Benchmarking webinar	√	Under consideration		
Workshop evaluation form	√	√	√	√

<sup>72</sup> Number of unique workshop registrants. Does not reflect the number of workshops a particular individual may have attended. Does not take into account name misspellings which may have caused a single individual to be counted multiple times.

<sup>73</sup> Does not take into account name misspellings which may have caused a single organization to be counted multiple times.

*Workshop tracking and evaluation metrics.* All of the utilities collect information about workshop registrants during registration and ask participants to fill out an evaluation form after the workshop. Utility analyses of the evaluation questions asking for feedback on the workshop show that without exception, the evaluations give the workshops and presenters high marks on average across all four utilities.

In addition to the potential for the information on the evaluation forms to identify ways to improve the workshops, the evaluation and registration forms could be a useful source of information about the types of customers interested in benchmarking buildings and their intentions regarding benchmarking. For workshop participants who are utility customers, this information could help improve the initiatives and track progress toward goals. They could also be used to generate leads for marketing of other utility commercial energy efficiency programs. Based on interviews with initiative staff, it appears that while workshop presenters receive feedback from the evaluation forms, the utilities could do more with the information being collected to improve understanding of the organizations being reached with the workshops and how they are using benchmarking, connect these organizations with other utility programs, and help in tracking initiative progress.

As Table 4-6 shows, except for basic information about the registrants such as name, affiliation, and address, feedback about the workshop attended, and the workshop's presenter, the data collected from registrants varies considerably from utility to utility. Some of the items that could be useful for the initiatives, or other utility energy efficiency programs, but are collected only by PG&E, include:

- The space type(s) registrants are interested in benchmarking.
- The number of buildings that registrants are considering benchmarking.
- The average size of buildings being considered for benchmarking.
- How the training will be put to use.
- Request to be contacted about specific utility commercial EE programs.
- Activities performed over the previous three years.
- The final decision-maker for energy efficiency projects.

**Table 4-6: Data Collected on Workshop Registration & Evaluation Forms**

	PG&E	SCE	SDG&E	SoCalGas
<b>Data Collected on Workshop Registration Form</b>				
Basic info (name, organization name, address, phone, email)	√	√ <sup>74</sup>	√	√
Space type, # of buildings to be benchmarked, average building size	√			
<b>Data Collected on Workshop Evaluation Form</b>				
Types of organizational goals (Environmental policy, Energy savings, Carbon reduction initiatives, Other)	√			
Activities performed over last three years (Energy audit, Benchmarking, Retro-commissioning, Demand response, EE projects, Other)	√			
Identify final decision-maker for energy efficiency projects	√			
Feedback on workshop & presenter	√	√	√	√
Request to be contacted about specific utility commercial EE programs	√	√		
# of employees working for organization			√	
Leased versus owned space			√	
Organization zip code			√	
Primary language			√	
How attendee learned about workshop	√		√	√
How training will be put to use			√	
How soon training will be applied				
Preferred method of contact				√

#### 4.4.4 Benchmarking Working Groups

As Table 4-7 shows, the IOUs participate in various working groups to support and inform benchmarking-related policy initiatives affecting utility customers.

*AB 1103 Working Group.* This group is facilitated by HMG and started in early 2009, initiated by the CEC. The purpose of this group is to develop the enabling regulations and accompanying guidelines for the implementation of AB 1103. All the IOUs participate. Other organizations participating in this group include the California Energy Commission, the California Public Utilities Commission, EPA, industry stakeholders, and State lawmakers.<sup>75</sup> Originally the meetings were held monthly, but they have tapered off as implementation of AB 1103 has progressed. The group is developing guidelines for users to follow, including items such as the kind of buildings affected, what benchmarking information needs to be disclosed in real estate transactions, and confidentiality requirements.

*Statewide IOU Benchmarking Working Group.* Representatives of each IOU also hold monthly meetings on benchmarking. The participants are the initiative managers, their technical support staff, and IOU regulatory affairs personnel. During these meetings, the IOUs share information on each utility's benchmarking plans and activities. In the first year, they focused much of their attention on trying to understand and determine how to address the directives in Decision 09-09-

<sup>74</sup> Actual evaluation form was not provided. It is not clear if phone number is collected.

<sup>75</sup> HMG Corporation. "Energy Benchmarking Work Group." Accessed September 30, 2011. <http://www.h-m-g.com/downloads/EnergyBenchmarking/Default.htm>.

047. According to initiative staff interviewees, the petition for modification that resulted in the April 14, 2011 modification to Decision 09-09-047<sup>76</sup> came from this group's discussions. When the second decision was issued in response, the utilities worked together via this group to share ideas on how best to satisfy the stated requirements and formulate an appropriate direction. SCE had been working on proxy benchmarking options prior to this, and when the second decision was issued they used this group to share their experiences and plans with the other utilities. The nature of the group is very collaborative. Utility staff switch off leading the meetings each month.

In addition to participating in these formal groups, IOU staff routinely work with EPA on benchmarking. The EPA representative for Portfolio Manager who focuses on the Western region is in regular contact with IOU initiative staff, about once per week, and noted that IOU initiative staff have been represented in consultations regarding upgrades to Portfolio Manager and EPA's Automated Benchmarking System.

**Table 4-7: IOU Participation in Benchmarking Working Groups**

	PG&E	SCE	SDG&E	SoCalGas
AB 1103 Working Group	√	√	√	√
Statewide IOU Benchmarking Working Group	√	√	√	√

#### 4.4.5 Evaluating California Energy Commission and Other Energy Benchmarking Tools

PG&E is planning to lead an effort within the Statewide IOU Benchmarking Working Group to evaluate various benchmarking tools in the marketplace, including but not limited to the CEC's Commercial Building Energy Asset Rating System (BEARS) and EnergyIQ.

**Table 4-8: Evaluation of Benchmarking Tools**

	PG&E	SCE	SDG&E	SoCalGas
Evaluate benchmarking tools via effort of Statewide IOU Benchmarking Working Group	√	√	√	√

#### 4.5 Utility-driven or “Proxy” Benchmarking

As described in Section 4.3, Decision 09-09-047 set numerical goals for the number of buildings that three of the four utilities “shall benchmark” by the end of 2012. As described in Section 3.2.1 and elaborated on further in the interview summaries, utilities cannot benchmark buildings with Portfolio Manager on behalf of commercial customers. In an effort to meet the numerical goals set forth in Decision 09-09-047 and provide further encouragement for customers to benchmark their buildings with Portfolio Manager, the utilities have embarked on the sixth form

<sup>76</sup> California Public Utilities Commission. “Second Decision Addressing Petition For Modification Of Decision 09-09-047.” April 14, 2011. Accessed December 14, 2011. [http://docs.cpuc.ca.gov/PUBLISHED/FINAL\\_DECISION/133880.htm](http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/133880.htm).

of support for benchmarking: they are investigating the possibility of providing customers with utility-driven or “proxy” benchmark scores for their buildings.

*Theory behind proxy score delivery.* Proxy scores represent each utility’s estimate of a building’s EUI based on the information about the building available to the utility. Staff at all four utilities described the theory behind the delivery of proxy scores or proxy EUIs in very similar ways. Essentially, the proxy scores serve two purposes. First, they are a way to help the utilities meet their numerical goals for buildings to be benchmarked by the end of the program cycle. Second, they are a tool to encourage customers to benchmark their building(s) with Portfolio Manager and to bring to their attention opportunities to improve their buildings’ energy efficiency, through participation in utility programs and through more active management of their buildings’ energy use. When providing customers with proxy scores or EUIs, the utilities intend to frame the proxy scores/EUIs as an approximate indicator of where the customer building might fall if they were to benchmark the building with Portfolio Manager themselves, and provide information to customers on how to get started benchmarking with Portfolio Manager in order to get a more accurate score. They also intend to include information on the benefits of benchmarking with Portfolio Manager, where to get help with benchmarking, and how to obtain information about utility energy efficiency programs that can help them improve their building’s energy consumption and benchmark score. The assumption behind the delivery of the score is that when customers see a rough estimate of how their energy use compares with that of other commercial buildings in the state, and are made aware that they can easily obtain a more accurate score and that utility programs can help them improve their score, they will be motivated to take the first step on the path to improving building performance, which is to benchmark their building(s) with Portfolio Manager.

*Description of utilities’ proxy benchmarking plans.* Table 4-9 compares the proxy benchmarking plans of each of the four utilities. As this table shows, SCE is the farthest along in delivering proxy benchmark scores to customers. This utility piloted the delivery of proxy scores to 1,700 customers in September 2011. In October 2011, SCE began expanding the approach, beginning with approximately 3, 880 building accounts identified as qualified to receive scores.<sup>77</sup> PG&E is completing development of its proxy score calculation methodology and expects to begin delivering proxy scores to customers building accounts in 2012. While SDG&E is exploring the possibility of developing proxy benchmark scores, the utility is continuing to attempt to meet its goals by requiring that all customers who wish to participate in their commercial programs either show that they have benchmarked the respective building with Portfolio Manager or provide evidence why they cannot. SoCalGas, while not subject to numerical goals like the other utilities, also is investigating proxy benchmarking. SCE and SoCalGas have considered working together

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<sup>77</sup> Qualified customers are defined as participants in SCE energy efficiency programs during the 2010-2012 energy efficiency program cycle (1) for which reliable data on square footage and building type are available, (2) for which all meters associated with the building can be identified, (3) which are the sole customer in the building, and (4) which have not already used SCE’s ABS. As of March 2012 SCE produced proxy benchmark scores for just under 12,000 buildings and anticipated meeting its goal of 50,000 buildings, barring unforeseen challenges.

to identify a process to share energy use data for proxy benchmarking, but these plans are on hold until confidentiality issues can be resolved.

Because the data sources and resources available to each utility vary, each is developing a slightly different methodology for calculating proxy benchmark scores. For example, the property data, which utilities look to for square footage and help in identifying individual buildings, available varies from county to county, as do charges for these data. Initiative staff interviewed for this study noted that it is difficult to find reliable information about building characteristics such as square footage; and it is difficult to identify individual buildings since this is not how either the utility customer information systems or county assessments track customer information. (To illustrate, utility customer information systems are organized by meter. A building may have multiple meters—or an entire campus could be on one meter. County assessor data provides aggregate square footage for each parcel, and a parcel may have more than one building.)

Because of customer confidentiality concerns, at this time utilities plan to provide proxy scores to customer building accounts only for facilities where there is just one utility customer building account.



Table 4-9: Technical Development and Delivery of Proxy Benchmarking Data to Customers

	PG&E	SCE	SDG&E	SoCalGas
<b>Administration &amp; Coordination</b>				
Budget for proxy score development & outreach	Marketing - \$190,000 Labor for Technical Development/Analysis, Product Management, and Project Management – about \$130,000 (approval pending)	\$258,000 <sup>78</sup>	Included in the \$315k allocated to benchmarking from CEI program budget for 2010-2012	Unknown
Coordination among utilities	None	Explored working with SoCalGas to identify process to share energy use data. Coordinating and sharing experiences with Statewide IOU Benchmarking Working Group members.	Working with SoCalGas to develop proxy benchmarking	Working with SDG&E to develop proxy benchmarking. Explored working with SCE to identify process to share energy use data.
<b>Proxy Benchmarking Status</b>				
Status of score calculation methodology	In progress	Methodology developed as of August 2011	Methodology under development	Methodology being explored
Pilot study	TBD	Completed September-October 2011 with 1,700 customers	TBD	TBD
Pilot evaluation	TBD	Used consulting firm to perform pilot distribution evaluation.	TBD	TBD
Full scale implementation	TBD	The Energy FootPrint campaign Group 1 distribution started October 2011 with approx. 3,800 SCE commercial program participants.	TBD	TBD
Actual or anticipated score delivery method	Mail	Direct mail using 4 step delivery process: 1) Pre-email, 2) Energy FootPrint letter, 3) Reminder postcard #1, and 4) Reminder postcard #2	Mail	Mail
<b>Proxy Benchmark Contents</b>				
Delivery of proxy score, proxy EUI, or both	TBD	Both	TBD	Proxy EUI only (to avoid confusion with Portfolio Manager score)

<sup>78</sup> Approximate costs for 2011 campaign development and distribution of 5,500 proxy Benchmarking energy values.

	PG&E	SCE	SDG&E	SoCalGas
Basis of proxy score or EUI	TBD (plan to use energy usage, square footage, building type, weather)	Electricity energy usage, square footage, building type		Energy usage, square footage
Primary source of building data	Utility CIS and data purchased from CoStar <sup>79</sup>	Utility CIS and county assessor data	TBD	TBD
Messaging to be tailored based on score relative to benchmark	No	Maybe <sup>80</sup>	No	No
Score or EUI to be California-specific based on CEUS data?	TBD (currently planned to be based on EPA methodology, but CEUS data may be incorporated/analyzed for value as an alternative)	Yes <sup>81</sup>	Yes	Unknown
<b>Requirements for Customers to be Qualified to Receive Proxy Scores or EUIs</b>				
Reliable square footage data available	TBD	√	√	√
Reliable building type data available	√	√	√	√
Able to identify all meters associated with building	√	√	√	√
One customer only in building	TBD	√		Unknown
One meter or service account only in building	TBD		√	
Customers who already use ABS excluded	√	√	√	√

<sup>79</sup> CoStar Group, [www.costar.com](http://www.costar.com), is a for-profit provider of commercial real estate information.

<sup>80</sup> According to communications from SCE staff in January 2012, “Content and graphical energy value representation conveys [the] appropriate message to the customer.” It is unclear if this the same thing as framing the message in relation to a particular range of score, for example, one that is higher or lower than average, or is close to the value needed to obtain ENERGY STAR certification.

<sup>81</sup> The benchmark for the Pilot was based on CEUS; however, subsequent mailers were and will be based on the median value derived from SCE’s database of proxy benchmarked buildings by building types. Also of note, the EUI is based on electric energy use only.

*Challenges and barriers to proxy benchmarking.* Given the difficulties of defining a building for proxy benchmarking and of gathering the necessary information to produce a score or EUI that is accurate enough to provide to a customer, the utilities do not expect to be able to provide a proxy benchmark score for all commercial customers.

Based on interviews with program staff, the main barriers to proxy benchmarking appear to be:

- The utilities do not routinely collect square footage data from customers. When customers have provided this information—as is sometimes the case for customers who have participated in utility energy efficiency programs—the utilities often find that it is not reliable.
- Identifying an individual building using utility and/or assessor data is not easy and is not always possible. Utility customer information/billing systems are organized around meters, not around individual buildings or individual customers. County assessor data are also not organized by building. The street address correlates less closely with individual buildings than one would expect.
- Commercial building property data from county assessors is very complicated and not readily available. The cost and quality of these data vary considerably. In particular, some of the publicly available county assessor data appear not to be highly accurate and may be outdated. In many cases, utilities have found that the county assessor data cannot be used to estimate building size for a parcel number.
- Developing the building information (building identifier, square footage, and building type) needed for proxy benchmarking often involves blending databases from different entities, a challenging task.

*Detailed description of SCE's proxy score delivery and evaluation plans.* SCE is sending proxy scores to customers in four separate communications. SCE expects the multiple communications to boost the response rate to proxy score mailings from 3 to 5 percent, which according to SCE staff is typical of direct mail, to close to 15 or 20 percent. SCE's approach (described below) is very similar to a research-based method for achieving high mail survey response rates<sup>82</sup> used in the social sciences.

The four communications are:

1. A pre-notification email telling customers what the proxy score is and alerting them to expect it. The purpose of this email is to help capture the attention of customers who are email-oriented, so that they will pay more attention to the hardcopy letter with the score.
2. A hardcopy letter that will include the score or "Energy Footprint," what it means, and information about next steps. The score will be provided on a scale that shows the building's

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<sup>82</sup> Dillman, D. A. 2000. *Mail and Internet Surveys: The Tailored Design Method*. New York: John Wiley & Sons, Inc.

energy footprint versus that of the average energy footprint of California buildings.<sup>83</sup> The next steps are:

- a. Enroll in Portfolio Manager to benchmark the building more accurately, and use SCE's ABS to make the process easier and faster.
  - b. Call the energy efficiency customer support representatives at the customer service hotline (an 800 number) for help with benchmarking.
3. A follow-up oversized postcard with a link to a website to help customers with next steps.
  4. A second follow-up oversized postcard with a link to a website to help customers with next steps.

SCE has surveyed a random sample of customers who received proxy benchmark scores to measure customer response, absorption of the information, and self-reported behavior. The findings from the survey will inform proxy score delivery for the next set of customers to receive scores. SCE is starting to develop a tracking mechanism so that they can readily match information about the customers who receive proxy scores for their building(s) with other program databases and with SCE ABS information. This system will help in the effects of the proxy score on customers' subsequent program-related activities. SCE also plans to track call center metrics and benchmarking web page landings and click-throughs.

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<sup>83</sup> For 2012 mailings, SCE plans to modify its methodology and utilize median values derived from the pool of proxy-benchmarked buildings in SCE's service territory.

## 5 Other Research Questions

Key findings and recommendations for each section are summarized in a bulleted list in italics at the beginning of the section. Detailed findings follow in plain text. Not every section has an associated key finding.

The tables in this section focus on results for specific groups of respondents. Tables with results for all respondents are shown in Appendix B. All key findings from this and previous sections are summarized in Section 7.

The results of the participant survey are representative only of workshop participants. While workshop participation is open to all, customers receive notification of workshops based on contact information available to the utility. Customers for whom utilities have individual contact information may not be representative of all utility customers with buildings that could be benchmarked with Portfolio Manager.

### 5.1 Describe the Types of Customers Using Benchmarking

#### 5.1.1 Customer Types

##### 5.1.1.1 General Types and Distribution

###### Summary of Key Findings in this Section

- ❖ *The research identified four general types of customer audiences for benchmarking tools that participated in benchmarking workshops, and the rates at which they were found in the sampled populations:*
  1. *Utility customers who own and manage facilities that they either lease to others or occupy themselves (48% of participants, 63% of non-participants),*
  2. *Utility customers who occupy and manage facilities that they lease from an owner or property management firm (17% of participants, 37% of non-participants),*
  3. *Facility or property management companies who manage buildings on behalf of utility customers, but do not own them (9% of participants), and*
  4. *Commercial real estate consultants and third party vendors, such as engineering firms or ESCOs (27% of participants)*
- ❖ *Staff at SDG&E, where benchmarking is required for program participation, speculated that over 90% of users of SDG&E's ABS/Portfolio Manager in their service territory are vendors of some kind who are addressing the benchmarking requirement to ensure that their customers' rebates can be processed. The rate of vendors among the SDG&E participant sample, 25%, was not significantly different from the rate for the rest of the sample. While workshop participants do not represent the universe of users of SDG&E's ABS and Portfolio Manager, this finding suggests that staff's concern may have been unfounded.*

Interviews with initiative staff and stakeholders suggest that, despite the focus on the building owner in some benchmarking legislation, the building owner is not necessarily the decision-maker about benchmarking, nor is the owner or the owner's staff necessarily doing the benchmarking. Insights provided by interviewees and a review of workshop registration data strongly suggest that the projected typical end-user—a building benchmarking their own building(s)—is just one of a variety of types of users of Portfolio Manager and utility ABSs, and is probably not the majority.

Based on conversations with initiative staff, interviews with utility customers, and the review of the workshop registration data, the evaluation team developed a breakdown of the different categories of broad customer types that are likely users of Portfolio Manager and included questions in the telephone surveys to identify the rates at which these different customer types are found among the populations of workshop registrants and of sampled non-participant customers. It is important to note that attempting to identify these rates definitively was not possible given the design and budget of the telephone surveys. The distribution of customer types in Table 5-1 below is based on information obtained while screening respondents to meet quotas for each group. The respondent numbers for each user group were determined by a quota in order to provide an adequate sample, and the data were weighted by user group to reflect our estimate of the percentage of each group amongst workshop registrants. (For more detailed information by utility see Table B-6 and Table B-7.)

**Table 5-1: Distribution of General Types of Customers Among Sampled Populations**

	Participants	Non-participants
<b>“End –users”</b>		
<i>Building owners or tenants</i>		
Utility customers who own <i>and</i> manage facilities that they either lease to others or occupy themselves.	48%	63%
Utility customers who occupy <i>and</i> manage facilities that they lease from an owner or property management firm.	17%	37%
<i>Facility or Property Management companies</i>		
Companies who manage buildings on behalf of utility customers, but do not own them. Both property management and facility management companies may represent many utility customers. Utility staff may have relationships with these organizations rather than with the customers/building owners themselves.	9%	Not included in sample
<b>“Vendors”</b>		
Commercial real estate consultants and Third party vendors, such as engineering firms or ESCOs.	27%	Not included in sample

Staff at SDG&E, where benchmarking is required for program participation, speculated that over 90 % of users of SDG&E's ABS/Portfolio Manager in their service territory are vendors of some kind who are addressing the benchmarking requirement to ensure that their customers' rebates can be processed. The rate of vendors among the SDG&E participant sample, 25%, was not significantly different from the rate for the rest of the sample. While workshop participants do

not represent the universe of users of SDG&E's ABS/Portfolio Manager, this finding suggests that staff's concern may have been unfounded.

### 5.1.1.2 Industries and Distribution

#### Summary of Key Findings & Recommendations in this Section

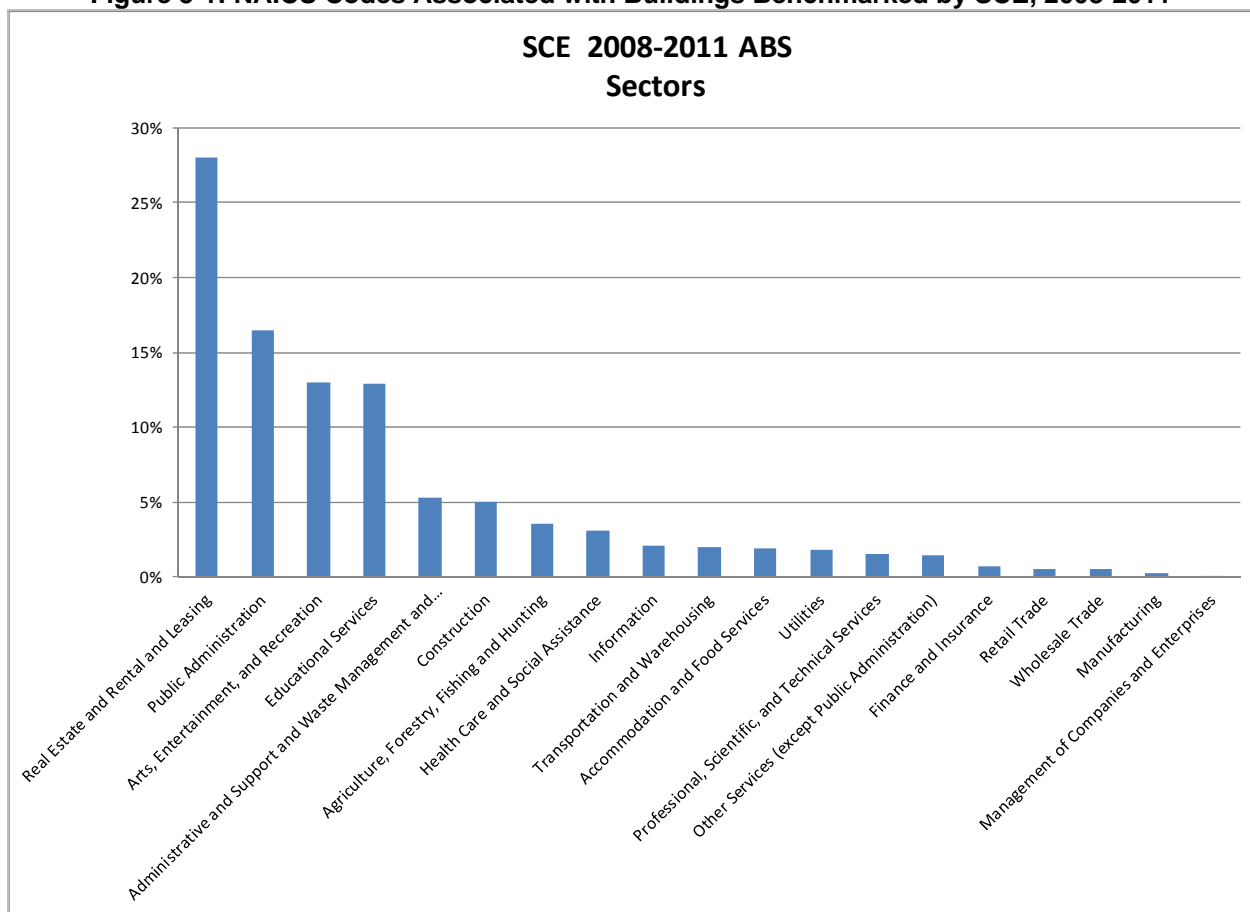
- ❖ *The most common facility type benchmarked using Portfolio Manager by SCE ABS users is "office" (44% of participants). A comparison of the SCE NAICS codes analysis with the survey data suggests that customers benchmarking municipal buildings may not be availing themselves as much as they could of the opportunity to take a benchmarking workshop. It also suggests that there may be an opportunity for IOUs to increase awareness of benchmarking among types of businesses and buildings other than municipal and office buildings.*
- ❖ *A comparison of the different rates at which the participant groups benchmark buildings suggests that non-profit and municipal customers (School/Education/Library, Municipal/Local Government Building, and Community Service/Church/Temple) are more likely to benchmark their buildings themselves, and customers running hotels or motels are less likely to benchmark their buildings themselves.*
- ❖ *Participants who had not benchmarked buildings were more likely than other participants to report building types that either cannot be benchmarked using Portfolio Manager or face particular benchmarking challenges. This may help in part to explain why this group of participants has not benchmarked.*
- **Recommendation:** *Given the paucity of data from utility ABSs at the time of the study and the importance of understanding the market for benchmarking in light of the state's interest in this approach to energy efficiency, the CPUC may want to consider conducting a market segmentation study for benchmarking in the future. (A full-blown market segmentation was outside of the scope of this study.)*

NMR staff reviewed the data supplied by IOUs in order to better understand the different market segments that are benchmarking with Portfolio Manager and the utility ABSs. The only data to help answer this question from the utility responses was from SCE, which provided NAICS codes for buildings benchmarked with Portfolio Manager using SCE's ABS since 2008. Figure 5-1 shows distribution by percentage of the NAICS codes associated with the business activities taking place in the 880 individual buildings (as identified by the Portfolio Manager building ID variable) in the SCE data file. Note that individual buildings can have multiple NAICS codes. As the figure indicates, the business activity most commonly associated with these buildings is Real Estate and Rental and Leasing (28%). Presumably in most cases this refers to the building being leased, and not to the primary business activity conducted in the building being real estate rental and leasing. Based on this assumption, the evaluation team believes this 28% probably represents leased office buildings. Public Administration, at 17%, most likely refers to municipal- or state-owned buildings. These are followed by Arts, Entertainment, and Recreation and Educational Services at 13% each. Information from utility ABSs about the building type



would have helped inform this analysis, but unfortunately no building type information was available due to the fact that the EPA does not supply the assigned building type via ABS.

**Figure 5-1: NAICS Codes Associated with Buildings Benchmarked by SCE, 2008-2011**



The survey data lend support to the idea that the Real Estate Rental and Leasing category is indeed office buildings. In the telephone surveys, participant end-users and non-participants were asked to identify the primary activities conducted at the buildings they owned, occupied, or managed in California, while vendors were asked to identify the primary activities at the buildings for which their organization performs benchmarking services in California. Table 5-2 shows only the most frequently offered primary building activities. (For a full listing of responses, see Table B-131.)

Consistent with the NAICS code analysis, the most common use reported by all participants was “office” (44%). This was mentioned most frequently by participants who had benchmarked (60%), followed by vendors (49%), and participants who had not benchmarked (25%). The differences between each of these groups were statistically significant. Non-participants (22%) reported office as the primary building activity at a rate similar to that of participants who had not benchmarked, and significantly lower than that of participants who had benchmarked and vendors.

After office, the other most frequently reported primary building activities among participant end-users who had benchmarked were school/education/library (12%), health care other than hospital (10%), non-food retail (10%), municipal/local government (8%), and community service/church/temple (8%). In addition to office, participants who had benchmarked were more likely than vendors to report school/education/library, municipal/local government building, and community service/church/ temple.

After office, vendors most frequently reported the primary business activities conducted at the buildings they have benchmarked for customers as hotel or motel (9%), non-food retail (9%), and health care other than hospital (8%). Vendors (9%) were more likely than participants who had benchmarked (4%) to report hotel or motel.

There were some systematic differences in building activities between participants who had *not* benchmarked and other participants. In addition to reporting office at lower rates than other participants, participants who had not benchmarked reported industrial process/manufacturing/assembly, college/university, condo association/apartment/residential, and agricultural facility at higher rates than the two participant groups that benchmarked. Except for office, all these building types either cannot be benchmarked using Portfolio Manager or face particular benchmarking challenges. (For example, initiative staff pointed out that campuses sometimes have just one meter for multiple buildings, and obtaining authorization to access energy use data for large residential properties is a burdensome process.) This may help in part to explain why this group of participants has not benchmarked.

**Table 5-2: Most Commonly Reported Primary Business Activities\***  
(participants, non-participants; multiple response)

	<b>EB<sup>84</sup></b>	<b>EN<sup>84</sup></b>	<b>V<sup>84</sup></b>	<b>All Participants</b>	<b>Non-participants</b>
<i>Sample size</i>	43	44	40	127	48
Office	60%ζδε	25%η	49%ε	44%ε	22%
School/Education/Library	12%η	17%η	--δε	11%	10%
Hotel or Motel	4%ε	11%ηε	9%δε	8%ε	10%
Industrial Process/Manufacturing/Assembly	6%ε	15%ηε	1%δε	8%ε	31%
Retail (non-food)	10%ε	2%	9%ε	7%ε	1%
Municipal/Local Govt. Building	8%ε	2%	5%	5%ε	--
College/University	--ζδ	9%ηε	--δ	3%ε	--
Community Service/Church/Temple	8%ζ	--	2%	3%	4%
Condo Assoc./Apartment Mgr./Residential	--ζδ	7%ηε	--δ	3%ε	--
Commercial Association	6%ζηε	--	--δ	2%ε	--
Agricultural Facility	--ζδ	9%ηε	--δ	3%ε	--
Health Care (other than Hospital)	10%δε	4%	8%δε	7%	--

ζ Significantly different from EN at the 90% confidence level.

<sup>84</sup> The “EB” group consists of end users that have benchmarked; “EN” of end users that have not benchmarked; and “V” of vendors, such as engineering services firms.

η Significantly different from Vendors at the 90% confidence level.

δ Significantly different from all participants at the 90% confidence level.

ε Significantly different from non-participants at the 90% confidence level.

\* For more information, see Table B-131

That such a large percentage of buildings are likely to be commercial office buildings suggests that there may be an opportunity for IOUs to increase awareness of benchmarking among other types of businesses and buildings. Given the paucity of data from utility ABSs and the importance of understanding the market for benchmarking in light of the state's interest in this approach to energy efficiency, the CPUC may want to consider conducting a market segmentation study for benchmarking in the future. (A full-blown market segmentation was outside of the scope of this study.)

### 5.1.2 Customer Awareness of Benchmarking

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The survey set a baseline of awareness among non-participant customers. Unaided, 16% of non-participants indicated that they had previously heard about benchmarking; adding aided to unaided, a total 24% had heard of it.*
- **Recommendation:** *Awareness of benchmarking among non-participants is relatively simple to measure via survey research and could be a useful a progress indicator for the utilities' benchmarking initiatives. Section 5.1.3 describes some challenges associated with surveying non-participants that should be borne in mind in planning future survey research among non-participants.*

The non-participant survey measured awareness of benchmarking two ways: “unaided” (customers were asked if they had heard of the practice) and “aided” (customers were read a description of benchmarking and then asked if they had heard of the practice). Unaided, 16% of non-participants indicated that they had previously heard about benchmarking; adding aided to unaided, a total 24% had heard of it. (Table 5-3)

**Table 5-3: Previously Heard about Benchmarking\***  
(non-participants [unaided]; non-participants who were not previously aware of benchmarking [aided])

	Unaided	Aided
<i>Sample Size</i>	48	48
Yes	16%	24%
No	84%	76%

\* For more information, see Table B-14 and Table B-15.

Awareness of benchmarking among non-participants is relatively simple to measure via survey research and could be a useful a progress indicator for the utilities' benchmarking initiatives. Section 5.1.3 describes some challenges associated with surveying non-participants that should be borne in mind in planning future survey research among non-participants.

The EPA representatives interviewed believed that awareness of benchmarking with Portfolio Manager is high in the commercial real estate sector and among local governments. They offered

a mixed assessment of awareness of benchmarking with Portfolio Manager. According to one interviewee, awareness is very high in the commercial real estate sector, due largely to the efforts of the Building Owners and Managers Association (BOMA). Awareness is also high among certain state and local governments due to the efforts of the National Association of State Energy Officials (NASEO) and of the benchmarking disclosure laws taking effect in some states and cities. One EPA interviewee also cited K-12 schools and acute care hospitals as among the building types with the highest awareness. However, the other EPA interviewee saw awareness among commercial, institutional, and government end users as “pretty limited” in large part because the deadlines for AB 1103 compliance have shifted. This interviewee noted that awareness could be higher.

Stakeholder interviewees were of the opinion that holders of larger portfolios are more likely to be aware of benchmarking and the value it can provide them and are more likely to be willing to benchmark. Those with smaller portfolios are less likely to be aware of benchmarking or willing to benchmark.

In the opinion of one stakeholder interviewee, large commercial customers who are members of BOMA tend to be highly aware of benchmarking and are probably active in it. This sector “takes care of itself when it comes to benchmarking.” However, this interviewee opined that among other segments awareness of benchmarking is probably very low, and noted that the segment made up of smaller buildings needs attention as they are probably the least efficient buildings in California. The telephone survey results (Section 5.1.8.1) include a finding that end-user participants who benchmarked reported larger portfolios of buildings owned, occupied or managed than participants who did not benchmark and non-participants. These findings lend credence to this stakeholder’s belief that awareness is higher among large commercial customers.

### 5.1.3 Rates of Benchmarking

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The rate at which end-user participants reported having completed benchmarking at least one building in the three years prior to the survey was 45%. For vendors, the rate was 28%. Four non-participants (5%) reported having completed benchmarking at least one building in the three years prior to the survey—similar to what would be expected given numbers from ENERGY STAR of California buildings benchmarked using Portfolio Manager as of December 2010. As the non-participant sample comprised customers most likely to qualify for and readily be able to benchmark with Portfolio Manager—i.e., medium and large customers who were sole tenants of commercial buildings—this suggests the rate of benchmarking among all commercial customers who have not taken a benchmarking workshop is similarly low. The sample size of non-participants who had benchmarked buildings was too small to make meaningful comparisons between participants who had benchmarked and non-participants who had benchmarked.*
- ❖ *The rate at which end-user participants reported having completed benchmarking at least one building in the three years prior to the survey, along with other data presented in this section, lends support to conclusions described elsewhere in this section that the workshops have been effective*

*in providing customers with the information and skills needed to benchmark their buildings.*

- **Recommendation:** *In planning for initiative tracking and future evaluation, the CPUC or IOUs may want to consider fielding a survey designed specifically to understand progress made on benchmarking by non-participants. The evaluation team's experience is that non-participants are a much more difficult group to recruit for a survey than are participants. This is due to the fact that frequently only the name and phone number of a corporation, rather than an individual contact, is available from the CIS for customers who have not participated in a utility workshop or program, and that benchmarking is a topic of low salience outside of workshop participants. Any study focusing on surveying non-participants will need to be carefully designed to boost response rates under these circumstances.*

The rate at which end-user participants reported having completed benchmarking at least one building in the three years prior to the survey was 45%. For vendors, the rate was 28%.<sup>85</sup> Four non-participants (5%) reported having completed benchmarking at least one building in the three years prior to the survey.

It is to be expected that the rate at which end-user participants reported having completed benchmarking at least one building in the three years prior to the survey would be considerably higher than for non-participants, since the participant group was by definition interested in benchmarking. The rate, along with other data presented in this section, lends support to conclusions described elsewhere in this section that the workshops have been effective in providing customers with the information and skills needed to benchmark their buildings.

One possible reason that the rate for vendors was lower than for end-users is that a substantial percentage of vendors sending staff to utility benchmarking workshops are using the workshops to scope out benchmarking as a business offering. Because vendors who had not completed benchmarking at least one building in the three years prior to the survey were excluded from the survey, it is not possible to assess the accuracy of this or other reasons that might explain the disparity in rates of building benchmarking between end-users and vendors.

To assess the accuracy of the rate at which non-participants reported having benchmarked a building in the three years prior to the survey, the research team calculated a rough estimate of the percent of California buildings benchmarked with Portfolio Manager as of December 31, 2010 using data from ENERGY STAR and the California Energy Commission. According to ENERGY STAR, 18,266 California buildings had been scored using Portfolio Manager as of December 31, 2010.<sup>86</sup> The California Energy Commission estimated that there were 525,736

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<sup>85</sup> These rates were calculated using data both from respondents who completed the participant survey and prospective respondents who answered the participant screening questions, but either did not qualify to complete the survey due to the respective quota having been filled, or did not complete it for another reason. In calculating these rates, the data were weighted to reflect the distribution of commercial customers by utility.

<sup>86</sup> Energy Star Snapshot, "Measuring progress in the C&I sectors", released Spring, 2011. Data runs through December 31, 2010.

commercial buildings in the state as of 2003.<sup>87</sup> These data suggest that about 3.5% of California buildings had been benchmarked as of the end of 2010. This is well within the confidence interval for the 5% rate found by the non-participant survey. As the non-participant sample was comprised of customers most likely to qualify for and readily be able to benchmark with Portfolio Manager—i.e., medium and large customers who were sole tenants of commercial buildings—we would expect it to be somewhat higher than the rate for all commercial customers. Together, these data provide strong evidence that the rate of benchmarking among all commercial customers who have not taken a benchmarking workshop is similarly low.

The sample size of non-participants who had benchmarked was too small to make meaningful comparisons of responses to survey questions by participants who had benchmarked versus non-participants who had benchmarked.

### 5.1.4 Customer Understanding of Benchmarking and Perception of Value

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The data suggest that among the population represented by the non-participant sample, a majority of those who have heard of the term “benchmarking” have a reasonable understanding of benchmarking. Three-quarters of non-participants who were aware of benchmarking but had not benchmarked buildings exhibited at least a moderate understanding of it.*
- **Recommendation:** *Like awareness, understanding of benchmarking among non-participants is simple to measure via survey research and could be a useful a progress indicator for the utilities’ benchmarking initiatives. Section 5.1.3 describes some challenges associated with surveying non-participants that should be borne in mind in planning future survey research among non-participants.*

Non-participants who were aware of benchmarking (unaided), but had not benchmarked buildings, were asked their understanding of the term “building benchmarking” as an open-ended question.<sup>88</sup> Six of the eight respondents (75%) gave answers exhibiting at least a moderate understanding of benchmarking (i.e., their answers indicated that they understood it involved measuring energy consumption). Of these, two (25%) gave answers exhibiting a high understanding of benchmarking (i.e., they understood that benchmarking involved comparing building energy usage to energy use of other buildings) (Table 5-4).

<sup>87</sup> Brooks, Martha. 2009. “Rating the Energy Performance of CA Commercial Buildings.” Presentation made at the Committee Workshop to Discuss Draft Regulations to Implement AB 1103, August 13. Accessed February 27, 2012 from [http://www.energy.ca.gov/ab1103/documents/2009-08-13\\_workshop/presentations/Martha\\_Brook\\_Presentation.pdf](http://www.energy.ca.gov/ab1103/documents/2009-08-13_workshop/presentations/Martha_Brook_Presentation.pdf).

<sup>88</sup> Non-participants who were aware of benchmarking using the “aided” measure were also asked about understanding. However, these non-participants were also read a description of benchmarking prior to being asked about understanding. For this reason, their results are not reported or discussed here.



**Table 5-4: Meaning of the Term “Building Benchmarking”<sup>\*</sup>**  
(non-participants who had heard of the term “Building Benchmarking” [unaided])

	<b>Total Non-Participants (count)</b>
<i>Sample Size</i>	8
Measuring energy consumption	4
Comparing building energy usage to other buildings	2

<sup>\*</sup> For more information, see Table B-16.

### 5.1.5 Customer Interest in Benchmarking

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Of those organizations that do not benchmark fairly soon after sending staff to a workshop, about one-half were still interested in benchmarking while about a third were not. Initiative staff told the evaluation team that they continue to send workshop announcements to past registrants.*
- **Recommendation:** *Given the rate of interest in benchmarking that remains among organizations that do not benchmark fairly soon after the workshop, it makes sense for the IOUs to continue the practice of sending workshop announcements to past registrants.*

Both participants and non-participants who had not benchmarked were asked to rate their organization’s interest in benchmarking its buildings in the future using a scale of zero (“not at all interested”) to ten (“extremely interested”). Among participants who had not benchmarked, just under one-half (48%) indicated that they were at least somewhat interested (6-10), and one-third (34%) indicated a high level of interest (8-10). Just over one-third (36%) were somewhat or not at all interested (0-4) in benchmarking their buildings in the future. Only three non-participants who were aware of benchmarking had not benchmarked, which unfortunately is too small a number to make meaningful comparisons against the participant sample. Of this small group, two were neither interested nor disinterested (5) and one was not at all interested (0). (Table 5-5)

**Table 5-5: Organization’s Interest in Benchmarking<sup>\*</sup>**  
(participant end users who did not benchmark; non-participants aware of benchmarking who did not benchmark)

	<b>Total Non-Benchmarking Participants</b>	<b>Non-participants (count)</b>
<i>Sample Size</i>	44	3
Very interested (8-10)	34%	--
Somewhat interested (6-7)	14%	--
Neither interested nor disinterested (5)	16%	2
Somewhat disinterested or not at all interested (0-4)	8%	1

<sup>\*</sup> For more information, see Table B-115.

The most common reason cited by participants for not benchmarking despite having attended the workshop was that benchmarking was not applicable to their organization or they did not own a big building (3 out of 13), followed by respondents claiming that they had already achieved their



goals or already optimized energy use, they did not care about energy use or had other priorities, and that the process was confusing or they did not understand it yet (2 each). (Table 5-6)

**Table 5-6: Reasons Organization is Not That Interested in Benchmarking\***

(participant end users who did not benchmark who said their organization is not that interested in benchmarking;  
non-participants who said their organization is not that interested in benchmarking)

	<b>Total Non-Benchmarking Participants (count)</b>	<b>Non-participants (count)</b>
<i>Sample Size</i>	13	1
Not applicable/don't own a big building	3	--
Already achieved goals/already optimized energy use	2	--
Don't care about energy use/have other priorities	2	--

\*For more information, see Table B-116.

In the opinion of one stakeholder interviewee, just because an organization is interested in benchmarking does not mean they will act. According to this interviewee, there are (1) those who are aware of benchmarking but not willing to benchmark because they do not have the time, and (2) those who are very aware and very willing. This includes “energy geeks” and some “super users” who want to incorporate benchmarking into their business processes. It should also be noted that implementation of AB 1103, which is expected to be a major driver for customer to benchmark buildings, had not yet take place as of the time of the study.

### 5.1.6 Length of Experience with Benchmarking

About two-fifths of both participant end-users and vendors who had benchmarked reported having started benchmarking buildings in 2010 or 2011(close to the time they took a workshop). This finding is to be expected given that workshop participants prior to 2010 were not included in the data request.

About two-fifths of participants (43%) and almost half of vendors (49%) reported having started benchmarking buildings in 2010 or 2011, within the range of time in which they had registered for a workshop. The earliest any participant reported having started benchmarking was 1985. The majority of both participants (67%) and vendors (74%) reported having started benchmarking in 2007 or later (Table 5-7).

**Table 5-7: Year First Began Benchmarking\***

(participants and non-participants who benchmarked)

	<b>EB</b>	<b>V</b>	<b>Non-participants (count)</b>
<i>Sample Size</i>	41	40	4
1985	4%	--	--
2007-2009	24%	29%	1
2010-2011	43%	45%	1

\*For more information, see Table B-65.

### 5.1.7 Customer Decision-making

#### Summary of Key Findings & Recommendations in this Section

- ❖ *When it comes to benchmarking, the building owner is not necessarily the decision-maker.*
- ❖ *Buildings at or over 50,000 square feet are more likely to be operated by a property management firm or by a building operator or facilities manager.*
- ❖ *At a property management firm with a large portfolio of buildings, the corporate Vice President for facilities is likely to be the decision-maker; for a large individual building, the facilities manager is likely to make the decisions.*
- ❖ *Smaller buildings are less likely to have an on-site building manager, in which case the decision to benchmark is likely to be made by the owner or a tenant.*
- ❖ *If a tenant makes the decision, typically they occupy either all, or the lion's share, of the building they lease.*

Stakeholder interviewees provided insight into who makes the decision to benchmark a building or portfolio of buildings. The insights made it very clear that despite the focus on the building owner in some benchmarking legislation, the building owner is not necessarily the decision-maker. One interviewee who had worked extensively with building owners indicated that one reason for this is that building ownership can be a complex matter, as “every type of ownership and tenancy situation exists.” For example, in the case of a condominium, the owner or “parcel holder” is likely to be the condominium association. A leased building may have absentee ownership residing elsewhere, and the absentee ownership situation may be complex. In such situations, a property manager may deal with the tenants.

All three stakeholder interviewees noted that who makes the decision to benchmark is also related to building size and to who is operating the building. Buildings at or over 50,000 square feet are more likely to be operated by a property management firm or by a building operator or facilities manager (who is often an employee of a property management firm). At a property management firm with a large portfolio of buildings, the corporate vice president for facilities is likely to make the decision. For a large individual building, the facilities manager is likely to make it. Smaller buildings are less likely to have an on-site building manager, in which case the decision to benchmark is likely to be made by the owner or a tenant. If a tenant makes the decision, typically they occupy either all, or the lion's share, of the building they lease.

### 5.1.8 Firmographics

#### 5.1.8.1 Number of Buildings Owned, Occupied or Managed

#### Summary of Key Findings & Recommendations in this Section

- ❖ *End-user participants who had benchmarked buildings reported larger portfolios of buildings owned, occupied or managed (49%) than both participants who had not benchmarked (33%) and non-participants (22%).*

End-user participants who had benchmarked reported larger portfolios of buildings owned, occupied or managed (49%) than participants who had not benchmarked (33%) and non-participants (22%). Both end-user participants who had benchmarked and those who had not were less likely than non-participants to report managing the smallest numbers of buildings (32% EB and 30% EN versus 53% non-participants). These differences are statistically significant. (Table 5-8)

**Table 5-8: Number of Buildings Owned, Occupied, or Managed in the US\***

(participant end users who did not benchmark; non-participants; participant end users who benchmarked; non-participants who benchmarked)

	EB	EN	Non-participants	Non-participants who benchmarked (count)
Sample Size	43	44	48	4
1 to 4	32% ε	30% ε	53%	2
Over 25	49%ε	33%	22%	1

ε Significantly different from non-participants at the 90% confidence level.

ζ Significantly different from EN at the 90% confidence level.

\* For more information, see Table B-124.

### 5.1.8.2 Area of Buildings Owned, Occupied or Managed in California

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Participants reported owning, occupying, or managing both larger portfolios of buildings and larger buildings than did non-participants. Nearly two-fifths of participants who reported the total conditioned square footage of their buildings via the survey reported a total area of 400,000 square feet or more, compared to one-seventh of non-participants; two-fifths of participants reported total area of less than 100,000 square feet as compared to two-thirds of non-participants. Interviewees have pointed out that benchmarking should be supported for smaller buildings as well, although this does not necessarily mean smaller buildings are not being benchmarked, as participants may have large numbers of small buildings that add up to large total square footages.*
- **Recommendation:** *As the initiative matures, initiative designers may want to give further consideration to how to better meet the needs of smaller customers*

The survey asked end users to provide either the total square footage or average square footage of the conditioned areas of their buildings in California. Vendors were asked to provide information for their clients' buildings.<sup>89</sup>

In general, participants reported owning, operating or managing larger total square footage in California than non-participants. Nearly two-fifths (38%) of participants who reported total conditioned square footage of their buildings reported a total area of 400,000 square feet or more, compared to one-seventh (14%) of non-participants; two-fifths (40%) of the participants

<sup>89</sup> Average square footage could not be calculated from the total since number of buildings was asked by category.

reported total area of less than 100,000 square feet as compared to two-thirds (66%) of non-participants.<sup>90</sup> (Table 5-9)

**Table 5-9: Total Square Footage of Buildings in California\***  
(participants and non-participants who indicated total square foot of buildings)

	EB	EN	Vendors (count)	All Participants	Non- participants
<i>Sample Size</i>	16	20	10	46	23
1,000-99,999 ft <sup>2</sup>	6	41%	4	40%	66%
400,000 ft <sup>2</sup> or more	8	34%ε	3	38%ε	14%

ζ Significantly different from EN at the 90% confidence level.

ε Significantly different from non-participants at the 90% confidence level.

\* For more information, see Table B-127 and Table B-128.

Among participants who reported average square footage, one-half (50%) reported the average building was 100,000 square feet or more, and only one-eighth (13%) reported that the average square footage was in the smallest area category of less than 10,000 square feet (note that, based on square footage, this includes buildings eligible for the 1-to-100 ENERGY STAR score). Among non-participants who reported average square footage, the pattern was reversed, with one-half (8 of 16) reporting an average building area of less than 10,000 square feet and only 2 of 16 reporting an average building area of 100,000 square feet or more. (Table 5-10)

**Table 5-10: Average Square Footage of Buildings in California\***  
(participants who indicated average square foot of buildings; non-participants)

	All Participants	Non-participants
<i>Sample Size</i>	30	16
1,000-9,999 ft <sup>2</sup>	13%	8
100,000 ft <sup>2</sup> or more	50%	2

\* For more information, see Table B-129 and Table B-130.

### 5.1.8.3 Customers with Buildings Served by Multiple Utilities

About three-fifths (61%) of participants reported that all of their buildings were served by the same utility. Non-participants (81%) were significantly more likely than participants to have all buildings serviced by the same utility. Participant end-users who had benchmarked (72%) were significantly more likely to have all buildings serviced by the same utility than were vendors (50%). (Table 5-11) (Some of the IOUs provide both electric and gas service to the majority of their customers.)

<sup>90</sup> These data were requested by category. The differences between categories were statistically significant for total area of 50,000-99,999 square feet and for 400,000-899,999 square feet.

**Table 5-11: All Buildings Served by Same Utility\***  
(participants)

	<b>EB</b>	<b>EN</b>	<b>V</b>	<b>All Participants</b>	<b>Non-participants</b>
<i>Sample Size</i>	43	44	40	127	48
Yes	72% $\eta$	56% $\epsilon$	50% $\epsilon$	61% $\epsilon$	81%
No	26% $\eta$	40% $\epsilon$	44% $\epsilon$	36% $\epsilon$	14%

$\eta$  Significantly different from Vendors at the 90% confidence level.

$\epsilon$  Significantly different from non-participants at the 90% confidence level.

\* For more information, see Table B-133 and Table B-134.

## 5.1.9 Benchmarking as a Business Offering

### Summary of Key Findings & Recommendations in this Section

- **Recommendation:** Participant survey data reported in this subsection suggest that there is an emerging business of benchmarking services. Initiative designers may wish to consider whether and how this emerging business could be leveraged to increase the rate of benchmarking.

### 5.1.9.1 Degree of Experience

#### Summary of Key Findings & Recommendations in this Section

- ❖ Vendors are doing more than just exploring benchmarking as a business opportunity—about half (51%) of participant vendors reported having benchmarked five or more buildings, and nearly a quarter (24%) reported having benchmarked 25 or more buildings.

In the Participant survey, vendors were asked how many customer buildings their organization had performed benchmarking services for in the U.S. The data suggest that these vendors are doing more than just exploring—about half (51%) of participant vendors report having benchmarked five or more buildings, and nearly a quarter (24%) 25 or more. (Table 5-12)

**Table 5-12: Number of Buildings Serviced in the US\***  
(participant vendors)

	<b>Total Vendors</b>
<i>Sample Size</i>	40
5 to 25	27%
Over 25	24%

\* For more information, see Table B-60 or Table B-125.

A stakeholder interviewee had hypothesized that vendors might be more—and less—likely to benchmark for clients with smaller buildings or portfolios. On the one hand, vendors who cold-call businesses in search of benchmarking work are likely to have success reaching out to smaller buildings that have not yet been benchmarked and probably tend to have low scores, and that such cold-calling could be very fruitful in producing benchmarking participants. However, because performing benchmarking does not require any special training or qualifications, owners of smaller buildings who benchmark may be more likely to undertake the benchmarking themselves. While the interviewee did not state this explicitly, the implication was that owners of

smaller buildings or smaller portfolios of buildings would likely not have the budget or interest to pay a firm to benchmark their building. Based on the survey data, however, it appears that vendors are just as likely as end-user participants to benchmark smaller buildings.

### 5.1.9.2 Client Base

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Nearly three-quarters of vendors (74%) identified large office building owners or managers as the type of client who in their experience had expressed the strongest interest in benchmarking. After office, vendors reported the following primary activities in buildings they benchmarked in California: hotel or motel (9%), non-food retail (9%), and health care other than hospital (8%).*

Vendors and participants had similar distributions of average conditioned square footage of facilities benchmarked: 1,000-9,999 square feet, 13%; 10,000-49,999 square feet, 21%; 50,000-99,999 square feet, 16%; 100,000 square feet or more, 50%.

Nearly three-quarters of vendors (74%) identified large office building owners or managers as the type of client who in their experience had expressed the strongest interest in benchmarking. This finding is in accordance with the earlier finding (Section 5.1.1.2) that vendors most frequently reported office as the primary business activity conducted at the buildings they have benchmarked for customers (49%). Table 5-13 shows the top five types of clients vendors cited as having the strongest interest in benchmarking.

**Table 5-13: Types of Clients with Strongest Interest in Benchmarking\***  
(participant vendors; multiple response)

	<b>Total</b>
<i>Sample Size</i>	34
Large office building owners or managers	74%
Small office building owners or managers	43%
Hotel owners or managers	39%
Data center owners or managers	36%
School administrators	32%

\* For more information, see Table B-83.

After office, vendors reported the following primary activities in buildings they benchmarked in California: hotel or motel (9%), non-food retail (9%), and health care other than hospital (8%). Table 5-14 shows the most common clients vendors identified as having a strong interest in benchmarking. The sample size was too small to compare differences across utilities.

**Table 5-14: Most Commonly Reported Primary Business Activities – Vendors Only\***  
(participants; multiple response)

	V	All Participants
<i>Sample size</i>	40	127
Office	49%	44%
Hotel or Motel	9% <sup>δ</sup>	8%
Retail (non-food)	9%	7%
Health Care (other than Hospital)	8% <sup>δ</sup>	7%
Municipal/Local Govt. Building	5%	5%
Community Service/Church/Temple	2%	3%
Industrial Process/Manufacturing/Assembly	1% <sup>δ</sup>	8%

<sup>δ</sup> Significantly different from all participants at the 90% confidence level.

\* For more information, see Table B-131.

### 5.1.9.3 Vendor Perception of Demand

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The data suggest that there is a substantial base of demand for vendors to benchmark buildings for clients.*

In the participant survey, vendors were asked questions designed to shed light on the demand for benchmarking as a service. Vendors were read two statements and asked to choose the one that best described the role of benchmarking commercial buildings for their business. Over two-fifths (44%) of vendors who had participated in a workshop said that they benchmarked commercial buildings only at the request of clients, suggesting that there is a substantial base of commercial customers who are asking for the service. (Table 5-15)

**Table 5-15: Role in Benchmarking\***  
(participant vendors)

	Total
<i>Sample size</i>	40
Benchmark commercial buildings only at the request of clients, and do not actively seek this business	44%
Actively seek business benchmarking commercial buildings	56%

\* For more information, see Table B-81.

Vendors were asked to rate the level of demand on a scale of zero (“none at all”) to ten (“a very great deal”) for commercial building benchmarking services in the service territory of the utility that had offered the benchmarking workshop they attended. One-half (50%) of these vendors indicated that there was moderate or strong demand, giving a rating of five or higher; about one-seventh (15%) indicated that there was strong demand, giving a rating of eight or higher (Table 5-16).



**Table 5-16: Demand for Commercial Benchmarking Services\***  
(participant vendors)

	<b>Total</b>
<i>Sample Size</i>	40
Strong demand (8-10)	16%
Moderate demand (5-8)	35%

\*For more information, see Table B-82.

### 5.1.10 Property/Rental/Real Estates Uses of Benchmarking

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The findings suggest that a subset of workshop registrants who have benchmarked buildings—perhaps about one-quarter—are using the results of benchmarking for real estate business purposes.*
- ❖ *By far the most common use is to market buildings or differentiate their business (53%), followed by playing a role in the acquisition of new buildings (35%), most commonly to evaluate the cost of operating or upgrading the building, helping value buildings for leases (26%), helping market buildings to potential tenants (24%), and playing a role in the sale of buildings in their portfolio (17%).*
- ❖ *The profiled interviewees pointed to some limitations to the real estate uses of benchmarking.*

A series of questions were asked in the participant and non-participant surveys to help quantify the use of benchmarking for real estate business purposes. Table 5-17 below shows the noteworthy findings, including:

- More than one-half (53%) of participants indicated that they either had used or expected to use their benchmarking activities to market buildings or otherwise differentiate their business.
- About one-quarter (26%) of participants who had benchmarked reported that their organization used benchmarking data to help value buildings for leases.
- About one-quarter (24%) of participants who had benchmarked reported their organization used benchmarking data to help market buildings to potential tenants.
- Just over one-third (35%) of end-user participants who had benchmarked reported that benchmarking had played a role in the acquisition of new buildings by their organization.
- Participants who had indicated that benchmarking played a role in the acquisition of new buildings by their organization were asked to specify the role it played. The most commonly offered response was that benchmarking helped to evaluate the cost of operating or upgrading the building (5 out of 12).
- Nearly one-fifth (17%) of participants who had benchmarked said their benchmarking activities played a role in the sale of buildings in their portfolio.

Taken together, these findings suggest that a subset of workshop registrants who have benchmarked are indeed using the results for real estate business purposes. While the numbers of

non-participants who benchmarked are too small to compare results, the fact that none of non-participants who were asked these questions said that their organization used the results in any of these ways suggests that outside of workshop participants, the rates of real estate uses of benchmarking results could be lower than this.

**Table 5-17: Use of Benchmarking\***  
(participant end users and non-participants who benchmarked)

	<b>Total Benchmarking Participants</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	41	4
Differentiate Business	53%	1
Value Buildings for Leases	26%	--
Market Buildings to Potential Tenants	24%	--
Acquisition of New Buildings	35%	--
Sale of Buildings in Portfolio	17%	--

\* For more information, see Table B-100 through Table B-106.

Stakeholder interviewees identified several limitations to the use of benchmarking for real estate business purposes that are specific to AB 1103. These are described in Section 5.6.2.5.

All five customers who were profiled were asked about the real estate uses of benchmarking. Of all the profiled customers, only the REIT mentioned using benchmarking data in real estate transactions. According to this interviewee, their organization preferentially acquires LEED buildings. LEED and ENERGY STAR buildings are more valued than other buildings, but ENERGY STAR certification is easier to achieve because it is just one part of LEED. The interviewee said that LEED buildings must be benchmarked, which they do before a building purchase. Given the organization's focus on LEED and ENERGY STAR buildings, benchmarking plays a significant role in the REIT's acquisition of new facilities.

## 5.2 Describe How Customers are Using Benchmarking

### 5.2.1 Updating and Monitoring of Benchmark Scores

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Taken together, the findings in this section suggest that about half the participants who benchmarked buildings are undertaking the kind of monitoring and re-benchmarking that is envisioned as an outcome of using Portfolio Manager. For example, nearly half of end-user participants who benchmarked (48%) strongly agreed that someone in their organization routinely monitors benchmark scores or EUIs. Of end-user participants whose organizations re-benchmark routinely, more than half (58%) report doing so at least four times a year, and nearly a third (29%) reported doing so at least twelve times a year. The majority of end-user participants (64%) agreed that someone in their organization usually checks the benchmark score or re-benchmarks after making a building or equipment change.*
- ❖ *Self-reported frequency of score monitoring and re-benchmarking is easily measured and could be*

*a useful progress indicator for the initiative or for benchmarking overall.*

### 5.2.1.1 Rate of Routine Monitoring of Scores

Among the purposes of the utility ABSs is to facilitate routine monitoring of benchmark scores, which is envisioned as an outcome of using Portfolio Manager. One-half of the participants (50%) strongly agreed (8-10) with the statement: “You or someone else in your organization routinely monitors your buildings’ benchmark scores or EUIs,” while 18% strongly disagreed (0-2).

About three-fifths (62%) of participants disagreed (0-4), and about one-half (49%) strongly disagreed (0-2) with the statement: “You *do not* re-benchmark or check your buildings’ benchmark scores.” However, over one-third (36%) of the participants expressed some level of agreement (6-10), suggesting that these participants treated their benchmarking as a one-time activity.

When asked “How common is it for you to continue to monitor a benchmark score or energy use intensity (EUI) for a client after you have benchmarked a building for them,” about one-third of vendors (32%) said it was very common (8-10), while a similar proportion (35%) percent said it was not at all common (0-2).

Because of the small number of non-participants who had benchmarked buildings, it is not possible to draw conclusions about the comparative rate of non-participant organizations’ routine monitoring from these data. The anecdotal evidence from the non-participant answers suggests that the rate of re-benchmarking and of routine monitoring of scores may be lower among non-participants who benchmark. (Table 5-18)

**Table 5-18: Routine Monitoring of Building Benchmarking Scores\***  
(participant end users and non-participants who benchmarked; participant vendors)

	Total EB	Non-participants (count)
<i>Sample size</i>	41	4
<b>Routinely Monitor Building Benchmarking Scores or EUIs</b>		
Strongly agree (8-10)	50%	1
Strongly disagree (0-2)	18%	--
<b>Do Not Re-benchmark or Check Buildings’ Benchmark Scores</b>		
At least somewhat agree (6-10)	36%	3
Disagree (3-4)	13%	--
Strongly disagree (0-2)	49%	--
<b>Vendors Continue Monitoring Client Benchmarking Scores</b>	<b>Total Vendors</b>	
<i>Sample size</i>	40	
Very common (8-10)	32%	
Not at all common (0-2)	35%	

\* For more information, see Table B-66, Table B-67 and Table B-70.

### 5.2.1.2 Frequency of Routine Monitoring

Participants who had at least somewhat agreed (3-10) that “You or someone else in your organization routinely monitors your buildings’ benchmark scores or EUIs,” were asked how frequently their organization usually re-benchmarked buildings or checked the score. Nearly three-fifths (58%) reported that their organization re-benchmarked at least four times a year; one-half of these (29%) reported having re-benchmarked at least twelve times a year. (Table 5-19)

**Table 5-19: Frequency of Re-benchmarking or Checking Scores\***  
(participant end users and non-participants who routinely monitor building benchmarking Scores or EUIs)

	Total Benchmarking End Users
<i>Sample size</i>	27
At least 12 times a year	29%
At least four times a year	29%

\*For more information, see Table B-71.

The interviews with customers also provided anecdotal evidence to support the above findings. With the exception of the engineering services vendor, the customers interviewed all benchmarked on a monthly basis. (The engineering services vendor noted that since ENERGY STAR is an annual designation, he typically benchmarks each customer building annually, updating the profile for the customers’ ENERGY STAR applications.)

### 5.2.1.3 Rate of Re-benchmarking After Making a Change to Building or Equipment

Almost two-thirds of participants (64%) expressed some level of agreement (6-10) with the statement: “When you make a change to a building or to equipment that could affect its energy use, you or someone else in your organization usually checks the benchmark score or re-benchmarks after making the change.” Of these, about one-half (48%) strongly agreed (8-10). (Table 5-20)

**Table 5-20: Someone in the Organization Usually Checks the Benchmark Score or Re-benchmarks After Making a Building or Equipment Change\***  
(participant end users and non-participants who benchmarked)

	Total Benchmarking End Users
<i>Sample size</i>	41
Strongly agree (8-10)	48%
Agree (6-7)	16%

\*For more information, see Table B-68.

### 5.2.1.4 Rate of Re-benchmarking After a Change in Tenancy

More than one-third of participants (37%) strongly agreed (8-10) with the statement: “You re-benchmark or check your buildings’ benchmark scores when there is a change in building tenancy,” although just over one-quarter (26%) strongly disagreed (0-2). (Table 5-21)

**Table 5-21: Re-benchmark or Check Building Scores when there is a Change in Building Tenancy\***  
(participant end users and non-participants who benchmarked)

	<b>Total Benchmarking End Users</b>
<i>Sample size</i>	41
Strongly agree (8-10)	37%
Strongly disagree (0-2)	26%

\* For more information, see Table B-69.

## 5.2.2 Use of Other Benchmarking Tools

### Summary of Key Findings & Recommendations in this Section

- ❖ *Portfolio Manager was by far the most commonly reported benchmarking tool or resource currently in use among both the participant end-users (63%) and vendors (65%).*

The telephone survey included a series of questions to better understand the use of multiple benchmarking tools by the sampled population.

Portfolio Manager was by far the most commonly reported benchmarking tool or resource currently in use among both the participant end-users (63%) and vendors (68%). This is to be expected considering the respondents had all participated in a utility's Portfolio Manager workshop. After Portfolio Manager, respondents reported having used internal methods, spreadsheets or data (17% end-users, 10% vendors), and utility bills (2% end-users, 13% vendors), followed by various types of software (Table 5-22). While only one respondent, an end-user, specified ABS, we suspect this was because customers do not necessarily realize the difference between Portfolio Manager and the utility ABS that provides them with automatic access to data.

**Table 5-22: Benchmarking Tools Used\***  
(participant end users who benchmarked; participant vendors who benchmarked; multiple response)

	<b>Total Participant End-Users (count)</b>	<b>Total Participant Vendors (count)</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	41	40	4
ENERGY STAR Portfolio Manager	26	27	--
Internal method/spreadsheets/data (ex. Metering, energy consumption)	7	4	--
Utility bills/monthly energy use	1	5	2

\* For more information, see Table B-74 and Table B-75.

### 5.2.3 How Customers Use Benchmark Scores

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The ways that end-users most frequently reported having used the information was to set a baseline score or EUI for future comparison (85%). End-users reported using the information to identify energy efficiency opportunities in the building nearly as frequently for a baseline for future comparison (84%), despite the fact that Portfolio Manager is not designed to identify specific energy-saving opportunities within buildings.*
- ❖ *Two-thirds (67%) of participants said they had used the information to identify which buildings needed the most improvement in their energy performance and a slightly smaller percentage had used it to set goals for facility performance (63%).*
- ❖ *The results suggest that there is a need for a tool that identifies energy efficiency opportunities within a building. The new module being developed for EnergyIQ is designed to meet this need, and an asset rating tool such as BEARS seems better suited to this purpose than Portfolio Manager. However, as an operational rating tool that does not require the use of a certified rater, it seems likely that EnergyIQ would be more popular as a supplemental tool than BEARS among users of Portfolio Manager.*
- **Recommendation:** *Given the desire of Portfolio Manager users to identify energy-saving opportunities within their buildings, IOUs may want to consider exploring ways to facilitate this in association with the benchmarking initiatives. In addition to connecting customers who have benchmarked with appropriate utility programs to help with this, supplemental use of the new EnergyIQ module or another benchmarking tool may help meet this need. Any exploration should be mindful of the value of the ENERGY STAR label in the eyes of customers and in the commercial building marketplace, and be careful about how the use of supplemental tools is framed, lest this value be eroded.*
- **Recommendation:** *Given the desire of Portfolio Manager users to identify energy-saving opportunities within their buildings, the utilities may wish to consider encouraging or collaborating with the EPA to include more diagnostic functionality in Portfolio Manager, either by adding this as content or allowing customization of the displayed information for utility customers.*

Participants were asked if they had used the information they obtained from benchmarking in each of a series of ways. The most frequent ways that end-users reported they had used the information was to set a baseline score or EUI for future comparison (85%) and to identify energy efficiency opportunities in the building (84%). Two-thirds (67%) of participants said they had used the information to identify which buildings needed the most improvement in their energy performance and a slightly smaller percentage had used it to set goals for facility performance (63%). (Table 5-23)

**Table 5-23: Use of Information Obtained in Benchmarking\***  
(participant end users and non-participants who benchmarked; multiple response)

	<b>Total Benchmarking Participants</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	41	4
Set a baseline score or EUI for future comparison	85%	2
Identify energy-efficiency improvement opportunities in the building	84%	2
Identify which buildings needed the most improvement in their energy performance	67%	1
Set goals for facility performance	63%	1

\* For more information, see Table B-88.

The large majority (90%) of participants said that benchmarking had provided them with new information about their buildings' energy performance. Just over two-thirds (66%) said that it was a requirement for ENERGY STAR or LEED certification, while slightly less than two-thirds (64%) said that it had confirmed or provided proof for management of what was already known about the buildings' performance. (Table 5-24)

**Table 5-24: Value Obtained from Benchmarking\***  
(participant end users and non-participants who benchmarked; multiple response)

	<b>Total Benchmarking Participants</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	41	4
Provided new information about buildings' energy	90%	1
Was a requirement for "ENERGY STAR" or "LEED" certification	66%	1
Confirmed or provided proof for management of what already known about buildings' performance	64%	1

\* For more information, see Table B-87.

The customers profiled provided further illustrations of how those with larger portfolios of buildings use benchmark scores. The municipality uses Portfolio Manager to track energy savings from the energy-efficiency projects that they have in place. They transfer the first and second year savings from these projects back into an energy savings fund. They are using the information to obtain LEED certification for four of their buildings in the next six months and plan to participate in the LEED Volume Program. They are also working with the U.S. Green Building Council (USGBC) on the Building Performance Partnership (BPP) and are starting to benchmark their water usage as part of that. In some facilities, they are undertaking energy efficiency projects for which they plan to track the energy savings every few months. They expect to conduct a thorough assessment of all facilities at least once a year.

At the federal agency, monthly benchmarking data are used to identify any big spikes in energy usage and buildings that are not performing well, whether they are "gobbling electricity or propane." For example, the data have helped the agency identify buildings that were heated while empty. The data are also used by management to assess whether to undertake an energy efficiency project and are important to obtaining funding for such projects. At least one energy efficiency project opportunity was identified as a result of benchmarking: retrofitting lighting



with T8 linear fluorescents in all of the staff buildings. Finally, the agency uses benchmarking data for its year-end report to Congress that is part of a federal mandate to reduce energy and water use. While the agency is not required to benchmark buildings under this mandate, benchmarking facilitates the process.

In the bank's retail branches, engineers do not generally see the benchmarking scores. Occasionally, they will see the score if there is an under-performing building. For example, one branch had a Portfolio Manager score of two. The branch was in a strip mall with four businesses and they realized they had been paying the utility bills for all the businesses. As a result of that investigation, they sub-metered the facility in order to break out the bills properly. In high rise buildings, such as the administrative office in which the interviewee works, engineers manage the building and do see the Portfolio Manager scores.

### 5.2.3.1 Vendor Perception of Customer Interest In and Use of Scores

#### Summary of Key Findings & Recommendations in this Section

- ❖ *About four-fifths (81%) of vendors believed clients to be at least somewhat interested in seeing the benchmarking results, while about three-fifths (62%) believed clients to be very interested.*
- ❖ *Nearly nine out of ten (88%) of the vendors believed that customers used the score to learn new information about their building's energy performance, over two-thirds (71%) believed the score was used to confirm or provide proof for management of what they already knew about their buildings performance, and about three-fifths (59%) believed it was used to fulfill a requirement for utility program participant or certification. (Only SDG&E customers are required to benchmark for commercial program participation. However, benchmarking with Portfolio Manager is among the offerings of some utilities' other commercial programs.)*

Vendors were asked how interested they believed their clients were in seeing the benchmarking results. On a scale of zero ("not at all interested") to 10, ("very interested") about four-fifths (81%) rated client interest at a six or higher, with about three-fifths (62%) reporting they believed the client to be very interested (8-10). (Table 5-25)

**Table 5-25: Client Interest in Benchmarking Results\***  
(participant vendors who provide results to the client only or to both the client and the utility)

	Total Vendors
<i>Sample size</i>	23
Very interested (8-10)	62%
Somewhat interested (6-7)	19%

\* For more information, see Table B-86.

Vendors were read four statements in random order and asked to identify the one that best described what the customer usually used the score report for in their experience. Nearly nine out of ten (88%) of the vendors believed that customers used the score to learn new information about their building's energy performance, over two-thirds (71%) believed the score was used to confirm or provide proof for management of what they already knew about their buildings

performance, and about three-fifths (59%) believed it was used to fulfill a requirement for utility program participant or certification. (Table 5-26) (Only SDG&E customers are required to benchmark for commercial program participation. However, benchmarking with Portfolio Manager is among the offerings of some utilities' other commercial programs. See Table B-84 in Appendix B for results for this question by utility.)

**Table 5-26: Clients' Use of Benchmarking Score\***  
(participant vendors)

	<b>Total Vendors</b>
<i>Sample size</i>	40
Learn new information about their building's energy performance	88%
Confirm or provide proof for management of what they already knew about their building's performance	71%
Fulfill a requirement for utility program participation or certification	59%

\* For more information, see Table B-84.

Vendors who believed that customers used the score to fulfill a requirement for utility program participation or certification were asked if they provided the results only to the client, only to the utility, or to both the client and the utility. Nearly nine out of ten (88%) said that they provided the results to either the client or to both the client and the utility; none said that they provided the result only to the utility (Table 5-27).

In contrast, the engineering services vendor profiled estimated that 95% of the managers of the facilities he benchmarks do not ask for the benchmarking data.<sup>91</sup>

**Table 5-27: Parties to Whom Vendors Provide Benchmarking Results\***

(participant vendors who believe customers usually use the score report to fulfill a requirement for utility program participation or certification)

	<b>Total Vendors</b>
<i>Sample size</i>	25
Provide results to the client only	44%
Provide results to both	44%

\* For more information, see Table B-85.

### 5.3 Use of Internal versus External Benchmarking

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Of the three basic ways that organizations use benchmarking tools—to compare buildings within a portfolio against each other, to compare a building or portfolio of buildings against a national index, and to compare a building with itself over time—the most common use from the perspective of end-users is to compare building energy performance with itself over time (81%), a form of internal benchmarking. The second most common use is to compare a building or portfolio of*

<sup>91</sup> This interviewee made an observation that may be of interest to EPA. Once the ENERGY STAR application is submitted to the EPA, the applicant no longer has a copy of the stamped application. According to this interviewee, clients want access to a copy of the stamped version of the application.

*buildings against a national index, a form of external benchmarking (65%) and third is to compare buildings within a portfolio against each other, another form of internal benchmarking (48%).*



Participants, vendors, and non-participants were asked a series of questions to assess how their organizations or clients used benchmarking as a comparison tool. Results are discussed in terms of “internal benchmarking” and “external benchmarking.” According to ENERGY STAR, “internal benchmarking allows an organization to compare the energy use at a building or group of buildings to that of others in that organization,” while “in external benchmarking, buildings are compared to other, similar buildings” outside the portfolio.<sup>92</sup>

Among participants, the largest percentage reported using benchmarking tools to track building energy performance to compare a building to itself over time (81%), a form of internal benchmarking, followed by using the tools to compare a building or portfolio of buildings against a national index, a form of external benchmarking (65%). Vendors reported that their clients were most likely to have used benchmarking in the same two ways and at similar percentages (71% and 73%, respectively). Using the data to compare a portfolio of buildings against each other, another form of internal benchmarking, was least common (48% for end-users and 62% for vendors). (Table 5-28)

**Table 5-28: Use of Benchmarking as a Comparison Tool\***

(participant end users and vendors who benchmarked; non-participants who benchmarked)

	<b>EB</b>	<b>V</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	41	40	4
To compare a building or portfolio of buildings against each other	48%	62%	1
To compare a building or portfolio of buildings against a national index	65%	73%	--
To compare a building to itself over time	81%	71%	3

\* For more information, see Table B-72 and Table B-73.

The customers profiled in the in-depth interviews were typically focused on internal benchmarking comparisons within their own portfolio of buildings to identify poor-performing buildings, the least commonly offered activity by those surveyed.

The municipal government uses the benchmarking data to compare each municipal facility against others of the same type (such as fire stations, which are the most energy intensive of their facilities and of which there are approximately 30), a form of internal benchmarking. They have not yet used the data for “external” benchmarking to compare their facilities with those of other municipalities across the U.S., although that is a long-term goal.

<sup>92</sup> ENERGY STAR. 2008. ENERGY STAR® Building Manual. April 2008. Accessed March 20, 2011 from [http://www.energystar.gov/index.cfm?c=business.EPA\\_BUM\\_CH2\\_Benchmarking](http://www.energystar.gov/index.cfm?c=business.EPA_BUM_CH2_Benchmarking).

The focus of most of the engineering services company's clients is neither internal nor external benchmarking—rather, it is on identifying properties with Portfolio Manager benchmark scores under 75. Their clients seek a score of 75 in order to obtain an ENERGY STAR rating. Only one of their clients compares benchmark scores across their portfolio (of 48 buildings). In this interviewee's opinion, there is little benefit to comparing properties within a portfolio because most commercial owners do not want to invest a lot of resources in buildings that score over 75 since there is little payback from improvements to such buildings and most building owners want a payback of one year or less.

The federal agency interviewee explained that many of the agency's buildings do not meeting the criteria for a Portfolio Manager rating as they are too small (under 5,000 square feet) or fall into the "other" category and are not eligible for a rating. Because of this, the agency focuses on comparing properties within their portfolio to each other and monitoring changes over time, a form of internal benchmarking.

The REIT's use of benchmarking is internal: they compare their buildings with one another in order to determine where to undertake energy-efficiency projects. They do not compare properties on a national scale because of the wide variety of buildings, climates, and uses (e.g. pharmaceuticals versus office buildings) which they think may not be comparable to their buildings.

The bank benchmarks facilities internally at a high level based on the Portfolio Manager score (a form of internal benchmarking). The portfolio is reviewed once a quarter. The advantage of comparing the properties comes from the ability to identify outliers and trends in building stock performance. For example, older facilities may not be up-to-date and the organization can take action. There are no disadvantages to making these comparisons. While they do receive the Portfolio Manager score for their buildings, the bank does not directly compare individual properties in their portfolio to all Portfolio Manager buildings across the US (a form of external benchmarking).

## 5.4 Customer Experiences with Benchmarking Participation

### 5.4.1 Rate of Use of Portfolio Manager

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Nine out of ten (90%) participants who had benchmarked reported having used Portfolio Manager to benchmark a least one building in the previous three years. However, just 63% of end-user participants who had benchmarked currently use Portfolio Manager to benchmark buildings.*

Both participants and non-participants who reported having completed benchmarking at least one building in the past three years were asked if their organization had used ENERGY STAR Portfolio Manager to do so. Nine out of ten (90%) participants who had benchmarked reported having used Portfolio Manager to benchmark a building a some point in the previous three years.

(Table 5-29) As noted in Section 5.2.2, just 63% of percent of end-user participants who had benchmarked currently use Portfolio Manager to benchmark buildings.

**Table 5-29: Use of ENERGY STAR Portfolio Manager in the Past Three Years\***  
(participants who have benchmarked at least one building in the last three years)

	<b>Total Participants</b>
<i>Sample size</i>	83
Yes	90%

\*For more information, see Table B-10 and Table B-11.

### 5.4.2 Role of Participants

Nearly three-quarters (73%) of participants' organizations that registered for the workshop benchmarked their own buildings and nearly one-quarter (23%) reported that another company had benchmarked buildings for them (Table 5-30).

**Table 5-30: Respondents' Role in Benchmarking Buildings**  
(participant end users and non-participants who have benchmarked at least one building in the last three years)

	<b>Total End Users</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	43	4
Benchmark buildings for own organization	73%	3
Another company benchmarks buildings for own organization	23%	--

\*For more information, see Table B-12 and Table B-13.

### 5.4.3 How Customers Learn About Benchmarking

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The most common ways that participants had first learned about benchmarking were through utility or EPA websites or email, through a utility energy efficiency program, through industry or trade journals, and through legislation.*
- ❖ *Participants who benchmarked were less likely than participants who had not benchmarked to have first heard about benchmarking from a utility account manager or representative (6% versus 28%), and more likely to have heard about benchmarking from a vendor (7% versus 0%) or from legislation (6% versus 0%).*

Participants surveyed for this study were most likely to cite their utility and EPA or ENERGY STAR as the source from which they had first learned about benchmarking (48% for those who benchmarked and 66% for those who had not), followed by word of mouth or community organizations (32% and 23%, respectively) and from industry or other government sources (26% and 15%, respectively). Participants who benchmarked (6%) were less likely than participants who had not (28%) to have first learned about benchmarking from a utility account manager or other utility representative and more likely to have heard about benchmarking from a vendor (7%) or from legislation (6%). (Table 5-31)

**Table 5-31: How Respondents First Learned about Benchmarking\***  
(participant end users; non-participants aware of benchmarking; multiple response)

	<b>EB</b>	<b>EN</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	43	44	7
<b>Utility/EPA/ENERGY STAR Sources</b>	48%	66%	2
Utility account manager or other utility representative	6%ζ	28%	1
<b>Industry/Other Government Information</b>	11%	6%	--
Through a vendor	7%ζ	--	--
Legislation (AB 1103 or other)	6%ζ	--	--
<b>Word of Mouth/Work/Community Organizations</b>	32%	23%	--

ζ Significantly different from EN at the 90% confidence level.

For more information, see Table B-17.

Representatives of EPA and stakeholders expressed the opinion that target audiences for Portfolio Manager learn about benchmarking with Portfolio Manager primarily from trade associations such as BOMA, NASEO, utilities (in California especially from the IOU workshops), and from service and product providers. To a lesser extent, they also learn about Portfolio Manager from on-line resources and webinars provided by ENERGY STAR. However, the survey results suggest that such associations were not as instrumental as were the utilities themselves, EPA or ENERGY STAR.

#### 5.4.4 Workshop Experience

##### 5.4.4.1 Opinions of Workshops

###### Summary of Key Findings & Recommendations in this Section

- ❖ *EPA, stakeholders, and initiative staff expressed very positive opinions of the benchmarking workshops.*
- ❖ *Reports provided by the utilities summarizing workshop evaluations showed that the workshops uniformly received high ratings and very positive feedback from attendees.*

EPA, stakeholders, and initiative staff all expressed very positive opinions of the benchmarking workshops. The EPA representatives perceived customer response to workshops as “overwhelmingly positive.” One stakeholder said:

*They actually have a live working session . . . with their own computers right there and then they set up their accounts and setup the ABS and download the data. At the end of the course, you’ve setup your system.*

Reports provided by the utilities summarizing workshop evaluations showed that the workshops uniformly received high ratings and very positive feedback from attendees.

The municipal government interviewee attended their local utility’s Portfolio Manager workshop for local government in person, while an assistant who helps with benchmarking attended an online training session. The in-person training was given by EEFG and “it was great.” The

online training was “pretty good.” However, while the on-line training covered the necessary information, it was thought to be “kind of repetitive.”

#### 5.4.4.2 Challenges Associated with Workshops

##### Summary of Key Findings & Recommendations in this Section

- ❖ *Workshops are offered in few locations, making them difficult for many customers to attend.*

Interviews with initiative staff revealed that workshops are offered in just a few locations, making them difficult for many customers to attend. The workshops are offered in-person at various utility sites or at customer sites when demand is sufficient. Staff at one IOU noted that in their experience, workshops offered in more far-reaching locations have been costlier to hold and had poorer attendance. As noted in Section 4.4.3, PG&E has created an on-demand web-based version of the workshop to help reach customers who cannot travel to an in-person workshop and other utilities are looking into this.

Initiative staff noted that workshop participation was related to impending implementation of AB 1103. In the aftermath of the delay in implementing AB 1103, all the utilities have found that demand for the workshops has declined.

#### 5.4.4.3 Why Customers Attend Benchmarking Workshops

##### Summary of Key Findings & Recommendations in this Section

- ❖ *The most common reasons that participants attended the workshop were to learn to use the Automated Benchmarking Service (26%), to better understand benchmarking performed by others (21%), and to learn about Portfolio Manager or benchmarking in general (21%).*
- ❖ *In interviews, SDG&E staff expressed concerns about whether requiring benchmarking for program participation would lead to the desired outcomes as envisioned by EPA. Compared to other utilities' service territories, more of the workshop participants in the SDG&E service territory attended because they are required to benchmark (17% SDG&E versus 3% PG&E and 0% SCE and SoCalGas). (Only SDG&E customers are required to benchmark for commercial program participation.)*

Survey participants were asked to identify the primary and secondary reasons they had attended the workshop. As Table 5-32 shows, the three most commonly offered primary reasons were:

1. To learn to use Automated Benchmarking Services (electronic meter data upload) (26%),
2. to better understand benchmarking performed by others (21%), and
3. to learn about Portfolio Manager or benchmarking in general (21%).



**Table 5-32: Main Reasons for Attending the Workshop (by Utility)\***  
(participants)

	PG&E	SCE	SDG&E	SoCalGas	All Participants
<i>Sample size</i>	35	33	35	24	127
To learn to use Automated Benchmarking Services (electronic meter data upload)	34% <sup>β</sup>	33% <sup>β</sup>	8% <sup>δ</sup>	23%	26%
To better understand benchmarking performed by others	16%	17%	31%	31%	21%
Learn about Portfolio Manager or benchmarking in general	21%	22%	8% <sup>δ</sup>	8% <sup>δ</sup>	21%

<sup>β</sup> Significantly different from SDG&E at the 90% confidence level.

<sup>δ</sup> Significantly different from all participants at the 90% confidence level.

\* For more information, see Table B-19.

These reasons were cited by all of the utility customers with the exception of SDG&E customers. As shown in Table 5-33, among SDG&E workshop participants the most commonly offered primary reasons for attending the workshops were:

1. To better understanding benchmarking performed by others (28%),
2. to learn about Portfolio Manager or benchmarking in general (25%), and
3. because benchmarking was required for rebates or mandated by the utility (17%).

**Table 5-33: Main Reasons for Attending the Workshop (SDG&E Only)\***  
(SDG&E participants)

	SDG&E	All Participants
<i>Sample size</i>	35	127
To better understand benchmarking performed by others	28%	21%
Learn about Portfolio Manager or benchmarking in general	25% <sup>γ</sup>	21%
Benchmarking required for rebates/mandated by utility	17% <sup>δ</sup>	6%

<sup>δ</sup> Significantly different from all participants at the 90% confidence level.

<sup>γ</sup> Significantly different from SoCalGas at the 90% confidence level.

\* For more information, see Table B-19 and Table B-20.

It is not surprising that primary reasons offered by SDG&E workshop attendees differed from the other utilities since SDG&E was the only utility that required benchmarking for program participation.

Additionally, SDG&E participants reported having taken the workshop primarily to better understand benchmarking performed by others (28%) at a higher rate than two other utilities, PG&E (16%) and SCE (17%). While the difference is not statistically significant, it does lend some credence to the comment the evaluation team heard from SDG&E staff who reported that they had felt that the people benchmarking weren't the customers themselves, but rather vendors or ESCOs. Compared to participants who had not benchmarked (32%), those who had benchmarked (17%) were less likely to report having taken the workshop primarily to learn how to use ABS (32% versus 17%. (Table 5-34)

**Table 5-34: Main Reasons for Attending the Workshop (by User Type)\***  
(participants by user group)

	EB	EN	V	All Participants
Sample size	43	44	40	127
To learn to use Automated Benchmarking Services (electronic meter data upload)	17%ζ	32%	30%	26%

\* For more information, see Table B-21 and Table B-22.

#### 5.4.4.4 Is Workshop Training Sufficient to Benchmark?

##### Summary of Key Findings & Recommendations in this Section

- ❖ *Four out of five (82%) participants stated that the training had been sufficient to allow them to benchmark buildings on their own. This result provides evidence that the workshops have been effective in providing customers with the information and skills to benchmark their buildings.*
- ❖ *A significantly higher percentage of PG&E participants reported that training had been sufficient than did participants from the other three utilities (94% PG&E versus 77% SCE, 69% SDG&E, and 73% SoCalGas).*
- **Recommendation:** *Considering the fact that PG&E uses the same trainer as SDG&E and SoCalGas, members of the IOU Benchmarking Working Group may wish to discuss among themselves and investigate what aspects of PG&E's workshops or other benchmarking support could be responsible for this outcome and if or how these might be replicated by other utilities.*

Participants were asked if the training provided in the workshop had been sufficient to allow them to benchmark buildings on their own. Overall, four out of five (82%) participants stated that the training had been sufficient to allow them to benchmark buildings on their own. This result provides evidence that the workshops have been effective in providing customers with the information and skills to benchmark their buildings.

A significantly higher percentage of PG&E participants (94%) reported that training had been sufficient than did participants from the other three utilities (77% [SCE], 69% [SDG&E], 73% [SoCalGas]) (Table 5-35). Considering the fact that PG&E uses the same trainer as SDG&E and SoCalGas, members of the IOU Benchmarking Working Group may wish to discuss among themselves and investigate what aspects of PG&E's workshops could be responsible for this outcome and if or how these might be replicated by other utilities, or if something different about PG&E's ABS or aspect of its offerings could account for this outcome.

**Table 5-35: Training Was Sufficient for Benchmarking**  
(participants by utility)

	PG&E	SCE	SDG&E	SoCalGas	All Participants
Sample size	35	33	35	23	126
Yes	94%αβγδ	77%	69%	73%	82%

α Significantly different from SCE at the 90% confidence level.

β Significantly different from SDG&E at the 90% confidence level.

γ Significantly different from SoCalGas at the 90% confidence level.

δ Significantly different from all participants at the 90% confidence level.

\* For more information, see Table B-23 and Table B-24.

Respondents who had said the training had not prepared them to benchmark buildings on their own were asked to identify the ways the training had been insufficient. The top reason, reported by nearly one-third of this group (31%), was that the training did not have enough detail and had been lacking in content (Table 5-36).

**Table 5-36: Why Training Was Not Sufficient\***  
(participants who said that the training was not sufficient; multiple response)

	Total Participants
<i>Sample Size</i>	26
Not enough detail/specificity/ lacking in content/ unanswered questions	31%

\* For more information, see Table B-25 and Table B-26.

## 5.4.5 Customer Experience with Portfolio Manager and Utility ABSs

### 5.4.5.1 Rates of Success Benchmarking with Portfolio Manager

#### Summary of Key Findings & Recommendations in this Section

- ❖ *About nine out of ten (89%) participants who had benchmarked had successfully benchmarked using ENERGY STAR Portfolio Manager.*
- ❖ *PG&E (94%) and SDG&E (90%) participants reported significantly higher rates of success benchmarking with Portfolio Manager than did SCE participants (60%). Given that not all customers are aware of when they are using Portfolio Manager versus a utility's ABS, this suggests that SCE customers may be experiencing more difficulties with the SCE ABS than are customers using the ABSs of other IOUs.*
- **Recommendation:** *It may be advisable for SCE to investigate the possible sources of customer problems with Portfolio Manager, which may be related to SCE's ABS.*

About nine out of ten (89%) participants who had benchmarked had successfully benchmarked using ENERGY STAR Portfolio Manager. PG&E (94%) and SDG&E (90%) participants reported significantly higher rates of success benchmarking with Portfolio Manager than did SCE participants (60%). The number of SoCalGas participants was too small to test significance, but the data suggested a high success rate for these participants as well. (Table 5-37)

**Table 5-37: Successful Benchmarking Using Portfolio Manager (by Utility)\***  
(participants who had benchmarked buildings in the past three years using Portfolio Manager)

	<b>PG&amp;E</b>	<b>SCE</b>	<b>SDG&amp;E</b>	<b>SoCalGas (count)</b>	<b>Total Benchmarking Participants</b>
<i>Sample Size</i>	20	20	20	15	75
Yes	94% $\alpha$	60% $\beta\delta$	90%	14	89%

$\alpha$  Significantly different from SCE at the 90% confidence level.

$\beta$  Significantly different from SDG&E at the 90% confidence level.

$\delta$  Significantly different from all participants at the 90% confidence level.

\* For more information, see Table B-27 and Table B-28.

The survey explained that for buildings that met certain qualifications, Portfolio Manager should have produced a benchmark score from zero to 100, and for all other buildings it should have produced EUI. Nearly four-fifths (78%) of participants who had benchmarked said they had received a score for buildings that should have qualified for one. SoCalGas (86%) and PG&E (84%) respondents reported receiving scores significantly more often than SCE respondents (60%). (Table 5-38)

**Table 5-38: Obtained a Benchmark Score from Portfolio Manager\***  
(participants who have benchmarked buildings in the past three years using Portfolio Manager)

	<b>PG&amp;E</b>	<b>SCE</b>	<b>SDG&amp;E</b>	<b>SoCalGas (count)</b>	<b>Total Benchmarking Participants</b>
<i>Sample Size</i>	20	20	20	15	75
Yes	84% $\alpha$	60%	75%	13 (86%)	78%

$\alpha$  Significantly different from SCE at the 90% confidence level.

\* For more information, see Table B-47 and Table B-48.

One of the customers profiled offered a possible explanation for the lower rate of benchmarking success of SCE customers. The engineering services company interviewee uses utility ABSs to upload energy use data from all the California IOUs on behalf of many clients. He noted that SCE requires a PIN to access a customer's energy use data. The interviewee has to obtain the PIN from the client or from the SCE staff member who set up the utility information in Portfolio Manager. He has found that in 90 percent of cases, SCE does not have the contact name and so the interviewee has to enter the energy use data for the meter manually.

While the problem that this interviewee described seems like one that might be particular to vendors, there were no significant differences in success rate by user groups (Table 5-39).

**Table 5-39: Successful Benchmarking Using Portfolio Manager (by User Type)\***  
(participants who had benchmarked buildings in the past three years using Portfolio Manager; non-participants who had benchmarked buildings using Portfolio Manager)

	EB	V	Total Benchmarking Participants	Non-participants (count)
<i>Sample Size</i>	35	40	75	1
Yes	84%	94%	88%	--

\* For more information, see Table B-27 and Table B-28.

#### 5.4.5.2 Difficulties Using Portfolio Manager

##### Summary of Key Findings & Recommendations in this Section

- ❖ *About one-half (51%) of participants who benchmarked buildings reported having had difficulties using Portfolio Manager. One-fifth (20%) of participants with difficulties said the program had been confusing or difficult to use, 13% had difficulty identifying or measuring each space in the building, especially for irregular buildings, and 12% experienced automatic reporting flaws or inaccurate scores.*

About one-half (51%) of participants who benchmarked reported having had difficulties using Portfolio Manager. SDG&E participants (71%) reported having difficulties significantly more frequently than PG&E (41%) and SCE (40%) participants (Table 5-40). Given that SDG&E participants reported fairly high rates (90%) of successful benchmarking with Portfolio Manager (Table 5-37), this suggests that most of those who reported having difficulties were able to overcome them.

**Table 5-40: Rate of Difficulties Using Portfolio Manager\***  
(participants who have benchmarked buildings using Portfolio Manager)

	PG&E	SCE	SDG&E	SoCalGas (count)	Total Benchmarking Participants
<i>Sample Size</i>	20	20	20	15	75
Yes	45%	42% <sup>β</sup>	78% <sup>δ</sup>	7	55%

<sup>β</sup> Significantly different from SDG&E at the 90% confidence level.

<sup>δ</sup> Significantly different from all participants at the 90% confidence level.

\* For more information, see Table B-31 and Table B-32.

Respondents who reported they had not been able to successfully benchmark a building using Portfolio Manager were asked to identify the reasons they had not be able to do so. The most frequently offered reason was that they used their own approach or an alternative to benchmarking (Table 5-41).

**Table 5-41: Reasons Why Unable to Benchmark with Portfolio Manager\***  
(participants who tried but were not successful benchmarking buildings  
in the past three years using Portfolio Manager)

	<b>Total Benchmarking Participants (count)</b>
<i>Sample Size</i>	13
We use our own/an alternate approach	3

\*For more information, see Table B-29 and Table B-30.

Both participants and non-participants who had benchmarked buildings in the past three years using Portfolio Manager and reported having had difficulties with the program were asked to identify the kinds of difficulties they had had. One-fifth (20%) of participants claimed that the program had been confusing or difficult to use, one-eighth (13%) had difficulty identifying or measuring each space in the building, especially for irregular buildings, and a similar proportion (12%) twelve percent experienced automatic reporting flaws or inaccurate scores. (Table 5-42)

**Table 5-42: Difficulties Using Portfolio Manager\***  
(participants who have benchmarked buildings in the past three years using Portfolio Manager and had difficulty  
using Portfolio Manager; multiple response)

	<b>Total Benchmarking Participants</b>
<i>Sample size</i>	35
Confusing or difficult to use	20%
Identifying/measuring each space in the building, esp. for irregular buildings	13%
Automatic reporting flaws/inaccurate scores	12%

\*For more information, see Table B-45 and Table B-46.

### 5.4.5.3 Ways to Improve Portfolio Manager

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Profiled customers suggested a variety of ways that Portfolio Manager could be improved. Some of these may already be addressed among the changes EPA's plans for Portfolio Manager in 2013 or in regular updates of Portfolio Manager.*

The five customers profiled offered the following input about the ease of use of Portfolio Manager and possible ways to improve it:

- Information could be easier to enter. Users should be able to edit information on the first page, rather than having to add a meter, or other information. It should populate the cells. It is not very user friendly and it is not easy to edit the building profile.
- Making Portfolio Manager scores applicable to more building types would make it more useful. As more cities use it, it would be good to compare information.
- Smaller and special-use buildings should be eligible for ratings under Portfolio Manager.
- Provide more information on how to generate Portfolio Manager reports.
- Make updates to Portfolio Manager sooner than the planned date of 2013, even if the changes occur as part of a trial or test period.

It should be noted that the changes planned for Portfolio Manager in 2013 may address a number of the issues with Portfolio Manager noted by survey respondents and profiled customers both here and in other areas of this report. These may also be addressed in regular updates of Portfolio Manager by EPA. (For example, the EPA has introduced new building types at a rate of about two per year as part of bi-annual upgrades).

#### 5.4.5.4 How Customers Transfer Data to Portfolio Manager

##### Summary of Key Findings & Recommendations in this Section

- ❖ *About four in ten (39%) end-user participants reported transferring the data manually (even after having taken the workshop), over one-third (36%) used a utility ABS to transfer the data automatically, and about one-tenth (11%) used a bulk upload option.*
- ❖ *End-user participants (42%) used ABS significantly more frequently than vendors (24%).*
- **Recommendation:** *The CPUC, CEC, and IOUs may wish to further investigate the reasons that customers do not use utility ABSs as part of evaluating potential approaches to addressing impediments to benchmarking due to privacy requirements.*

Among the surveyed participants who had used Portfolio Manager, four in ten (40%) reported transferring the data manually (even after having taken the workshop), over one-third (34%) used a utility ABS to transfer the data automatically, and about one-tenth (11%) used a bulk upload option. End-user participants (43%) used ABS significantly more frequently than vendors (25%). Vendors most commonly reported entering data by hand, one building at a time (42%) (Table 5-43). One possible reason for this higher rate of manual entry by vendors is that vendors may be more likely to benchmark multi-tenant buildings. Given that written authorization is required to upload tenants' meter data, it is conceivable that vendors find it easier to gather energy bills from tenants and enter them manually rather than going through the administrative burden of completing and processing written release forms, particularly if benchmarking is performed as a one-time effort to obtain a rebate for a client or qualify them for program participation. There are other possible explanations as well. The survey did not inquire about the reasons for entering data via options other than utility ABS. The CPUC, CEC, and IOUs may wish to further investigate the reasons that customers do not use utility ABSs as part of evaluating potential approaches to addressing impediments to benchmarking due to privacy requirements.



**Table 5-43: How Energy Use Data are Transferred into Portfolio Manager\***

(participants who have benchmarked buildings in the past three years using Portfolio Manager; non-participants who have benchmarked buildings using Portfolio Manager)

	<b>EB</b>	<b>V</b>	<b>Total Benchmarking Participants</b>
<i>Sample Size</i>	35	40	75
Enter building and energy consumption information into Portfolio Manager by hand, one building at a time	37%	42%	40%
Use ABS to automatically transfer energy consumption data only from the utility into Portfolio Manager	43% <sup>η</sup>	25%	34%
Upload building and energy consumption data for 10 or more buildings from an Excel spreadsheet using a template from Portfolio Manager	10%	12%	11%

<sup>η</sup> Significantly different from Vendors at the 90% confidence level.

\* For more information, see Table B-33 and Table B-34.

The bank profile offers a good illustration of the range of ways that customers can transfer data into Portfolio Manager. The bank interviewee has used Portfolio Manager to benchmark bank buildings for two-and-a-half years. The process of setting up the building profiles was “onerous,” requiring entry of all data—square footage, meter number, age of building, and space allocation (e.g. office, retail, etc). The interviewee used a semi-manual upload process for one year, downloading information from Advantage IQ, their billing aggregator, and entering the data into Portfolio Manager’s bulk data uploader (an Excel spreadsheet). The Excel uploader had a bill template that would process the data for entry into Portfolio Manager. Then he switched to using utility ABSs, which worked well for the big utilities but was more difficult for their smaller facilities with municipal utility providers. Now Advantage IQ manages all of the uploading of the bank’s data into Portfolio Manager on a monthly basis.

All the profiled customers use utility ABS(s) to transfer data into Portfolio Manager when it is available.

#### **5.4.5.5 Use of Multiple Utilities’ ABSs**

Participants who had benchmarked buildings in the past three years using Portfolio Manager and had used ABS to automatically transfer energy consumption data only from the utility into the program were asked to identify the utilities they had done this for. Three-quarters (75%) of these participants reported having used ABS to transfer data from a single utility and about one-fifth (21%) had used ABS to transfer data from two utilities (Table 5-44).

**Table 5-44: Rate at Which Respondents Transferred Data into Single Versus Multiple Utilities’ ABS\***

(participants who have benchmarked buildings in the past three years using Portfolio Manager and used ABS to automatically transfer energy consumption data only from the utility; multiple response)

	<b>Total Benchmarking Participants</b>
<i>Sample Size</i>	24
Percent transferring data with only one utility	75%

Percent transferring data with more than one utility	21%
--	-----

\* For more information, see Table B-35 and Table B-36.

The profiled REIT customer uses multiple utilities' ABSs for its many buildings around the state. Only if there is no ABS option for the building do they enter or upload the data manually.

#### 5.4.5.6 Problems Using Utility ABSs

##### Summary of Key Findings & Recommendations in this Section

- ❖ *Of the 25 participants who had used ABS to automatically transfer energy consumption data, 70% reported that they had encountered difficulties successfully authorizing meters or receiving data for authorized meters. The most frequently mentioned difficulty was problems obtaining utility usage data.*
- ❖ *About one-quarter of respondents who reported using some data entry method other than ABS said that their organization had tried to use ABS to automatically transfer building energy use data in the last three years. The range of reasons why they had stopped included that ABS was confusing or difficult to use, they had problems getting authorizations from tenants, they could not identify all meters, they had technical problems enrolling in ABS, they received confusing error codes, the company's focus changed, and that they help customers get set up with ABS but do not use it themselves.*
- *Recommendation: The IOUs may wish to investigate ways to improve users' experiences with utility ABSs, such as simplifying the process of enrolling in utility ABSs, authorizing meters, clarifying error codes, or other suggestions mentioned in this document.*

Of the 25 participants who had used ABS to automatically transfer energy consumption data, 70% reported that they had encountered difficulties importing data. (Table 5-45)

**Table 5-45: Rate of Difficulties Using ABS\***

(participants who have benchmarked buildings in the past three years using Portfolio Manager and used ABS to automatically transfer energy consumption data only from the utility)

	Total Benchmarking Participants
Sample Size	25
Yes	70%

\* For more information, see Table B-41 and Table B-42.

The sixteen participants who reported having difficulties using ABS to import building energy use data electronically into Portfolio Manager were asked to indicate the difficulties they had experienced. The most frequently mentioned difficulty was problems obtaining utility usage data (9 of 16); other difficulties mentioned included difficulty getting training/customer support from utility (3 of 16), automatic reporting stopping when meter ID numbers change (3 of 16), problems getting authorizations from tenants or others (2 of 16), and problems due to having multiple addresses for a building (2 of 16). (Table 5-46)

**Table 5-46: Difficulties Using ABS\***

(participant end users who have benchmarked buildings in the past three years using Portfolio Manager and used ABS to automatically transfer energy consumption data only from the utility and had difficulties using ABS; multiple response)

	<b>Total Benchmarking Participants (count)</b>
<i>Sample size</i>	16
Problems obtaining utility usage data	9
Difficulty getting training/customer support from utility	3
Automatic reporting stops when meter ID numbers change	3
Problems getting authorizations from tenants or others	2
Problems due to having multiple addresses for a building	2

\* For more information, see Table B-43 and Table B-44.

Respondents who had reported using some data entry method other than ABS were asked whether their organization had tried to use ABS to automatically transfer building energy use data in the last three years or not. About one-quarter (24%) of these respondents reported that they had in fact tried to use a utility ABS. (Table 5-47)

**Table 5-47: Used Methods Other than ABS to Transfer Data, But Had Tried to Use ABS\***

(participants who have benchmarked buildings in the past three years using Portfolio Manager and uploaded data by hand or from Excel using a template from Portfolio Manager)

	<b>Total Benchmarking Participants</b>
<i>Sample Size</i>	37
Yes	24%

\* For more information, see Table B-37 and Table B-38.

The eight respondents who had tried to use a utility ABS to transfer data into Portfolio Manager gave a range of reasons why they had stopped. These included: ABS was confusing or difficult to use, they had problems getting authorizations from tenants, they could not identify all meters, they had technical problems setting up account, they received confusing error codes, the company's focus changed, and that they help customers get set up with ABS but do not use it themselves. (Table 5-48)

**Table 5-48: Why Respondents Stopped Using ABS\***

(participants who have benchmarked in the past three years using Portfolio Manager and tried to use ABS; multiple response)

	<b>Total Benchmarking Participants (count)</b>
<i>Sample size</i>	8
Confusing or difficult to use	1
Problems getting authorizations from tenants or others	1
Could not identify all meters	1
Technical problems setting up account	1
Received confusing error codes	1
Change in direction of company focus	1
Withdrew from full time market	1
Data/software wouldn't download	1
We help our customers get set up with ABS but do not use it ourselves	1

\* For more information, see Table B-39 and Table B-40.

Among the customers profiled, the municipal government interviewee reported initially having problems importing historical data into their utility's ABS for a number of buildings. Their utility sent them information that should have made it possible for them to import the historical data, but they were not able to do so. Despite this, they have been able to use the utility ABS to upload current energy use data, and have been doing so for some time on a monthly basis.

The profiled REIT interviewee reported that the benchmarking tools are not always intuitive to use, noting that ABSs differ from utility to utility and they all have unique bugs. For example, for SDG&E and SoCalGas users have to press the back button to accept terms and conditions. This is not intuitive, and without technical support it would be hard to know to do this. SDG&E has their own way of verifying information using the account number and zip code for all buildings rather than just for one building. This same interviewee added that more than any other utility, SDG&E requires the use of sub-meters by building tenants. Tracking down sub-meter data can be hard. Getting data from tenants is a challenge and the organization has started to make provision of energy data a requirement in leases. (However, in this economy it is important to be flexible, and sometimes brokers will change the terms of a lease, removing the requirement to collect energy data. In addition, existing leases do not have that requirement.) SCE has more privacy concerns associated with ABS, so owners cannot enroll multiple entities without written authorization or without meeting the requirement of the 15/15 rule.<sup>93</sup> However, once written authorization has been entered into SCE's ABS system or the 15/15 rule has been met, data will be uploaded automatically via ABS.

The REIT interviewee also offered advice for prospective users of utility ABSs and Portfolio Manager. First, anyone starting to benchmark should work with their utility on ABS, because sometimes the energy use data do not come through. For example, having the wrong city name

<sup>93</sup> According to SCE, to meet the requirements of the 15/15 rule, the energy usage must be associated with at least 15 separate customer accounts, and no account can comprise 15% or more of the total energy usage.

or similar detail errors will occasionally cause a problem and the utility can help identify those issues. For benchmarking a large number of buildings, the bulk upload process is important because it can take a long time to benchmark with ABS if there are 100 meters or so.<sup>94</sup>

#### 5.4.5.7 Improvements to Utility ABSs

##### Summary of Key Findings & Recommendations in this Section

- **Recommendation:** *The IOUs may wish to investigate the appropriateness and viability of customer-suggested changes for their ABSs.*

The profiled customers offered the following suggestions for improving their utilities' ABSs:

- Develop a uniform process for using ABS. The differences between each utilities ABS make for more work to figure things out.
- If privacy requirements allow, provide electricity consumption information to owners when tenants have the meters.
- Fix the SDG&E and SoCalGas requirement to use the back button to accept terms and conditions.
- Where not already in place, add automated alerts when information is not automatically updated.

#### 5.4.5.8 Customer Experiences with Utility Technical Support

##### Summary of Key Findings & Recommendations in this Section

- ❖ *SDG&E participants who had benchmarked buildings contacted technical support significantly more frequently than did all benchmarking participants together (62% versus 41%). While the data provide no indication if this difference is related to SDG&E's requirement that customers benchmark building(s) as a prerequisite for program participation, it seems logical that SDG&E customers would have more incentive than other utilities' customers to follow through with technical support to complete benchmarking.*
- ❖ *PG&E participants reported the lowest frequency of contacting technical support (30%).*
- ❖ *Over two-thirds (70%) of these participants reported that technical support had resolved their problem.*

Among participants who had benchmarked buildings in the past three years, SDG&E participants contacted technical support significantly more frequently than all benchmarking participants together (62% versus 41%). While the data provide no indication if this difference is related to SDG&E's requirement that customers benchmark building(s) as a prerequisite for program participation, it seems logical that SDG&E customers would have more incentive than other utilities' customers to follow through with technical support to complete benchmarking. PG&E participants reported the lowest frequency of contacting technical support (30%). The data

<sup>94</sup> Bulk upload is an alternative to utility ABSs for users with 10 or more buildings. These users can upload building and energy consumption data from an Excel spreadsheet using a template from Portfolio Manager instead of using a utility's ABS.

suggest that end-users may have contacted technical support more often than vendors (50% vs. 32%), but the difference is not statistically significant (Table 5-49).

**Table 5-49: Respondent Contacted Technical Support\***

(participants who have benchmarked buildings in the past three years using Portfolio Manager)

	By Utility				By User Group		Total Benchmarking Participants
	PG&E	SCE	SDG&E	SoCalGas (count)	EB	V	
<i>Sample Size</i>	20	20	20	15	35	40	75
Yes	30%β	44%	62%δ	4	50%	32%	41%

β Significantly different from SDG&E at the 90% confidence level.

δ Significantly different from all participants at the 90% confidence level.

\* For more information, see Table B-49 and Table B-50.

Over two-thirds (70%) of participants reported that technical support had resolved their problem (Table 5-50).

**Table 5-50: Technical Support Was Able to Resolve Problem\***

(participants who have benchmarked buildings in the past three years using Portfolio Manager and who contacted technical support)

	Total Benchmarking Participants
<i>Sample Size</i>	30
Yes	70%

\* For more information, see Table B-51 and Table B-52.

Representatives of EPA noted that the EPA does not provide technical support for Portfolio Manager and only the IOUs do so. In their opinion, this support is important to benchmarking by customers of California utilities. These interviewees felt that for this reason, it is important to maintain, and possibly enhance, the technical support for Portfolio Manager and ABS provided by the utilities.

#### 5.4.5.9 Satisfaction with Technical Support

##### Summary of Key Findings & Recommendations in this Section

- ❖ *Two-fifths of participants who had benchmarked buildings and contacted technical support (40%) indicated a very high level of satisfaction, while 15% indicated a very low level of satisfaction.*
- ❖ *Among the respondents who reported low levels of satisfaction with technical support, three said that technical support had not known the system or had not been able to provide the information needed, one said that it had taken a long time to get an answer, and one said that the problem had not been fixed.*
- **Recommendation:** *The IOUs may wish to improve their tracking of technical support requests in order to provide insights for future improvements to utility ABSs, for future recommendations for Portfolio Manager revisions, and to serve as data for future initiative evaluation.*

Participants who had benchmarked buildings in the past three years using Portfolio Manager and had contacted technical support rated their level of satisfaction with technical support on a scale

of zero (“not at all satisfied”) to ten (“very satisfied”). Two-fifths (40%) indicated a very high level of satisfaction (8-10) while nineteen-percent indicated a very low level of satisfaction (0-3). (Table 5-51)

**Table 5-51: Satisfaction with Technical Support\***

(participants who have benchmarked buildings in the past three years using Portfolio Manager and who contacted technical support)

	Total Benchmarking Participants
<i>Sample Size</i>	30
Very satisfied (8-10)	40%
Not at all satisfied (0-3)	19%

\* For more information, see Table B-53 and Table B-54.

Among the four respondents who reported low levels of satisfaction (0-3) with technical support, three participants said that technical support had not known the system or had not been able to provide the information needed, one participant said that it had taken a long time to get an answer, and one participant said that the problem had not been fixed. (Table 5-52)

**Table 5-52: Reasons for Dissatisfaction with Technical Support\***

(participants who were dissatisfied with technical support)

	All Participants
<i>Sample Size</i>	4
Technical support did not know the system or could not provide the information needed	3
It took a long time to get an answer	1
The problem was not fixed	1

\* For more information, see Table B-55 and Table B-56.

Participants who had called technical support and had indicated a high level of satisfaction (7-10) were asked for most important reason they had been satisfied with technical support. The most common reason given was that technical support had helped with or solved the problem and had followed through (Table 5-53).

**Table 5-53: Reasons for Satisfaction with Technical Support\***

(participants who have benchmarked buildings in the past three years using Portfolio Manager who contacted and were satisfied with technical support)

	Total Benchmarking Participants (count)
<i>Sample Size</i>	12
Helped/solved the problem/followed through	10

\* For more information, see Table B-57 and Table B-58.

The customers with large portfolios who were profiled described a range of experiences with technical support. When the profiled municipal government first started having issues with Portfolio Manager they emailed the workshop presenter, who was helpful. They then contacted their local utility, which only offers an email address for tech support, to obtain help. They emailed the utility several times and received assistance, but the utility was unable to resolve the



problem. As a result, they have started entering the data themselves, going site-by-site and choosing the “add meter entry” function for each one to add the historical data that they were missing.

The engineering services company interviewee noted that, having benchmarked or re-benchmarked about 400 buildings, in his experience each building has its own quirks. As a result, from time to time he emails technical questions to the each of the utilities’ technical support for clients’ buildings around the state. He noted that sometimes it can take up to a year to get resolution to an issue. Often, by the time he has received a reply he has forgotten the question. In the case of one building, ABS worked at first and then stopped working. The interviewee tried to consult with tech support at the utility but never received a response to his inquiry. This interviewee has experienced instances in which EPA staff and the utility technical support pointed to each other as the source of a problem. In this interviewee’s opinion, given the frequency of occurrence of certain challenges with utility ABSs, it is often easier just to enter the data manually than to try to track down the information needed to resolve the problem. (Manual entry takes about 20 minutes per building according to this interviewee.)

In the experience of the federal agency interviewee’s experience, email support has been helpful and issues with Portfolio Manager have been resolved fairly quickly. The REIT interviewee has been on the phone with tech support at every utility with which they work. This interviewee indicated that the IT people at all the utilities offer great support.

The bank interviewee obtained support in setting up ABS for uploading information on a monthly basis from two of the IOUs. This interviewee did not attend any workshops and did not need any additional support as the bank had no problems using utility ABSs to benchmark more than 350 buildings for the bank.

## 5.5 Describe Benchmarking Participation Motivations and Barriers

### 5.5.1 Reasons for Using Portfolio Manager Instead of Another Benchmark Tool

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The top reasons that participant end-users and participant vendors who benchmarked buildings use Portfolio Manager include that it is widely recognized, it is associated with the ENERGY STAR label, and that it is considered an industry standard (28% total across all three).*
- ❖ *Other reasons for using Portfolio Manager: Portfolio Manager was recommended by their utility (20%), it is easy to use or readily accessible (18%), it is free (15%), and it is required for certification or rebate or is mandated by law (13%).*
- ❖ *Another reason cited by stakeholders was the ability to obtain a score with a relatively small set of data inputs and no site visit.*

When asked why their organization had chosen to use Portfolio Manager to benchmark instead of some other tool, participants and vendors who benchmarked gave a broad range of answers.

Three similar answer categories, when grouped together, stood out: Portfolio Manager is widely recognized, associated with the ENERGY STAR label, or considered an industry standard (28% for end-users and 22% for vendors). The other top answers offered were that it was recommended by their utility (20% end-users, 17% vendors), it is easy to use or readily accessible (18%) or free (15% end-users, 13% vendors), and it is required for certification or rebate or is mandated by law (13% end-users, 15% vendors). (Table 5-54)

**Table 5-54: Reasons for Using Portfolio Manager\***  
(participant end users and participant vendors who used Portfolio Manager; multiple response)

	Total Participant End Users	Total Participant Vendors
Sample size	23	37
Wide recognition/ENERGY STAR brand/ Industry standard	28%	22%
Recommended by utility	20%	17%
Easy to use/accessible	18%	--
Free	15%	13%
Required for certification/ mandatory by law or rebate	13%	15%

\* For more information, see Table B-79 and Table B-80.

Stakeholder profiles highlighted several valuable positive attributes of Portfolio Manager that could serve as reasons to use this tool to benchmark rather than some other tool. These include that Portfolio Manager is readily available, costs nothing to use, enjoys widespread voluntary adoption by the market and is associated with a widely recognized and valued label, ENERGY STAR. Other key positive attributes include the automated upload of energy use data and the ability to obtain a score with a relatively small set of data inputs and no site visit.

Several of the customers profiled described why they use Portfolio Manager. The bank mentioned that it is needed in order to apply for the ENERGY STAR label, and it allows for information to be pulled together quickly. The REIT interviewee noted that other software can cut and slice the data more than Portfolio Manager, but LEED and BOMA want the information in Portfolio Manager. The federal interviewee uses Portfolio Manager because this is the tool she was trained on and knows how to use.

### 5.5.2 Customer Reasons for Declining Benchmarking

#### Summary of Key Findings & Recommendations in this Section

- ❖ *About one-half (49%) of participants who were aware of benchmarking but did not benchmark buildings reported the existence of challenges or barriers to the activity.*
- ❖ *The most common reasons that organizations did not benchmark were the cost to collect information and continue monitoring energy performance (16%), followed by the fact that data gathering is time consuming (15%), and that the respondent's organization or building was too small to benchmark (14%). The most common challenges or barriers identified by these organizations were a lack of resources, followed by the difficulty of using Portfolio Manager software, a lack of information, and that no category for their facility existed.*

- ❖ *Among non-participants who had not heard of benchmarking, one third (33%) said that the cost to collect information and continue monitoring energy performance might prevent their benchmarking. Other barriers cited were a lack of resources and lack of information, including not knowing how to benchmark.*

The surveys asked respondents a series of questions to help understand barriers to benchmarking both among those who were aware of benchmarking and those who had not heard of it before the survey.

#### 5.5.2.1 Barriers Among Customers Aware of Benchmarking

Aware participant and non-participant end-users whose organizations had not benchmarked were asked if any challenges or barriers had prevented their organization from benchmarking the buildings it owned, occupied or managed. As shown in Table 5-55, about one-half (49%) of participants reported the existence of challenges or barriers to benchmarking. Over two-fifths (45%) of the participants who had not benchmarked said their organizations had considered benchmarking.

**Table 5-55: Barriers to Benchmarking\***  
(participant end users who did not benchmark; non-participants aware of benchmarking who did not benchmark)

	<b>Total Non-Benchmarking Participants</b>
<i>Sample size</i>	44
Had Challenges or Barriers to Benchmarking	49%
Had Considered Benchmarking	45%

\* For more information, see Table B-107 and Table B-110.

The most common reason for not benchmarking cited by those participants whose organizations had considered it was the cost to collect information and continue monitoring energy performance (16%), followed by the fact that data gathering is time consuming (15%), and that the respondent's organization or building was too small to benchmark (14%). (Table 5-56)

**Table 5-56: Why Organization Has Not Considered Benchmarking\***  
(participant end users who did not consider benchmarking; non-participants who did not consider benchmarking; multiple response)

	<b>Total Non-Benchmarking Participants</b>
<i>Sample size</i>	23
Cost to collect information and continue monitoring energy performance	16%
Data gathering is time consuming	15%
Organization/building is too small to benchmark	14%

\* For more information, see Table B-108.

More than one-fifth (22%) of participants whose organizations had not benchmarked said that their organizations were extremely likely (8-10) to benchmark in the next year, significantly

more frequently than reported by non-participants (4%). About three-fifths (59%) of participants and two-thirds (67%) of non-participants reported that they were at least somewhat unlikely (0-4) to benchmark within the next year, with about two-fifths (41%) of participants and one-half (51%) of non-participants in the not at all likely range (0-2). (Table 5-57)

**Table 5-57: Likelihood of Benchmarking in Future\***  
(participant end users and non-participants who did not benchmark)

	<b>Total Non-Benchmarking Participants</b>	<b>Non-participants</b>
<i>Sample size</i>	44	44
Extremely likely (8-10)	22% <sup>ε</sup>	4%
Somewhat unlikely (3-4)	18%	16%
Not at all likely (0-2)	41%	51%

<sup>ε</sup> Significantly different from non-participants at the 90% confidence level.

\* For more information, see Table B-109.

The most common challenges or barriers to prevent benchmarking identified by these participants as having prevented benchmarking were a lack of resources (5 out of 19), followed by the Portfolio Manager software was difficult to use, a lack of information, and that no category for their facility existed, each of which were mentioned by two respondents. (Table 5-58)

**Table 5-58: Challenges or Barriers that Prevented Benchmarking\***  
(participant end users who did not benchmark who indicated challenges or barriers; multiple response)

	<b>Total Non-Benchmarking Participants</b>
<i>Sample size</i>	19
Lack of resources	5
Portfolio Manager software difficult to use	2
Lack of information	2
No category for our facility	2

\* For more information, see Table B-111.

### 5.5.2.2 Barriers Among Customers Unaware of Benchmarking

Among non-participants who had not heard of benchmarking, one third (33%) said that the cost to collect information and continue monitoring energy performance might prevent their organization from benchmarking. Over one-fifth (11%) cited not knowing how to benchmark as a barrier as well as a lack of resources and lack of information (6% and 5% respectively). Nearly one-eighth (12%) said that there were no barriers to benchmarking. (Table 5-59)

**Table 5-59: Challenges or Barriers that Might Prevent Benchmarking\***  
(non-participants who had not heard of benchmarking; multiple response)

	<b>Non-participants</b>
<i>Sample size</i>	37
Cost to collect information and continue monitoring energy performance	33%
Don't know how	11%
Lack of resources	6%
Lack of information	5%
None	12%

\* For more information, see Table B-112.

About one-fifth (21%) of non-participants said that the resources that their organization allocated to managing energy costs were very consistent with the importance it assigned to energy costs and about one-half (51%) said that the resources were somewhat consistent. (Table 5-60)

**Table 5-60: Consistency of Resources Allocated with Importance Assigned to Managing Energy Costs\***  
(non-participants)

	<b>Non-participants</b>
<i>Sample Size</i>	48
Very or Somewhat consistent	71%
Not very or not at all consistent	25%

\* For more information, see Table B-119.

For the 13 respondents who said that resources were “not very consistent” or “not at all consistent,” the top reasons for their organization allocating inconsistent resources were that there are not enough resources or time (4 respondents), it doesn't suit the organization (2 respondents), or they don't know (3 respondents).

For the 33 respondents who said that the resources were “very” or “somewhat” consistent, the top reason for consistency was that the organization is always looking to save energy or money (7 respondents). (Table 5-61)

**Table 5-61: Reasons for High Level of Consistency of Resources Allocated with Importance Assigned to Energy Costs\***

(non-participants who indicated level of consistency of energy-efficiency resources)

	<b>Somewhat or Very consistent (count)</b>	<b>Not very or not at all consistent (count)</b>	<b>All</b>
<i>Sample Size</i>	33	13	46
Always looking to save money/energy	7	--	15%
Not enough resources/time	--	4	11%
Doesn't suit organization/company	--	2	9%
Don't know	--	3	11%

\* For more information, see Table B-120.

Two-thirds (67%) of non-participants said it was somewhat or very important, for them to be able to assess how the energy consumption in their buildings compared to the energy consumption in buildings occupied by other similar companies or competitors (Table 5-62).

**Table 5-62: Importance of Comparing Building Energy Consumption Against Similar Companies' or Competitors'\***

(non-participants)

	<b>Non-participants</b>
<i>Sample Size</i>	48
Somewhat or Very important	67%
Not very or not at all important	33%

\* For more information, see Table B-121.

Of the 16 respondents who said that comparing energy consumption was “not very important” or “not at all important,” the top reasons were that that they are not concerned with or do not care about buildings' energy use (9 respondents). (Table 5-63)

**Table 5-63: Reason for Importance of Comparing Building Energy Consumption Against Similar Companies' or Competitors'\***

(non-participants who indicated importance of comparing building energy consumption; multiple response)

	<b>Not very or not at all important (count)</b>	<b>All</b>
<i>Sample Size</i>	16	46
Not concerned with others/Don't care	3	22%

\* For more information, see Table B-122.

### 5.5.3 Perceived Importance of ENERGY STAR Label/Rating

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The bulk of data regarding the importance of the ENERGY STAR label support observations made elsewhere in this report that the ENERGY STAR label has considerable value for building owners.*

The few participants and non-participants who offered ENERGY STAR certification as among the most interesting aspects of benchmarking were asked additional questions regarding the

value of this certification. The results were mixed and inconclusive (Table B-117). However, four of the five customers with large portfolios who were interviewed noted that the Portfolio Manager 1-100 rating is important for delivering a rating that can be used to qualify the building for an ENERGY STAR label. Two said that it was important to them for LEED certification.

In Section 5.5.1 it was noted that two-thirds (66%) of participants who benchmarked agreed that benchmarking had been a requirement for ENERGY STAR or LEED certification, and 18% volunteered that obtaining a green building label such as ENERGY STAR was an aspect of benchmarking that interested their organization. Taken together with observations from the stakeholder and EPA interviews as well as anecdotes from the customers with large portfolios, the data support observations made elsewhere in this report that the ENERGY STAR label has considerable value for building owners.

## 5.6 Effectiveness of Benchmarking at Eliciting Energy Savings

### 5.6.1 Benchmarking and Subsequent Building Energy Management and Improvements

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Benchmarking appears to have resulted in about three-fifths (62%) of participants taking energy management actions in their buildings such as monitoring of controls, thermostats, buildings, or electrical or steam usage. When this group of participants was asked to rate how much of an influence benchmarking had had on how their organization managed building energy use, all said that it had had at least some influence, and 62% indicated that it had had a great or very great deal of influence. When asked how benchmarking had changed their organizations' energy use, participants who benchmarked most frequently reported monitoring of controls, thermostats, buildings, or electrical or steam usage (25%), followed by identifying areas or buildings for reducing energy use (22%).*
- ❖ *Thirty-four participants—84% of all participants who benchmarked—indicated that they had planned or implemented improvements to benchmarked buildings since benchmarking. These participants identified two measure upgrades most frequently, lighting upgrades (96%) and HVAC improvements (83%), followed by three management or behavioral changes: adding energy management system or controls (82%), conducting energy audits or feasibility studies (81%) and changing thermostat set points and turning off lights (80%).*
- ❖ *The benchmark scores or EUIs were at least somewhat important to the decision-making for subsequent changes that were made or planned for the buildings benchmarked by 67% of participants who benchmarked, and very important to 35% of all participants who benchmarked.*
- ❖ *Since the participants studied had taken the first step of voluntarily making the decision to participate in the workshops, it is possible that they were already pre-disposed to making energy efficiency improvements. Thus, it may not be possible to extrapolate the results for actions taken subsequent to benchmarking and any related savings to customers who benchmark but did not volunteer to attend a utility energy efficiency workshop.*



The telephone surveys asked a series of questions to both participants and non-participants about the relationship between benchmarking and management of building energy use, and asked participants who had benchmarked questions about the relationship between benchmarking and subsequent energy efficiency improvements.

About three-fifths (62%) of participants who had benchmarked said that their organization had changed how it managed building energy use since benchmarking. In the same vein, about two-thirds (65%) of participants who benchmarked at least somewhat disagreed (0-4) that benchmarking had had *no* effect on how their organization managed their buildings; of these, about one-half (49%) strongly disagreed (0-2). (Table 5-64)

**Table 5-64: Benchmarking and How Organization Manages Building Energy Use\***  
(participant end users and non-participants who benchmarked)

	<b>Total Benchmarking Participants</b>	<b>Non-participants (count)</b>
<i>Sample Size</i>	41	4
Organization Changed How it Manages Building Energy Use Since Benchmarking	62%	1
Strongly disagree that benchmarking has had no effect on management of buildings' energy use (0-4)	65%	3

\* For more information, see Table B-90 and Table B-99.

When asked to rate how much of an influence benchmarking had on how their organization manages building energy use, all of the participants who benchmarked said that it had at least some influence (4-10), and about three-fifths (62%) indicated that it had a great or very great deal of influence (8-10). (Table 5-65)

**Table 5-65: Influence of Benchmarking on How Organization Manages Building Energy Use\***  
(participant end users who changed building energy management since benchmarking; non-participants who changed building energy management since benchmarking)

	<b>Total Benchmarking Participants</b>
<i>Sample size</i>	24
A great or very great deal of influence (8-10)	62%
At least some influence (4-7)	37%

\* For more information, see Table B-92.

When asked how benchmarking had changed their organizations' energy use, participants who benchmarked most frequently reported monitoring of controls, thermostats, buildings, or electrical or steam usage (25%), followed by identifying areas or buildings for reducing energy use (22%). (Table 5-66)

**Table 5-66: How Benchmarking Changed Organization's Management of Building Energy Use\***  
(participant end users who changed building energy management since benchmarking; non-participants whose organization changed how it manages building energy use since benchmarking; multiple response)

	<b>Total Benchmarking Participants</b>
<i>Sample Size</i>	24
More frequent monitoring (of controls, thermostats, buildings, electrical/steam usage)	25%
Identify areas or buildings for reducing energy use	22%

\* For more information, see Table B-91.

Participants who benchmarked were also asked if their organization had planned or implemented energy efficiency improvements in the buildings they had benchmarked. Thirty-four participants—84% of all participants who benchmarked—indicated that they had planned or implemented improvements to benchmarked buildings since benchmarking. These participants identified two measure upgrades most frequently, followed by three management or behavioral changes: lighting upgrades (96%), HVAC improvements (83%), adding energy management system or controls (82%), conducting energy audits or feasibility studies (81%) and changing thermostat set points and turning off lights (80%). Other changes that were cited fairly frequently were motors (57%), refrigeration (53%), windows (39%), air compression (29%), and insulation/sealing (22%). (Table 5-67)

**Table 5-67: Improvements Planned or Implemented Since Benchmarking\***  
(participant end users and non-participants who benchmarked; multiple response)

	<b>Total Benchmarking Participants</b>
<i>Sample size</i>	41
Organization has planned or implemented improvements since benchmarking	84%
<b>Planned or Implemented Improvements Since Benchmarking</b>	
<i>Sample size</i>	34
Lighting upgrades	96%
HVAC	83%
Energy management system or controls	82%
Energy audits or feasibility studies	81%
Behavior changes, like changing thermostat set points and turning off lights	80%
Motors	57%
Refrigeration	53%
Windows	39%
Air compression	29%
Insulation/Sealing	22%

\* For more information, see Table B-93 and Table B-94.

These same participants were asked how important the benchmark scores or EUIs were to the decisions to make energy efficiency improvements to these buildings. Eighty percent gave responses indicating that the benchmark scores or EUIs were at least somewhat important (4-10); of these, 42% indicated that they were very important (8-10). Thus, the benchmark scores or

EUIs were at least somewhat important to the decision-making for subsequent changes that were made or planned for the buildings benchmarked by 67% of participants who benchmarked,<sup>95</sup> and very important to 35% of all participants who benchmarked.<sup>96</sup> (Table 5-68)

**Table 5-68: Importance of Benchmark Scores or EUIs to Decisions to Make Energy-efficiency Improvements\***

(participant end users who planned or implemented changes; non-participants who planned or implemented changes)

	<b>Total Benchmarking Participants</b>
<i>Sample size</i>	34
Very important (8-10)	42%
At least somewhat important (4-7)	38%

\* For more information, see Table B-96.

More than one-half (55%) of participants who had benchmarked disagreed (0-4) with the statement, “You are no more likely to make energy efficiency improvements in buildings that have been benchmarked than in other buildings,” with over one-quarter (28%) completely disagreeing (0). (Table 5-69)

**Table 5-69: Disagreement with “You are No More Likely to Make Energy Efficiency Improvements in Buildings that have been Benchmarked than in Other Buildings”\***

(participant end users and non-participants who benchmarked)

	<b>Total Benchmarking Participants</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	41	4
Disagree (1-4)	27%	1
Strongly disagree (0)	28%	--

\* For more information, see Table B-99.

Since the participants studied had taken the first step of voluntarily making the decision to participate in the workshops, it is possible that they were already pre-disposed to making energy efficiency improvements. Thus, it may not be possible to extrapolate the results for actions taken subsequent to benchmarking and any related savings to customers who benchmark but did not volunteer to attend a utility energy efficiency workshop.

Among the customers profiled, the municipal government interviewee explained that for their organization, the next step after benchmarking is an energy audit, or a retro-commissioning audit at the sites with the most energy-intensive usage. The federal agency identified at least one energy efficiency project opportunity that was identified as a result of benchmarking: retrofitting lighting with T8 linear fluorescents in all of the staff buildings.

<sup>95</sup> Calculated by multiplying the 84% of participants that made changes to buildings subsequent to benchmarking by the 80% who gave responses indicating that the benchmark scores or EUIs were at least somewhat important (4-10).

<sup>96</sup> Calculated by multiplying the 84% of participants that made changes to buildings subsequent to benchmarking by the 42% who gave responses indicating that the benchmark scores or EUIs were very important (8-10).

### 5.6.1.1 Benchmarking and Utility Program Participation

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The survey data suggest there is a positive relationship between benchmarking and utility program participation among participants. About four-fifths (81%) of participants who had planned or made changes to buildings subsequent to benchmarking said at least some of the changes were associated with energy-efficiency programs offered by their utility.*

About four-fifths (81%) of participants who planned or made changes to buildings subsequent to benchmarking said yes when asked, “Are any of these changes associated with energy efficiency programs offered by your utility?” (Table 5-70)

**Table 5-70: Changes Were Associated with Energy-Efficiency Programs Offered by Utility\***  
(participant end users who planned or implemented changes; non-participants who planned or implemented changes)

	Total Benchmarking Participants	Non-participants (count)
Sample size	34	4
Yes	81%	3

\* For more information, see Table B-95.

Among the customers profiled, only the REIT indicated a relationship between benchmarking and subsequent program participation. Specifically, benchmarking influenced their decision to participate in retro-commissioning with one of the IOUs.

### 5.6.1.2 Benchmarking and More Comprehensive Retrofits

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The survey data suggest that benchmarking encourages more comprehensive retrofits among participants. More than one-half (53%) of participants agreed (6-10 on a scale of 0-10) and nearly two-fifths (37%) strongly agreed (8-10) with the statement, “You implement more comprehensive energy efficiency measures in the buildings you benchmark.”*

More than one-half (53%) of participants agreed (6-10) and nearly two-fifths (37%) strongly agreed (8-10) with the statement “You implement more comprehensive energy efficiency measures in the buildings you benchmark” (Table 5-71). This finding suggests that benchmarking may be important to achieving deep energy savings in commercial buildings.

**Table 5-71: Agreement with “You Implement More Comprehensive Energy Efficiency Measures in the Buildings Benchmarked”<sup>\*</sup>**

(participant end users and non-participants who benchmarked)

	<b>Total Benchmarking Participants</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	41	4
Strongly agree (8-10)	37%	--
Agreed (6-7)	16%	3

<sup>\*</sup> For more information, see Table B-97.

Among customers profiled, the REIT customer identified the organization’s long-term goal around benchmarking as being to achieve deeper energy retrofits.

### 5.6.1.3 Use of Benchmarking in Rewarding Staff Performance

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The survey data suggest that benchmarking is being used to some extent in performance assessments among the organizations of nearly half (48%) of participants.*
- ❖ *That nearly one-fifth (17%) of participants strongly agreed, and a similar proportion (18%) at least somewhat agreed, with the statement, “Your organization considers benchmarking scores in the bonuses of building engineers or property managers,” suggests that among participants’ organizations benchmarking plays a more limited role—but a role nonetheless—in the bonuses of some building engineers or property managers.*

Nearly one-half (48%) of participants agreed (6-10) and over one-fourth (29%) strongly agreed (10) that their organization considered benchmarking scores in the *performance assessments* of building engineers or property managers.

Nearly one-fifth (17%) of participants strongly agreed (8-10), and a similar proportion (18%) at least somewhat agreed (6-10) with the statement: “Your organization considers benchmarking scores in the *bonuses* of building engineers or property managers” (Table 5-72).

**Table 5-72: Organization’s Use of Benchmarking in Rewarding Staff Performance<sup>\*</sup>**

(participant end users and non-participants who benchmarked)

	<b>Total Benchmarking Participants</b>	<b>Non-participants (count)</b>
<i>Sample size</i>	41	4
<b>Organization considers benchmarking scores in the performance assessments of building engineers or property managers</b>		
Strongly agree (10)	22%	--
Agree (6-9)	26%	3
<b>Organization considers benchmarking scores in the bonuses of building engineers or property managers</b>		
Strongly agree (8-10)	17%	--
Agree (6-7)	1%	2

\* For more information, see Table B-98.

None of the profiled customers are currently rewarding employees for energy-efficiency initiatives that improve benchmarking scores. The REIT is looking into the long-term prospects for tying engineers' bonuses to energy efficiency improvements, but noted that establishing bonuses is hard because of union rules. This interviewee identified an inherent problem in providing incentives for energy performance, namely that it becomes more difficult over time. Other reasons noted by interviewees were budget constraints and the challenge of providing incentives in the federal government. The engineering services vendor pointed out that the chief engineer can have a big impact on the score by doing things like turning off the chiller when it is not needed. In this interviewee's opinion, "a good chief engineer will pay his own salary if he is on top of things."

## 5.6.2 Opportunities to Improve Benchmarking Outcomes

### Summary of Key Findings & Recommendations in this Section

- ❖ *Interviewees identified a number of general opportunities to improve the outcomes from benchmarking activities in California, including changes to the regulatory structure or process, providing more inducements to benchmark, enhancing or expanding benchmarking through the utility benchmarking initiatives, and encouraging EPA to improve Portfolio Manager.*
- **Recommendation:** *The CPUC may wish to consider assessing the clarity of the state's laws and regulations regarding the privacy of energy use in relation to benchmarking of commercial buildings, and clarifying customer privacy requirements as appropriate to facilitate benchmarking of the maximum number of buildings in the state.*
- **Recommendation:** *Greater engagement between CPUC staff and the staff of state agencies working on benchmarking could result in more integrated efforts, mutual reinforcement of the different agencies' work, and faster implementation of AB 1103. The CPUC may wish to take a more active role in understanding the issues and potential solutions around customer privacy for benchmarking, and collaborate with the IOUs, CEC, and other stakeholders to put the necessary regulatory framework in place that would enable an optimum solution.*
- **Recommendation:** *The CPUC, CEC, or other appropriate agency, in collaboration with the IOUs, may wish to investigate whether some other regulatory approach, such as an expansion of the building stock to which AB 1103 applies, or an expansion of the benchmarking initiatives, could encourage benchmarking on an ongoing basis.*

- **Recommendation:** *The CPUC may wish to explore the possibility of regulatory action to require IOUs to add the building attribute to their customer information systems, and to add total square footage and building type to the building attribute, and to obtain this information from their customers. In considering this possibility, it should be taken into consideration that there may be (1) technical or other limitations to the ability of IOUs to add this information, and (2) substantial costs associated with such changes. The costs could include, and may not be limited to, those of soliciting, obtaining, and inputting the information from customers; maintaining the information given the dynamic nature of non-residential building stock; and technical changes that would likely need to be made to customer information system software.*
- **Recommendation:** *The CPUC and/or IOUs may wish to investigate whether there may be inducements not yet tried, and worth considering, that could encourage more customers to benchmark.*
- **Recommendation:** *The CPUC may wish to investigate what system-level benchmarking entails and its possible use as a tool to help achieve the state's energy efficiency goals.*
- **Recommendation:** *The CPUC, CEC, and other stakeholders interested in the benchmarking of California's commercial buildings may want to further engage the EPA to identify existing gaps in Portfolio Manager by expanding the list of eligible buildings, facility and space types and by modifying the underlying methodologies used to create scores.*

As detailed in the following sections, the individuals and organizations interviewed for this study identified a number of opportunities to improve the prospects for benchmarking and increase the attention paid to commercial building energy management and efficiency in California.

#### **5.6.2.1 Clarify Regulation and Change the Regulatory Structure**

Several interviewees suggested that the state's laws and regulations regarding the privacy of energy use data could constrain benchmarking of commercial buildings in the state. In an attempt to comply with current laws and regulations concerning privacy, IOUs have required owners of multi-tenant buildings to obtain authorization from each tenant (i.e., utility customer) with a meter in the building in order to use the utility ABSs with Portfolio Manager. It was the opinion of one interviewee that requiring authorization from each tenant impedes benchmarking by owners of multi-tenant buildings, and of two interviewees that it constrains utilities' efforts to estimate proxy benchmark scores for customer buildings. It was the opinion of another interviewee that some of the regulatory decisions addressing customer privacy may have been issued outside the context of energy efficiency or predate the state's concerns about energy efficiency and could be interpreted in more than one way. Given these observations, the CPUC may wish to consider assessing the clarity of the state's laws and regulations regarding the privacy of energy use in relation to benchmarking of commercial buildings, and clarifying relevant customer privacy requirements as appropriate in order to facilitate benchmarking of the maximum number of buildings in the state.

Additionally, there is a perception that the CEC and CPUC could facilitate benchmarking through improved coordination and cooperation between the organizations. Greater engagement



between CPUC staff and the staff of state agencies working on benchmarking could result in more integrated efforts, mutual reinforcement of the different agencies' work, and faster implementation of AB 1103. In this vein, the CPUC may wish to take a more active role in understanding the issues and potential solutions around customer privacy for benchmarking, and collaborate with the IOUs, CEC, and other stakeholders to put the necessary regulatory framework in place that would enable an optimum solution.

While AB 1103 only applies to buildings at the time of sale or lease of an entire building, energy use decisions are not made only at these times. A regulatory structure may be needed to encourage benchmarking on an ongoing basis, not just as part of real estate transactions.

The CPUC could explore the possibility of regulatory action to require IOUs to add the building attribute to their customer information systems, and total square footage and building type to the building attribute, and to obtain this information from their customers. There could be substantial costs associated with such changes, including the costs of soliciting, obtaining, and inputting the information from customers and maintaining the information given the dynamic nature of non-residential building stock, as well as technical changes that may need to be made to customer information system software.

#### ***5.6.2.2 Provide More Inducements to Benchmark***

Since AB 1103 only applies to buildings at the time of sale or lease of an entire building, and only to buildings over a certain size, many commercial customers will not be affected by AB 1103 either any time soon or at all, and thus will not be subject to one of the most compelling drivers to benchmark. More inducements to benchmark may be needed to get a larger numbers of California customers to benchmark with Portfolio Manager.

#### ***5.6.2.3 Enhance or Expand Benchmarking through the Initiatives***

Whole-building benchmarking is not the only opportunity for benchmarking commercial buildings. One stakeholder profiled suggested that system-level benchmarking (e.g. of lighting or HVAC) represents an important, untapped opportunity to identify energy-saving opportunities in specific buildings. System-level benchmarking may be available as part of asset-rating tools. The CPUC may wish to investigate what system-level benchmarking entails and if its possible use as a tool to help achieve the state's energy efficiency requirements.

#### ***5.6.2.4 Encourage EPA to Further Improve Portfolio Manager***

While the IOUs already provide feedback to EPA about Portfolio Manager, they could help improve Portfolio Manager by making a stronger push for additional building types to be included in it, and by persuading EPA to address gaps in features of Portfolio Manager and the underlying methodology described in Section 3.2.6. If the CPUC, CEC, and other stakeholders interested in the benchmarking of California's commercial buildings could join together to address these issues, it may increase the likelihood of changes being made to Portfolio Manager that would be beneficial for the benchmarking of California commercial buildings.

### 5.6.2.5 Potential Issues with the Implementation of AB 1103

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Interviewees identified a number of potential issues with the implementation of AB 1103, including the timing of benchmarking in a real estate transaction; that some real estate transactions that should be subject to AB 1103 may not be; and that an operational rating may not be the best choice for building valuation.*

The stakeholders interviewed also identified a number of issues with the potential to impede AB 1103 in improving the energy efficiency of commercial buildings.

Depending on when benchmarking is required during a real estate transaction, the results may not be available to the purchaser to help in selecting or valuing the building. It is not yet clear at what point in a transaction benchmarking will be required by AB 1103.

Furthermore, some real estate transactions that would be subject to AB 1103 according to the spirit of the law may not be subject to the letter of the law. The majority of transactions related to commercial buildings are for portions of buildings, not for whole buildings. For example, a single building is often leased to multiple tenants, so a change in tenancy in one part of the building will not subject the building to AB 1103 requirements. Even when an entire building transfers ownership, this often takes place a portion at a time in order to avoid new tax assessments, thus allowing the building to avoid being subject to AB 1103.

Stakeholders also pointed out that where a change in ownership or tenancy is likely to introduce a substantial change in operational energy use, taking an operational rating into account in building valuation could be misleading. Tenant plug loads and tenant decisions about how to occupy a space determine some portion of a building's energy use, and these are reflected in operational ratings. This has implications for using operational benchmarking ratings, such as that required by AB 1103, in building valuation. For example, the new owner or tenant could find a much different result when re-benchmarking simply because of a change in operational energy use associated with the change in the activity taking place in a building with new occupants.

## 5.7 Effectiveness of Initiatives and Opportunities for Improvement

### 5.7.1 Effectiveness of Benchmarking Support in Driving Customers to Benchmark

**Summary of Key Findings & Recommendations in this Section** *The initiatives facilitate, rather than drive, customers to benchmark their buildings with Portfolio Manager.*

❖ *While the results suggest that requiring benchmarking for commercial program participation might indeed result in somewhat greater rates of benchmarking, there are reasons that mandatory benchmarking might not produce the behavioral outcome envisioned for the initiatives. For example, benchmarking conducted only in response to a requirement may be produced with less attention to detail than voluntary benchmarking, and thus the accuracy of the score could suffer. Also, the appropriate customer staff might not become aware of their energy use when benchmarking is mandatory, especially if a vendor benchmarks on behalf of a customer just so that the customer can qualify for a rebate. Such customers may also be less likely to re-benchmark or monitor benchmarking scores after the rebate requirement is satisfied.*



According to the theory behind the benchmarking initiatives, described in Section 4.2, the initiatives facilitate, rather than drive, customers to benchmark their buildings with Portfolio Manager. The only mechanisms currently in place explicitly meant to “drive” customers to benchmark are proxy benchmarking and SDG&E’s requirement that commercial customers wishing to participate in a utility program must first benchmark with Portfolio Manager.

As reported in Section 5.4.4.3, the survey results suggest that compared to other service territories, vendors in the SDG&E service territory are somewhat more likely to benchmark than are end-users, and a significantly greater proportion of the workshop participants reported attending the workshop because they were required to benchmark. In 2010, SDG&E did benchmark more buildings than any other IOU, presumably because of the requirement. Together these results suggest that requiring benchmarking might indeed result in somewhat greater rates of benchmarking. However, the quality of the outcome must be taken into consideration. SDG&E staff interviewed for this study were of the opinion that voluntary benchmarking is probably more effective than mandatory benchmarking, and expressed concern that making benchmarking a pre-requisite for program participation might not produce the behavioral outcomes envisioned for the initiatives since the right people might not become aware of their energy use when benchmarking is mandatory. Staff noted that this would especially be the case where a vendor is doing the benchmarking on behalf of a customer just so the customer can qualify for a rebate.

Finally, it is tempting to conclude that since the rate of benchmarking is much higher among workshop attendees (participants) than among those who did not attend the workshop (non-participants), the workshops are effective at driving customers to benchmark their buildings. However, this conclusion would not be valid, since attendees who were more interested in

benchmarking prior to learning about the workshop would have greater incentive to attend a benchmarking workshop than those who were not.

## 5.7.2 Customer-driven Benchmarking: Successes, Challenges & Lessons Learned

### 5.7.2.1 Successes

#### Summary of Key Findings & Recommendations in this Section

- ❖ *As described in Section 5.4.4.4, the survey results provide evidence that the workshops are effective at providing customers with the information and skills to benchmark their buildings. Four-fifths (82%) of participants stated that the training had been sufficient for them to benchmark their buildings on their own.*
- ❖ *Interviewees hold the initiative support in high regard. They identified some specific strengths, including the pioneering nature of the initiatives, strong utility ABS support, workshops that offer hands-on experience using Portfolio Manager and utility ABSs, and utilities' benchmarking websites.*

As described in Section 5.4.4.4, four-fifths (82%) of participants stated that the training had been sufficient for them to benchmark their buildings on their own. The survey results provide evidence that the workshops are effective at providing customers with the information and skills to benchmark their buildings.

EPA representatives and stakeholders interviewed were all familiar with the support for benchmarking provided by the IOUs. Both groups of interviewees expressed high regard for the support offered via the IOUs' initiatives. To quote one EPA interviewee, "California utilities have taken benchmarking to a different scale—[an] admirable effort." A stakeholder interviewee expressed the view that the IOUs' support increases the likelihood of customer benchmarking.

EPA staff identified the following specific strengths of the benchmarking initiatives:

- *Pioneering and independent nature of initiatives.* The California IOUs pioneered efforts to invest in utility ABSs, and they are largely self-sufficient in terms of reaching out to encourage customers to use Portfolio Manager and training them in its use. Indeed, they provide the only technical support for Portfolio Manager.
- *Strong ABS support.* Having an ABS available to customers is an important resource that allows customers to easily track energy usage. Utility ABSs make the benchmarking process much less onerous. Because of impetus from the CPUC, IOUs have built a structure to support ABS that is better than that of other ABS providers.
- *Strong workshops that offer customers hands-on experience with benchmarking.*
- *Websites.* The utility websites are good resources for spreading awareness of utility ABSs among building owners and among consultants who are trying to figure out how they can support building owners.

### 5.7.2.2 Challenges

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Interviewees identified challenges of the initiatives that include difficulties meeting goals set by the CPUC because utilities cannot use Portfolio Manager to benchmark on behalf of a customer; a disconnect between the needs of customers benchmarking buildings with Portfolio Manager, the tracking needs of the initiative, and the organization of utility customer information and billing systems; and the difficulty of defining a “customer” for purposes of benchmarking.*
- **Recommendation:** *Since utilities cannot use Portfolio Manager to benchmark on behalf of a customer, and this was not taken into consideration when the goals for buildings benchmarked by the end of 2012 were adopted, the CPUC may wish to consider relaxing the goals for buildings benchmarked that were set for the utilities.*

Some of the EPA, stakeholders and initiative staff interviewed noted that utilities cannot use Portfolio Manager to benchmark on behalf of a customer. This makes it very difficult for the IOUs to meet the CPUC’s goal for benchmarking specific numbers of buildings through Portfolio Manager. For this reason the CPUC may wish to consider relaxing the goals for buildings benchmarked that were set for the utilities.

Interviews with initiative staff revealed a disconnect between the needs of customers benchmarking buildings with Portfolio Manager, the tracking needs of the initiative, and the organization of utility customer information and billing systems (CIS). Utility CISs are organized around meters and customers, not around individual buildings. This makes it very difficult to:

- Seamlessly provide energy use information for Portfolio Manager.
- Identify buildings that could qualify to be benchmarked by customers
- Set and assess progress towards goals related to the numbers of buildings that have been, or could be, benchmarked.

Another challenge to setting and assessing progress toward utility benchmarking goals noted by initiative staff is that of defining a “customer” for purposes of benchmarking. There are situations where the entity that pays the bill does not own the building and will not be listed as the “customer” on a program application. The “customer” of record may not be the individual or organization that owns the facility. The facility manager may also not work for the same organization as the building owner. A vendor or ESCO unrelated to any of these may do the actual building benchmarking.

### 5.7.2.3 Opportunities for Improving Initiative Implementation/Assistance/Services

#### Summary of Key Findings & Recommendations in this Section

- ❖ *A variety of ideas were offered by interviewees and survey respondents for improving implementation and assistance or services to increase the likelihood of benchmarking. Among other ideas, these include utilities taking a more involved approach to ensuring that customers capture all meter data and accurately input other characteristics for buildings they benchmark both to help alleviate the impediments created by data privacy issues and improve the quality of scores and EUIs; encouraging the use of asset ratings and of California-specific benchmarking tools in addition to Portfolio Manager; and increasing customer awareness of benchmarking.*
- **Recommendation:** *To help increase interest in the workshops among building types that are less frequently benchmarked with Portfolio Manager, the IOUs may wish to consider hosting more facility- or industry-specific workshops.*
- **Recommendation:** *The IOUs may wish to explore what, if any, additional information, financial assistance, or other assistance could be provided through the initiatives to help customers benchmark.*
- **Recommendation:** *The IOUs may wish to explore ways to work more pro-actively with customers to identify and upload meters for multi-tenant buildings and ensure that facility attributes required by Portfolio Manager are accurate and complete. One example of such an approach is that of Commonwealth Edison.*
- **Recommendation:** *If they have not already done so, utilities would benefit from sharing information with each other resulting from their investigations of or experiences with possible approaches to facilitate benchmarking of multi-tenant buildings under existing privacy requirements.*
- **Recommendation:** *As benchmarking data become publicly available or available through the utilities' local government programs, utilities could consider the possibility of using these data to identify the highest and lowest performers across the cities and provide targeted support, perhaps as part of local government partnership programs. The utilities could also use data available via ABS and proxy benchmarking to do this internally for marketing and sales. This could help improve the delivery and effectiveness of utility commercial programs.*
- **Recommendation:** *A better understanding of the market for benchmarking could help in determining how best to expand the use of Portfolio Manager outside of office and municipal buildings, tailoring marketing communications to different customer types or local situations. Given the degree of information from workshops and from utility ABSs about initiative participants, and the importance of understanding the market for benchmarking in light of the state's interest in this approach to energy efficiency, the CPUC may want to consider conducting a market segmentation study for benchmarking in the future.*



- **Recommendation:** *Utilities may wish to increase consumer awareness of benchmarking by judiciously expanding both the range of marketing channels used and their marketing budgets. To increase awareness and encourage greater use of benchmarking they may also wish to increase engagement with industry associations of companies that own and operate commercial buildings, and reach out to associations representing industries that use buildings that can be benchmarked with Portfolio Manager.*
- **Recommendation:** *The benchmark score in itself does not provide guidance on actions that could help improve a building's energy use. Other than informing workshop registrants what utility programs are available to them as part of workshops,<sup>97</sup> the initiatives generally lack any other mechanism to provide customers with what they need—and appear to want—to get to the next step of identifying opportunities within a building. The utilities may wish to give further thought to the initiative design to help customers take action after benchmarking.*
- **Recommendation:** *Articulating the initiative theory and laying it out in the form of a logic model could help in identifying each of the customer segments that use, or could benefit from, benchmarking. It could also clarify ways to maximize the initiatives' abilities to reach each segment, and help in identifying meaningful progress indicators that can be measured efficiently. Given the similarities among the utilities' efforts, and the fact that some of the audiences for benchmarking have buildings in multiple service territories, the utilities may wish to work together to articulate a common initiative theory and develop a common logic model that may then be adapted for each utility's circumstances and goals.*
- **Recommendation:** *Incentives could in theory be offered to encourage customers to benchmark and to share their benchmarking data. The CPUC and IOUs may wish to explore how incentives might be used to encourage benchmarking, and examine whether it is desirable or appropriate to do so given that no savings are claimed from benchmarking.*
- **Recommendation:** *Utilities are already leveraging billing data to develop proxy scores which are intended to encourage customers to benchmark their buildings. However, currently it is not possible to calculate proxy scores for all commercial customers, nor is the score for a particular building necessarily available to all customers in the building. Utilities could explore ways to improve how building energy use data are communicated in monthly bills, so as to encourage customers to benchmark their buildings with Portfolio Manager and manage their buildings' energy use—or in the case of tenants, to request the building owner to do this.*

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<sup>97</sup> The “Benchmarking—What’s Next?” advanced workshop provides information to customers about both possible actions to perform and available utility programs.



- **Recommendation:** *While benchmarking with Portfolio Manager is part of some commercial offerings for some of the utilities, for the most part the connection between the benchmarking and a utility's other programs is made primarily through the information about other utility programs that is included in the workshops. Initiative staff may wish to give some thought to other ways that customers who are benchmarking with Portfolio Manager could be informed about and encouraged to participate in the utility's other commercial programs. Conversely, they also may wish to give some thought to ways that the commercial programs could more actively encourage customers to benchmark with Portfolio Manager, check scores, and manage energy use on a regular basis. Findings on the value of benchmarking, especially in implementing comprehensive building upgrades, may indicate that there could be opportunities to improve whole-building upgrade programs and energy audits through incorporation of benchmarking.*
- **Recommendation:** *In addition to more closely integrating benchmarking into the utilities' other commercial programs, there may be opportunities to use the benchmarking activities of customers with buildings in multiple service territories to coordinate the delivery of commercial programs across those service territories. For example, utilities could ask commercial program participants about buildings they have in other service territories, and help to connect these customers with benchmarking support and commercial program staff at the utilities serving these territories. The utilities may wish to explore how they might be able to cross-market benchmarking where appropriate and desirable.*

The telephone survey asked what assistance or services would make respondents' organization more likely to benchmark the buildings they owned, occupied or managed. Respondents provided some suggestions which were not already part of the initiatives (Table B-113). Some of these are summarized above as recommendations:

- Hosting more facility-specific workshops than in the past, or making the benchmarking tool more facility-specific.
- Providing staff, guidance, or services to help with benchmarking.
- Help persuading tenants or building unit owners to cooperate.
- Providing more information, financial assistance, or other assistance from a professional to help with benchmarking.

The in-depth interviews also generated a range of ideas to improve implementation of the benchmarking initiatives. Some of these are summarized above as recommendations. These included:

- ❖ To help alleviate the impediments created by data privacy issues when there are multiple tenants in a single building, utilities could explore working more pro-actively with customers to identify and upload meters and ensure that facility attributes required for an accurate benchmark score are accurate and complete. One example of such an approach is that of Commonwealth Edison of Illinois. According to an EPA interviewee, when a Commonwealth Edison customer first sets out to benchmark a building, Commonwealth Edison develops a list of all the meters and customers—including tenants—associated with

the building, and provides the list to the building owner for verification. Once the list has been verified, Commonwealth Edison aggregates the meter data for the owner to use with Portfolio Manager. Because of this involvement, the utility knows when energy use data have been successfully downloaded to Portfolio Manager for all the meters associated with a particular premise and the building score or EUI could thus be considered a “finished product,” at least in terms of these data. The EPA interviewee noted that in addition to helping to lower the barriers associated with privacy issues when benchmarking buildings with multiple tenants, this approach could improve the quality of the scores and EUIs for tracking and later analysis. SCE already offers a solution similar to Commonwealth Edison’s for multi-tenant buildings that meet the “15/15 rule”<sup>98</sup> from CPUC Decision D.97-10-031.

- ❖ PG&E notes that data aggregation along the lines of Commonwealth Edison’s solution presents significant technical complexities and obstacles and may not be a sufficient mechanism to meet existing customer privacy requirements. PG&E has developed another solution to provide tenant data to building owners while mitigating customer privacy concerns. If they have not already done so, utilities would benefit from sharing information with each other resulting from their investigations of or experiences with possible approaches to facilitate benchmarking of multi-tenant buildings under existing privacy requirements.
- ❖ Encourage the use of asset ratings and of California-specific benchmarking tools in addition to Portfolio Manager. Given what some other interviewees have said about the value of the ENERGY STAR brand in the commercial arena—e.g., that it should not be underestimated, especially not its spillover effects, and the potential for market confusion from conflicting ratings—any decision to incorporate another tool or tools will require careful consideration by the IOUs, CPUC, and other relevant state agencies, at a minimum.
- ❖ Increase customer awareness of benchmarking.
- ❖ Find innovative ways to integrate benchmarking into utility commercial and industrial energy efficiency programs.
- ❖ Offer incentives to encourage customers to benchmark and to share their benchmarking data.
- ❖ Leverage benchmarking data to improve delivery of other commercial programs. A combination of publicly available benchmarking data plus utility data could be used to target buildings or customers for programs, possibly through the utilities’ local government partnership programs. Commercial building performance data will soon become available through San Francisco’s Green Building Ordinance. Other municipalities may adopt similar legislation in the future. Building performance data from the San Francisco ordinance and possible future ordinances could be coupled with the detailed energy use data already possessed by utilities in order to open up new opportunities for utility program delivery. For example, utilities could combine their own energy use data with the publicly available data from governments or through their local government partnerships programs to identify the highest and lowest performers across the city and provide targeted support, perhaps as part of

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<sup>98</sup> According to SCE staff, if the 15/15 rule is met, and the meter read dates align, then all building meter data will be automatically uploaded via ABS. To meet the requirements of the 15/15 rule, the energy usage must be associated with at least 15 separate customer accounts, and no account can comprise 15% or more of the total energy usage.

local government partnership programs. This would help improve the delivery and effectiveness of utility commercial programs.

- ❖ If utilities are not already doing so, reach out to owners of smaller commercial buildings, which are not typically able to obtain a rating from Portfolio Manager.
- ❖ Offer advanced classes in Portfolio Manager.

Based on research findings and suggestions from earlier in the study as well suggestions described here, the evaluation team has developed the following additional recommendations for improving the benchmarking initiatives. All of these are summarized above.

*Conduct Market Research.* A better understanding of the market segments that the survey suggests are less well-represented at the workshops could help in determining how best to expand the use of Portfolio Manager outside of office and municipal buildings. The results of market research could help in tailoring marketing communications to different customer types or local situations. Given the degree of information available from workshops and from utility ABSs about initiative participants, and the importance of understanding the market for benchmarking in light of the state’s interest in this approach to energy efficiency, the CPUC may want to consider conducting a market segmentation study for benchmarking in the future.<sup>99</sup>

*Increase Consumer Awareness of Benchmarking.* With unaided customer awareness of benchmarking at 16% and aided awareness at 30% among “non-participant” customers, there appears to be substantial scope for increasing customer awareness of benchmarking. While the utilities have been working closely with organizations such as BOMA and NASEO, only 13% of participants said that they had heard about benchmarking from such industry sources. The utilities reported using just a few marketing channels with limited budgets. Judiciously expanding both the range of marketing channels used and the marketing budgets could help increase customer awareness of benchmarking. In addition to increased engagement with industry associations of companies that own and operate commercial buildings, reaching out to associations representing industries that use buildings that can be benchmarked with Portfolio Manager, such as health care or hospitality, could be a fruitful way to increase awareness and encourage greater use of benchmarking.

*Help Make Benchmarking More Actionable.* As is to be expected from an operational rating tool, the Portfolio Manager benchmark score in itself does not provide guidance on actions that could help improve a building’s energy use. For that, the building owner needs to take other steps to get more actionable information, often starting with an energy audit, possibly in conjunction with a utility retro-commissioning program. As described in Section 5.2.3, customers *want* to use Portfolio Manager to identify specific energy-saving opportunities within buildings, even though that is not the purpose of the tool. Other than informing workshop registrants what utility programs are available to them (for example, as part of the “Benchmarking—What’s Next?” advanced workshop) and in some cases providing contact information of interested workshop

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<sup>99</sup> A full-blown market segmentation was outside of the scope of this study.

participants to utility account representatives, the initiatives lack any other mechanism to provide customers with the information they need—and appear to want—to get to the next step of identifying opportunities with a building. One solution might be to tighten the link between the benchmarking support provided through the initiatives and utility audit or retro-commissioning programs. Another might be encouraging customers to use supplemental benchmarking tools. The utilities may wish to give further thought to the initiative design to help customers take action after benchmarking.

*Articulate Initiative Theory and Logic.* No logic models have been created for the initiatives, and the utilities have not formally articulated the initiative theory. This may be due to the fact that the benchmarking initiatives do not have formal “program” or “subprogram” status. Articulating the theory and laying it out in the form of a logic model, especially one that is informed by market research, could help in identifying each of the customer segments that use, or could benefit from, benchmarking. It could also clarify ways to maximize the initiatives’ abilities to reach each segment, and help in identifying meaningful progress indicators that can be measured efficiently. This report provides a resource with which utilities can begin drafting the initiative theory and building logic models for their initiatives. Given the similarities among the utilities’ efforts, and the fact that some of the audiences for benchmarking have buildings in multiple service territories, the utilities may wish to work together to articulate a common initiative theory and develop a common logic model that may then be adapted for each utility’s circumstances and goals.

*Encourage Benchmarking Through the Use of Incentives.* Incentives could in theory be offered to encourage customers to benchmark and to share their benchmarking data. If the CPUC and the IOUs decide that it is desirable for customers to use asset ratings or California-specific benchmarking tools in addition to Portfolio Manager, incentives could help encourage this as well.

*Leverage Utility Bills to Encourage Benchmarking and Building Energy Management.* Utilities are already leveraging billing data to develop proxy scores which are intended to encourage customers to benchmark their buildings. However, currently it is not possible to calculate proxy scores for all commercial customers, nor is the score for a particular building necessarily available to all customers in the building. Utilities could explore ways to improve how building energy use data are communicated in monthly bills, so as to encourage customers to benchmark their buildings with Portfolio Manager and manage their buildings’ energy use—or in the case of tenants, to request the building owner to do this.

*Better Integrate Benchmarking Into Other Commercial Programs.* While benchmarking with Portfolio Manager is part of some commercial offerings for some of the utilities, for the most part the connection between the benchmarking and a utility’s other programs is made primarily through the information about other utility programs that is included in the workshops. Initiative staff may wish to give some thought to other ways that customers who are benchmarking with Portfolio Manager could be informed about and encouraged to participate in the utility’s other

commercial programs. Conversely, they also may wish to give some thought to ways that the commercial programs could more actively encourage customers to benchmark with Portfolio Manager, check scores, and manage energy use on a regular basis.

*Coordinate Initiative Delivery Across Utilities.* In addition to more closely integrating benchmarking into the utilities' other commercial programs, there may be opportunities to use the benchmarking activities of customers with buildings in multiple service territories to coordinate the delivery of commercial programs across those service territories. For example, utilities could ask commercial program participants about buildings they have in other service territories, and help to connect these customers with benchmarking support and commercial program staff at the utilities serving these territories.

### 5.7.3 Effectiveness of Proxy Benchmarking

As only one utility, SCE, had begun delivering proxy benchmark scores to customers at the time of this study, this study stops short of answering the question, "How effective is proxy benchmarking at encouraging participation in utility programs, more comprehensive retrofits, and better operations and maintenance practices?" As noted in Section 4.5, SCE will continue to deliver proxy scores to customers in 2012, and PG&E expects to begin to deliver scores to customers during this same period.

## 5.7.4 Proxy Benchmarking: Successes, Challenges and Lessons Learned

### 5.7.4.1 Challenges and Observations

#### Summary of Key Findings & Recommendations in this Section

- ❖ *Interviewees identified a number of important challenges to proxy benchmarking. Among other challenges, these include that proxy benchmarking is currently limited to the "low hanging fruit" of buildings with one customer and will not be viable for all commercial customers; that the goals for buildings benchmarked by each utility may not be attainable by all utilities even with proxy benchmarking; and that proxy scores could demotivate recipients under certain circumstances.*
- ❖ *Utilities sending out proxy scores should make it clear to recipients that Portfolio Manager will give them a more accurate score, and that it is likely to vary from the proxy score.*

Initiative staff identified the following challenges to proxy benchmarking:

- *Utility CISs do not lend themselves to the calculation of proxy benchmark scores.* Utility customer information/billing systems are organized around meters, not around individual buildings or individual customers. This makes it very difficult to identify buildings via the utility Customer Information System (CIS) that could qualify to receive a proxy benchmark score.
- *Proxy benchmarking won't be viable for all commercial customers.* It is challenging and labor intensive to define a building for proxy benchmarking and gather the necessary information to produce a score or EUI that is accurate enough to provide to a customer. This

is due to the lack of reliable information about building characteristics such as square footage, and the difficulty of identifying individual buildings given that this is not how either utilities or county assessments track customer information. (County assessor data provides aggregate square footage for each parcel, and a parcel may have more than one building.) This raises the question of the number of customers for which the utilities will be able to calculate a benchmark score at reasonable cost.

- *Even the “low hanging fruit” is challenging to reach.* Currently proxy benchmarking is limited to the “low hanging fruit” of parcels with one building and one customer. This also ensures that customer confidentiality is not breached when the score is given to the customer. However, all the IOU staff expressed the opinion that based on their experience thus far identifying individual buildings and finding reliable data on building square footage, it is hard to obtain and match data even for these ostensibly simple cases.
- *Numerical goals may not be attainable by all utilities even using a proxy approach.* Only SCE expects to obtain its goal of 50,000 buildings to be benchmarked by the end of 2012, barring any unforeseen challenges. It is unclear whether any of the other utilities with goals stipulating the number of buildings to be benchmarked by the end of the program cycle can actually identify enough “low hanging fruit” among their customers to meet the goals at reasonable cost.
- *Multi-tenant buildings may not be viable proxy benchmark candidates.* Data privacy rules also complicate—and could effectively block—proxy benchmarking for multi-tenant buildings. This is because data privacy rules limit what tenant-related information can be provided to the owner. For example, assuming that the utility can identify the owner from among all the building tenants, since tenant usage data is involved in developing the score, the utility or the owner also must obtain authorization from the tenants for the utility to reveal the score to the owner.

The proxy benchmark plans were described to stakeholders and EPA representatives. None were aware of any similar approach having been pursued before. These interviewees offered some observations on the planned approach. One stakeholder interviewee who was somewhat familiar with the proxy benchmark plans felt that they offer both potential value and risk:

*I think there's probably value – I don't know that I would do it in the way that they're attempting to do it. The way they are going is very complicated and may not be successful. They have to get third party databases and match properties to other records to get square footage, etc. [which is] very uncertain and complicated. [It] seems like there is a different way to skin that cat. Maybe you give somebody an indication of their [electric and/or gas] use without the energy use intensity part and some distribution of how that use compares to others . . . and give them a teaser that says if you give us square footage you could get a proper benchmark. [That] might get you as far or further without as much work.*



This interviewee suggested that the logical follow-on to providing customers with proxy benchmark scores would be for the utilities to offer customers public-goods charge-funded programs to help with the next steps, i.e. auditing and commissioning. If actions are identified, the programs could help customers undertake them and then re-benchmark.

Another stakeholder not familiar with the plans thought that the approach could give utilities a sense of where to target their programs, but as with all benchmarking, it would be important to understand the limitations of the data:

*Like anything with benchmarking, you have to understand limitations to the data you are getting. All you get with a proxy benchmark [is] building type, square foot and utility bills. There are other distinctions around the data that could explain things.*

As described in Section 4.5, only very limited information will be used in calculating proxy scores. To set appropriate expectations among proxy score recipients about what they can expect from benchmarking with Portfolio Manager, utilities sending out proxy scores should make it clear to recipients that Portfolio Manager will give them a more accurate score, which is likely to vary from the proxy score.

EPA representatives made the following observations:

- The primary benefit of the proxy benchmark scores is likely to be building awareness of benchmarking and related tools among the recipients.
- While the proxy scores could motivate some customers to benchmark their buildings, they could also demotivate others. For example, customers who receive a high proxy score might be led to think that their building is efficient enough and that they don't need to track energy use since there would be little room for improvement.
- The proxy scores or EUIs need to be normalized in some way, such as for weather.
- For technical reasons, they would expect that each utility must take a slightly different approach to developing proxy scores.

#### **5.7.4.2 Successes**

Thus far, SCE has managed to develop a methodology to calculate proxy scores for at least a portion of their commercial customers, and they are confident enough in it that they are beginning to deliver scores to customers. PG&E is working on a methodology and is expected to deliver scores to customers in 2012.

The findings from the in-depth interviews with proxy score recipients are expected to shed further light on successes associated with the proxy benchmarking approach.

#### **5.7.4.3 Opportunities for Improvement**

##### **Summary of Key Findings & Recommendations in this Section**

- ❖ *Opportunities for improvement of outcomes from the delivery of proxy scores to customers include implementing a delivery strategy designed to increase the likelihood that customers will notice the*



*information and act, such as that developed by SCE; tailoring messages to go with specific ranges of proxy scores or proxy EUIs; and beefing up technical support to prepare for the anticipated increase in benchmarking with Portfolio Manager and utility ABSs if proxy scores succeed in encouraging large numbers of commercial customers to benchmark with Portfolio Manager.*

- **Recommendation:** *Previous research in benchmarking also suggests that benchmarking may be more effective as a motivator to action in cases where the score is within striking distance of the ENERGY STAR label. In planning for proxy score pilots, utilities may want to consider tailoring the framing of the message about the proxy score to particular score ranges and planning to test differences in outcomes as part of the evaluation of their pilot studies.*
- **Recommendation:** *The delivery of the proxy scores should be planned with care to boost response rates over standard direct mail marketing and increase the likelihood that customers will notice the information and act on it.*
- **Recommendation:** *The proxy score efforts at the other utilities would be benefited by taking into account the results of SCE's evaluation of the proxy score pilot study.*
- **Recommendation:** *Customer usage of technical support is likely to grow as the IOUs make progress toward meeting their benchmarking goals. The IOUs should consider increasing the resources devoted to technical support.*

The evaluation team has identified the following issues and potential opportunities to improve outcomes from proxy-driven benchmarking. Any additional opportunities identified from interviews with proxy score recipients will be included in the summary of findings from these interviews.

*Score delivery must be designed with care.* According to utility staff, response rates to typical direct marketing campaigns range from 2 to 5 percent. Such low rates are not likely to help the utilities achieve their goals with proxy benchmarking. It is possible to boost these rates and increase the likelihood that customers will notice the information and ensure that they receive reminders to act on it through careful design of materials and of plans for delivery. The approach taken by SCE to proxy score delivery is similar to a research-based approach used in the social sciences<sup>100</sup> which has been proven to yield relatively high response rates. SCE also planned for subsequent evaluation of the pilot implementation. The proxy score efforts at the other utilities would be benefited if SCE were to share the results of the evaluation with the utilities.

*IOUs may want to consider tailoring messages to go with specific proxy scores/EUIs.* None of the IOUs have described any plans to tailor the messaging around the proxy score/EUI. Some of the findings from recent studies of residential comparative feedback programs (such as those offered by OPower) suggest that different subgroups of households respond differently to information about where their energy use falls in relation to their neighbors.<sup>101</sup> Previous research

<sup>100</sup> Dillman, Donald A., Jolene D. Smyth, and Leah M. Christian. 2009. *Internet, Mail and Mixed-Mode Surveys: The Tailored Design Method*. Hoboken, NJ: John Wiley & Sons.

<sup>101</sup> Costa, D.L., and M.E. Kahn. 2010. "Energy Conservation 'Nudges' and Environmentalist Ideology: Evidence from a Randomized Residential Electricity Field Experiment." NBER Working Paper No. 15939, April

in benchmarking also suggests that benchmarking may be more effective as a motivator to action in cases where the score is within striking distance of the ENERGY STAR label.<sup>102</sup> In planning for proxy score pilots, utilities may want to consider tailoring the framing of the message about the proxy score to particular score ranges and planning to test differences in outcomes as part of the evaluation of their pilot studies.

*Success will require beefing up of tech support.* Customer usage of technical support is likely to grow as the IOUs make progress toward meeting their benchmarking goals. With the possible exception of SCE, which has been working to enhance its call center capabilities in anticipation of increased demand due to proxy benchmarking, the resources for utility technical support appear to be barely adequate to meet current customer needs, and substantially inadequate for the anticipated future needs of the initiatives. For these reasons the IOUs should consider increasing the resources devoted to technical support.

### 5.7.5 Savings from Benchmarking

#### Summary of Key Findings & Recommendations in this Section

- ❖ *The findings described here provide evidence that there are savings from benchmarking, that a substantial portion of the savings is associated with programs, and that it should be possible to measure the savings. Of participants who said that the benchmark scores or EUIs had a great deal of influence on how their organization manages energy use, 28% reported that since benchmarking they have monitored controls more frequently, 25% had identified areas or buildings for reducing energy use, 21% had participated in energy efficiency programs, and 13% had implemented automated controls. Of participants who said the benchmark scores or EUIs were very important to their decisions to make energy efficiency improvements in the buildings benchmarked, 100% had added an energy management system or controls to one or more buildings or areas of buildings, 97% each had upgraded lighting or installed HVAC measures, 83% had made energy efficiency changes to motors, and 70% to refrigeration. Seventy-three percent each undertook energy audits or feasibility studies or made behavioral changes affecting energy use.*
- ❖ *Since the participants studied had taken the first step of voluntarily making the decision to participate in the workshops, it is possible that they were already pre-disposed to making energy efficiency improvements. Thus, it may not be possible to extrapolate these results to customers who benchmark but did not volunteer to attend a utility energy efficiency workshop.*

<sup>102</sup> Vaidya, R., Reynolds, A., Azulay, G., Barclay, D. and B. Tolkin. 2009. "ENERGY STAR® Portfolio Manager and Utility Benchmarking Programs: Effectiveness as a Conduit to Utility Energy Efficiency Programs." In Proceedings of the 2009 International Energy Program Evaluation Conference. Accessed from <http://www.iepec.org/2009PapersTOC/papers/084.pdf#page=1>.

**Recommendation:** *Given that this study suggests that savings could result from benchmarking buildings, the CPUC and utilities may wish to further explore the possibility of estimating the savings from measures implemented as a direct result of using the Portfolio Manager tool. These measures may be installed through a utility energy efficiency program or outside a utility energy efficiency program. In both cases, this would require a much more detailed investigation of the activities undertaken in a sample of buildings, including establishing causality through investigating the role of benchmarking in the decision-making about these activities, than was possible to do in this study. It would benefit from detailed benchmarking data for each building, if available, and measure information at the individual building level, rather than in the aggregate as was requested in the participant survey. The CPUC may also wish to commission the development of a battery of questions for use in evaluations of commercial energy efficiency programs to assess the influence of benchmarking with Portfolio Manager on the decision to install rebated measures.*

As Section 6 explains, this study attempted to answer many research questions with only a very minimal amount of actual benchmarking data from the utilities' ABSs and none from Portfolio Manager. Because of the difficulty of associating individual attendees with specific ABS accounts and buildings benchmarked, what little benchmarking data that were available could be connected with only a handful of individuals in the sample frame, and with even fewer actual survey respondents.

Given the lack of benchmarking data to help in answering the research questions posed in the study, the survey instrument became the primary source of data for the evaluation and thus had to include questions on a very wide range of topics. Within the time allotted to the survey it was not possible to ask about the full range of research topics while also obtaining the degree of detail about energy efficiency improvements in specific buildings benchmarked that would have been required for a meaningful analysis of the savings from benchmarking.

The survey data can, however, offer useful insights to begin to characterize savings from benchmarking through the examination of responses to selected survey questions for two subgroups of participants. These are (1) those who said that benchmarking had a very great deal of influence (8-10) on how their organization manages building energy use, and (2) those who said that the benchmark scores or EUIs were very important (8-10) to their decisions to make energy efficiency improvements in the buildings benchmarked.

Table 5-73 shows how the organizations of the first subgroup of participants reported having changed how they managed building energy use since benchmarking. Given that this group rated the influence of the benchmark scores or EUIs on how the organization manages energy use as 8, 9 or 10 on of a scale of zero to ten, one could make a reasonable argument that, absent other causal forces, such as participation in a utility energy efficiency program, a majority of the savings from the management changes offered in response to this open-ended question could be attributed to benchmarking. More than a quarter (28%) of this group of participants reported that since benchmarking they have monitored controls more frequently, nearly one-quarter (25%) had

identified areas or buildings for reducing energy use, about one-fifth (21%) had participated in energy efficiency programs, and about one-eighth (13%) had implemented automated controls.

**Table 5-73: Changes in Building Energy Use Management Since Benchmarking\***

(participant end users who reported changing building energy management since benchmarking and said that benchmarking had a very great deal of influence (8-10) on how their organization manages building energy use; multiple response)

	Participants (percent)
<i>Sample Size</i>	<i>13</i>
More frequent monitoring (of controls, thermostats, buildings, electrical/steam usage)	28%
Identify areas or buildings for reducing energy use	24%
Participate in energy efficiency programs	21%
Implemented automated controls	13%
More awareness in managers/organization as a whole	9%
Reduce energy use	9%
Retrofits/upgrades to maintain Energy Star requirements	6%
Changes in business practices/energy efficiency policy	3%
Other	12%

\* For more information, see Table B-91 and Table B-92.

Table 5-74 shows the frequency of the different types of energy efficiency improvements planned or made to the buildings benchmarked by the organizations of the second subgroup of participants, those who said that the benchmark scores or EUIs were very important (8-10) to their decisions to make energy efficiency improvements in the buildings benchmarked. This table also shows the extent to which the improvements made by this subgroup of participants were associated with a utility energy efficiency program. As described in Section 5.6.1.1, a substantial fraction (81%) of the participants who made improvements to buildings after benchmarking did so in association with such a program. A perusal of the unweighted rates at which this subgroup said the improvements were associated with an energy efficiency program suggests that the rate probably does not differ from that of the rest of the participants who made improvements to buildings after benchmarking.

A similar argument can be made for the group of participants shown in Table 5-73 as for those shown in Table 5-74: given that this group rated the importance of the benchmark scores or EUIs to the decisions to make energy efficiency improvements in these buildings as 8, 9 or 10 out of a scale of 0 to 10, one could make a reasonable argument that absent other causal forces, a portion of the savings from improvements associated with energy efficiency programs could be considered savings from benchmarking. For those who made improvements outside of an energy efficiency program, absent other causal forces, one could make a reasonable argument that a majority of the savings from the changes offered in response to this open-ended question could be attributed to benchmarking. In the latter case especially, the savings attributable to benchmarking could be substantial: 100% of these respondents had added an energy

management system or controls to one or more buildings or areas of buildings since benchmarking. Ninety-seven percent of this group had upgraded lighting or installed HVAC measures, followed by changes to motors (83%), refrigeration (70%) and various other measures to improve energy efficiency. Seventy-three percent each undertook energy audits or feasibility studies or made energy use behavior changes that were largely due to the benchmark scores or EUIs as well.

**Table 5-74: Actual or Planned Improvements Since Benchmarking\***

(participant end users who benchmarked, planned or made changes to buildings since benchmarking, and said benchmark scores or EUIs were very important (8-10) to the decisions to make energy efficiency improvements in buildings benchmarked; multiple response)

	Participants (percent)	Improvements were Associated with Utility Energy Efficiency Programs	
		Yes (count)	No, Don't Know or No Response (count)
<i>Sample size</i>	14	9	6
Energy management system or controls	100%	9	6
Lighting upgrades	97%	9	5
HVAC	97%	9	5
Motors	83%	7	4
Energy audits or feasibility studies	73%	8	4
Behavior changes, like changing thermostat set points and turning off lights	73%	8	4
Refrigeration	70%	6	3
Windows	43%	6	1
Air compression	32%	2	0
Insulation/Sealing	26%	4	1
Heating/hot water upgrades	19%	0	0
Roofing Upgrade	5%	0	1

\* For more information, see Table B-94 and Table B-96.

Because of the limitations described above, this study could not estimate the possible energy savings attributable to benchmarking from the management changes or measures implemented by these participants. Nonetheless, the results provide evidence that there are savings from benchmarking, that a substantial portion of the savings are associated with programs, and that it should be possible to measure these savings.

Given that this study suggests that savings could result from benchmarking, the CPUC and utilities may wish to further explore the possibility of estimating the spillover-like savings associated with the use of the Portfolio Manager tool. This would most likely require a much more detailed investigation of the activities undertaken in a sample of buildings, and the role of benchmarking in the decision-making about these activities, than was possible to do in this study. It would benefit from detailed benchmarking data for each building, if available, and measure information at the individual building level, rather than in the aggregate as was requested in the participant survey.

## 6 Evaluability Assessment

### 6.1 Review and Assess Available Benchmarking Data and Performance Metrics

The purpose of the evaluability assessment was to (1) determine which of the research questions slated for this evaluation could and could not be answered with the data currently available from the initiatives and (2) to answer the following researchable needs and questions:

- i) What benchmarking data are available for analysis by CPUC evaluation teams? Could this be improved, and how?
- ii) Assess what primary data should be collected to address the questions:
  - (1) What is the potential of benchmarking as a tool to track progress of building energy use intensities over time, for tracking of energy efficiency potentials, or serving as market effects indicators? What performance metrics would be useful to track for benchmarking implementation?
  - (2) In anticipation of building labeling, are there some parameters that should be gathered and tracked?

#### Summary of Key Findings & Recommendations in this Section

- ❖ *There was not as much benchmarking data as originally anticipated available for analysis by the evaluation team. The reasons for this include that the utilities were not readily able—or not able at all—to connect building-level utility ABS data to customer data at the meter level; two of the four utilities currently gather minimal information through their ABSs; and most utilities collect only very limited data for initiative tracking.*
- ❖ *One set of utility ABS data, from PG&E, was complete enough to warrant analysis. The data set included a much higher percentage of very low (0) and very high (80-100) scores than would normally be expected. This caused the team to question the validity and usefulness of these data for tracking benchmarking progress.*
- ❖ *Interviews with initiative staff and EPA revealed that Portfolio Manager and utility ABSs lack mechanisms to ensure the readiness of benchmarking data for analysis. Until this is resolved, the only benchmarking data likely to be worth analyzing are those of ENERGY STAR certified buildings. These data are unavailable for analysis from EPA because of promises of confidentiality made by EPA to users of Portfolio Manager. The research identified a number of ways in which the quality of benchmarking data that might in future become available from the IOUs for analysis by the CPUC's evaluators could be improved. These are described in the Recommendations for this section.*



- ❖ *The team identified a prioritized listing of utility ABS variables that should be technically feasible for all utilities to track. Three impediments would need to be addressed for coordinated tracking of selected ABS data by utilities to happen. (1) Some of the utilities' ABS on-line Terms and Conditions of Use would need to be modified to allow the utilities to capture the data that flows through their ABSs and share these data with the CPUC for evaluation purposes. (2) The utilities would need to devote the IT resources to enable tracking. (3) Assuming that the first two impediments are addressed, the utilities would then need to agree on which variables to track.*
- ❖ *The CPUC or IOUs may wish to explore, with providers of benchmarking and billing services such as AdvantageIQ and Siemens, the possibility of obtaining information about the number of buildings benchmarked in the state, and include this information in tracking progress toward goals.*
- ❖ *Given the data quality challenges found with the scores and EUIs available from utility ABSs, at the current time the data produced every six months to one year by EPA ENERGY STAR appear to be the most reliable and readily available sources of information for developing market effects indicators for building benchmarking. However, due to the confidentiality that EPA promises users of Portfolio Manager, these data do not include average EUI or score for each building type by state, which severely limits their usefulness for tracking of changes over time in the EUIs of different types of California buildings.*
- ❖ *The evaluation team identified a number of possible initiative performance metrics not currently tracked that may be readily available to the IOUs, or be relatively simple to collect and track over time through survey research. These are listed in the recommendations for this section.*
- ❖ *Of the original research questions listed in Section 1.4, numbers 11 through 13 could not be answered with the data available:*
  - 11. Review the algorithms for estimating savings associated with the use of Portfolio Manager.*
  - 12. Research how customers can access benchmarking data without disclosing specific and confidential customer data.*
  - 13. Research whether public access to benchmarking data increases program participation and energy efficiency.*



**Recommendations:**

- *The limited ABS data currently collected by utilities could be made more useful for initiative and market progress tracking by expanding what is collected by each of the utilities. Some potential items for tracking are listed in Table 6-1 above. Modifications would be required to the IOUs' ABS Terms and Conditions of Use to allow all the utilities to gather data via ABS and provide these data to the CPUC for evaluation purposes. The CPUC and IOUs may wish to work together to facilitate development by the IOUs of consistent Terms and Conditions of Use that meet CPUC needs for evaluation data, and to prioritize indicators to use for tracking initiative progress and progress toward the state's broader goals for benchmarking. Whether to require utilities to revamp their ABSs or CISs to enable tracking of specific indicators across all utilities is a policy decision that the CPUC may also wish to consider.*
- *One possible approach to the benchmarking data quality issues described here that may be worth investigation is a modification to Portfolio Manager to enable users to indicate if all the meters known to be associated with the building, and all the facility's attributes, had successfully been entered. If technically feasible, such a modification should have the potential to render the score and EUI data worthy of analysis and use in market progress and initiative tracking, tracking of energy efficiency potentials, and tracking associated with AB 1103. The CPUC and IOUs may wish to explore with EPA the possibility of EPA's making such a modification to Portfolio Manager.*
- *The CPUC and IOUs may wish to explore the possibility of conducting more research to gather data on the EUIs and other characteristics of different types of buildings in California, and supporting similar national efforts to do so. This could include investigation of how many buildings have energy consumption data needs that do not come from a utility, for example on-site generation or meters that serve multiple buildings and therefore require sub-metering. Such research would help with tracking changes over time in the EUIs of different types of California buildings, and with comparing average California scores and EUIs for each building type against those of other states.*
- *The CPUC and IOUs may wish to explore the possibility of tracking the following indicators for the purposes of tracking initiative performance, benchmarking progress across the state, or both:*
  1. *The number of buildings by type that customers attempt to benchmark each year;*
  2. *Data collected from workshop registrants via the registration forms and workshop evaluations, including the number, type, and area of buildings to be benchmarked and energy efficiency activity in the building(s) in the prior three years.*
  3. *Awareness of benchmarking.*
  4. *Self-reported frequency of score monitoring and re-benchmarking.*

The evaluation team requested the following data from each IOU to help in conducting an evaluability assessment of the benchmarking initiatives and in answering other research questions addressed by this study:

- Benchmarking initiative descriptions, program theory, and logic models.
- Copies of benchmarking workshop presentations and listings of dates and location of workshops held, including number and affiliation of workshop registrants and evaluation feedback from participants.
- Copies of materials integral to the delivery of the benchmarking initiatives, such as brochures or other marketing or information materials, website addresses, reports which may be provided to customers in conjunction with benchmarking, etc.
- Descriptions of the uses and challenges of using Portfolio Manager.
- Descriptions of the uses and challenges of using utility ABSs.
- Information about customers touched by the benchmarking initiatives, including but not limited to use of utility ABS; number, type and location of buildings benchmarked with Portfolio Manager; building scores and EUIs; business type; and participation in other utility programs.
- Data collected for subsequent reporting both for customers benchmarking with Portfolio Manager and for customers slated to receive proxy benchmark scores.
- Benchmark scores and other information about customer buildings benchmarked with Portfolio Manager to support analysis of the applicability of Portfolio Manager to California buildings.
- Utility ABS database specifications and enhancement plans.
- Technical and user documentation on the proxy benchmarking score process.

### **6.1.1 Benchmarking Data Available for Analysis**

As Section 6.2 describes, the different utilities collect sharply varying amounts of information from users of their ABSs, and differing utility ABS Terms and Conditions of Use meant that in some cases, ABS data collected by one or more utilities could not be provided to the evaluation team. Also, some of the data requested either did not exist or could not be readily accessed by the IOUs. As a result, some of the planned analysis could not go forward, either because the data were not available or because there were too few survey respondents for whom the data were available. Below is a listing of data which were either only partially available or were unavailable.

- Number and of buildings owned or managed was not available.
- Record of calls made to utility ABS/Portfolio Manager technical support was minimally available.
- Utility ABS user information, including number of ABS accounts, customer account numbers associated with each ABS account, number of buildings associated with each customer account and ABS account, type of buildings benchmarked, and benchmark score or EUI: PG&E provided much of this information for all its ABS users. SCE and SDG&E provided some of this information for small numbers of customers that had benchmarked under the auspices of certain programs. Results of analysis of PG&E's ABS are reported in

Section 6.1.2. While PG&E, SCE and SDG&E made substantial efforts to connect workshop participants with specific account information, there were too few survey respondents with account information to warrant analysis using the additional data.

- Other utility energy efficiency program participation, including listing of buildings with a benchmarking score that have also been enrolled in program(s) and program measures installed per building: While PG&E, SCE and SDG&E made substantial efforts to connect workshop participants with program participation information, there were too few survey respondents with account information to warrant analysis using the additional data.
- Building types and space types within buildings was not available.
- .

Interviews conducted with initiative staff revealed a number of reasons for the lack of data.

First, that the IOU Customer Information Systems (CISs) are organized by meter, not by building or customer address, makes it extremely difficult for the utilities to connect customer account data with building-level benchmarking data in their ABSs. The evaluation team had hoped to analyze the relationship between benchmarking and other energy efficiency program participation, but we found that each utility energy efficiency program commonly keeps its own database of program participation. The IOUs report that it is cumbersome and time-consuming for the utilities to connect CIS data with records from the program participation databases, and attempting to also connect this information with utility ABS use for enough ABS users to warrant analysis proved not to be feasible for the utilities within the time frame of the study.

Second, two of the four utilities—SDG&E and SoCalGas—currently use their Automated Benchmarking Systems primarily to push energy usage data out to Portfolio Manager, rather than to gather data. The data that these utilities do gather, described in Section 6.3, are minimal. As Section 6.1.2 describes in more detail, those ABS data that are collected by utilities were not necessarily available to the evaluation team due to the assurances of confidentiality provided to utility ABS users by utility ABS Terms and Conditions of Use.

Third, utility staff noted that they had only recently (in April 2011) received clarification on key aspects of Decision 09-09-047. Thus far the utilities have focused primarily on establishing the initiatives and determining how to meet the goals set by the CPUC for buildings to be benchmarked in their service territories by the end of 2012. It appears that while utility staff are tracking specific metrics required for reporting to the CPUC, they have not planned in advance for tracking in support of initiative evaluation.

Fourth, with the exception of SCE, all the utilities lack a separate budget for the benchmarking initiatives. Staff noted that the lack of a separate budget complicates tracking of metrics. Two of the utilities—SDG&E and SoCalGas—have much less to spend on the initiative than SCE and PG&E. These utilities noted that the relatively low level of resources devoted to the initiative limits their ability to track initiative-related data.

### 6.1.2 Review of Benchmarking and Performance Data

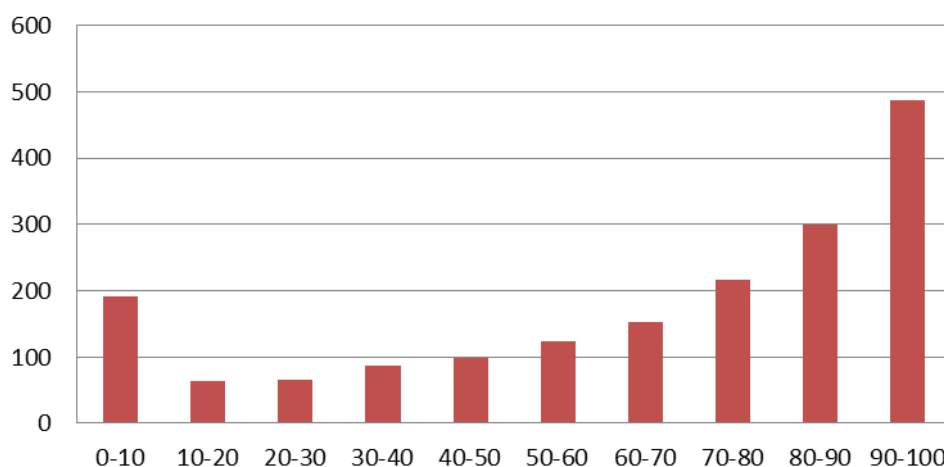
The evaluation team reviewed the benchmarking and performance data for over 4,000 buildings supplied by PG&E to assess the usefulness of customer score and EUI data from the utility ABSs for tracking progress in EUIs over time.

As noted in Section 3.2.8, users of Portfolio Manager and utility ABSs experience a number of challenges using Portfolio Manager and utility ABSs. Customers, their agents, and the IOUs report that data collection and entry into Portfolio Manager or utility ABSs is time consuming and error-prone. Ensuring accurate and complete input of Service IDs of meters on the premise is difficult because customers are often unaware of all the building's meters and their locations. Further, IOUs are unable to consistently map meters with specific buildings and addresses. More problematic from the IOUs' perspective is the ability to seamlessly integrate their back end operating systems so that customer data can be uploaded into the EPA's Automated Benchmarking System for use in Portfolio Manager.

The analysis of the PG&E building scores and EUIs<sup>103</sup> gave little reason to believe that data could be useful for tracking and evaluation. As the graph below indicates, the dispersion of scores is heavily weighted toward buildings with a score of 100. Indeed, nearly 787 buildings (or 44%) out of 1783 building included in this sample scored higher than 80.

**Figure 6-1: Frequency of PG&E Benchmark Scores**

#### Benchmarking Score Histogram



The high number of buildings with exceptionally high Portfolio Manager scores could be attributable to the following factors:

- Users had not completed entering data for all meters when the score was generated and they last logged out of their Portfolio Manager account.
- Users failed to account for all meters on the premises.

<sup>103</sup> Other IOUs did not provide sufficient information on Portfolio Manager scores to analyze.

- Users under-represented the gross square feet of facilities, or
- Users inaccurately entered other important parameters that drive energy consumption such as occupancy, hours of operation, plug load, or ratio of windows to square footage.

An additional cause for concern with respect to data validity relates to the fact that 191 building entries in the Excel spreadsheet provided by PG&E had a score of “0” or no score at all. This may have been a result of incorrect or incomplete information being uploaded from the user’s back end operating systems to ABS. Because of concerns about data quality, it is difficult to conclude that submitted scores are indicative of high performing buildings relative to other California buildings.

## 6.2 Potential for Benchmarking as a Tracking Tool

In theory, considerable information about building stock and about operating energy use and how it changes over time should be available to the utilities from customers using their ABS services. As noted above, there is cause for concern about the usefulness of the scores and EUIs currently available through IOUs for understanding progress on benchmarking in California. The evaluation team identified three critical issues with utility ABS data that render them of limited use for tracking even when they are available, and a fourth issue having to do with the invisibility to utilities of benchmarking with Portfolio Manager using non-utility ABSs.

*1. Portfolio Manager lacks a mechanism to ensure readiness of data for analysis.* As the evaluation team learned through interviews with EPA representatives, with the exception of buildings that are seeking ENERGY STAR certification, Portfolio Manager does not include a mechanism for determining whether or not all energy meters for a particular building have been entered, nor for ensuring that all data have been entered, nor for enforcing the requirement that they all be entered. It is up to the user to ensure that the data entered are complete.

It appears that in many cases, including but not limited to those requiring tenant authorization to release data, obtaining a meaningful score or EUI—that is, one that is based on complete energy use data from a complete set of meters within a building—is a lengthy and involved process.

Portfolio Manager currently does not reflect where a user is in the process of benchmarking a particular building. Portfolio Manager will produce a score and/or EUI once all the basic requirements have been met. The principle requirement is providing 12 months of energy use data in a form or format that meets the requirements of Portfolio Manager,<sup>104</sup> which are:

- At least 11 full consecutive calendar months of energy data for all active meters. If there are multiple meters, there must be 11 consecutive and overlapping months.
- No individual electrical meter entry can be for a period longer than 65 days.

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<sup>104</sup> Personal communication from EPA staff, December 12, 2011.

- No gaps or overlaps in the meter readings of more than one day.<sup>105</sup>

While users are supposed to enter energy meters that account for all energy use (regardless of fuel type) in the building—that is, all the meters for the building—there is currently no mechanism in Portfolio Manager to indicate when all meters have successfully been entered with data uploaded. It appears that so long as a single meter that satisfies requirements is entered, Portfolio Manager will generate an EUI and, if the building type is qualified, it will also generate a benchmark score.<sup>106</sup>

Absent any indicator from Portfolio Manager that all meters associated with a particular building have been successfully entered into Portfolio Manager and energy usage data obtained for these, it is the evaluation team's opinion that some unknown share of the scores or EUIs that are currently available to utilities through their ABSs cannot be considered reliable data for analysis.

One possible solution to this problem would be for EPA to build into Portfolio Manager a way to determine if all meters known to be associated with the building had successfully been entered. For example, a question could be included asking users to indicate if all the meters known to be associated with the building had successfully been entered. Only when this question is answered “yes” would a score or EUI be generated for the building. While such an approach would still rely on users to make the determination as to whether or not all meters had been entered, it could help considerably in reducing the rate of “work-in-progress” scores and EUIs gathered by utilities through their ABSs, quite possibly rendering these data worthy of analysis and use in market progress and initiative tracking.

*2. Utilities have yet to coordinate tracking of utility ABS or other initiative data.* As mentioned above, the utilities have been focusing primarily on establishing the initiatives and are only now beginning to focus on detailed tracking of initiative activity and customer use of their ABSs. They also have very limited resources available for the initiative, and thus for initiative tracking. Two of the utilities, SDG&E and SoCalGas, capture very little of the information that is potentially available to them as suppliers of ABS. SCE captures quite a lot of this information, including but not limited to building characteristics and meters associated with a particular building. PG&E is in the process of upgrading its tracking system to capture some of the same data that SCE captures, as well as additional data.

*3. Some utilities' on-line Terms and Conditions of Use of ABS limit the availability of data for evaluation.* Two of the utilities, SDG&E and SoCalGas, cited promises of confidentiality to users of their ABSs as being a primary reason that ABS data were not available to the evaluation team. SDG&E noted that “under the utility's standard Terms and Conditions for the ABS tool, the data that is collected can be used only for the sole purpose of participating in the [ENERGY STAR] program . . . .” According to SoCalGas, the information sought for their customers by the evaluation team is only available through the EPA, which considers it confidential. Issues of

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<sup>105</sup> Energy Star. “Reasons for Not Receiving an Energy Performance Rating.” Accessed December 12, 2011. [https://www.energystar.gov/istar/pmpam/help/Warning\\_Messages.htm](https://www.energystar.gov/istar/pmpam/help/Warning_Messages.htm).

<sup>106</sup> Personal communication from with EPA staff, December 12, 2011.



what data are permissible for utilities to gather via ABS, with whom it can be shared, and for what purpose, will need to be addressed in the process of putting together any systematic tracking of ABS data across the utilities.

Thus far, the utilities have not attempted to coordinate their efforts to track data related to utility ABS use. To do so would necessitate incurring some expense in revamping their tracking systems to collect a consistent subset of variables for tracking and analysis, since each utility's ABS is slightly different due to differences among the utility Customer Information Systems.

*4. Utilities have no information about benchmarking of customer buildings with Portfolio Manager using non-utility Energy Service Provider ABSs.* It should also be noted that there may be more benchmarking activity of customer buildings in the utility service territories than can be identified by the utilities. Service providers such as AdvantageIQ and Siemens, who provide billing as well as energy management services for commercial building owners, have their own ABS portals for Portfolio Manager. Customers who use these services can benchmark buildings with Portfolio Manager without the utility's knowledge, as can customers with large portfolios who prefer to use Portfolio Manager's bulk data upload option. Utility efforts to promote benchmarking with Portfolio Manager and support the implementation of AB 1103 could result in a customer choosing to benchmark building(s) with Portfolio Manager. However, absent some mechanism to estimate the number of customers who benchmark buildings without the IOUs' ABSs, this would not be counted toward the goal because the customer chose not to use the utility's ABS to upload data into Portfolio Manager. The CPUC or IOUs may wish to explore, with providers of benchmarking and billing services such as AdvantageIQ and Siemens, the possibility of obtaining information about the number of buildings benchmarked in the state, and include this information in tracking progress toward goals.

### **6.3 ABS Variables to Consider for Tracking by Utilities**

The evaluation team reviewed the variables collected, or planned for collection, from ABS users across all four utilities. Based on this review, the evaluation team created a listing of variables (Table 6-1) that, if gathered across all four utilities, could provide a reasonably comprehensive picture of the number and type of buildings in the utility service territory that customers have attempted to benchmark. This information could help assess progress toward initiative goals by each utility, and toward the state's vision of the role of benchmarking. Unless otherwise noted, it is the evaluation team's assumption that (1) each of these variables is technically feasible for utilities to collect based on the fact that at least one utility is either currently collecting the variable or plans to collect it and (2) if necessary, the utilities' terms and conditions of use can be modified to allow the tracking. The questions of whether the usefulness of these data would warrant the expense of establishing uniform tracking systems is a policy decision for the CPUC to consider.



Table 6-1: Variables for Tracking Progress

Variable Description	Collected or Planned for Collection by Utility			
	PG&E <sup>107</sup>	SCE	SDG&E	SoCal Gas
<b>Priority Items for Collection</b>				
<i>User/Customer Information</i>				
Utility Customer IDs/Utility identifier(s) for the customer account(s) associated with the building	√	√	√	√
User's email address.	√	√		
Name of the building owner's representative performing the authorization	√	Pending		
The date this entry was originally created.	√	√		
Local date & time when record was last modified	√	TBD		
<i>Building Information</i>				
The identifier for the building as defined in Portfolio Manager	√	√	√	√
Name of the Building or Campus as entered by user in ABS	√	√		
Street Address of the Building	√	√		
City in which the Building resides	√	√		
State in which the Building resides	√	√		
Zip code of building location.	√	√		
Climate zone (can be extrapolated from zip code)		√		
Portfolio manager defined type for this space (Office, Hospital, K-12 School, etc.)	√	√		
Year in which building was built.	√	√		
Building Gross Floor Area [sf]	√	√		
Site EUI (Weather-Normalized) [kBtu/sf]	√	√	√	
Source EUI (Weather-Normalized) [kBtu/sf]	√	√		
Total Greenhouse Gas Emissions [mtCO <sub>2</sub> e]	√	√		
Building's most recent available ENERGY STAR score	√	√	√	
Year of the building's current ENERGY STAR score	√	√		
Indicator for whether a building is using default values.	√	TBD		
Year the facility earned the ENERGY STAR label	√	TBD		
Last date the building earned the ENERGY STAR label	√	TBD		
NAICS code(s) associated with building	√	√		
<i>Meter Information</i>				
Meter name as identified by user.	√	√		
The actual SA ID as entered by the user in Portfolio Manager to identify his meter	√	√		
The identifier for the meter as defined in Portfolio Manager	√	√		
The identifier for the meter as defined in the energy service provider's system	√	√		
The name/value pair for any custom IDs that have been provided and associated at the meter level	√	√		

<sup>107</sup> Not all these data were being collected by PG&E at the time of this study, but are now being collected after an October 2011 upgrade of PG&E's Automated Benchmarking System.

Variable Description	Collected or Planned for Collection by Utility			
	PG&E <sup>107</sup>	SCE	SDG&E	SoCal Gas
Customer indicator Res or Non Residential (1=NR, 0=R)	√	√		
Service Type (Gas or Electric) of the meter	√	√		
Energy type as identified by the user (e.g. electricity, wood, etc.)	√	√		
If "Other" is selected as the energy type by the user, description of energy type (e.g. on-site solar).	√	√		
For meters that measure energy generation, energy generation method as identified by the user.	√	√		
Units in which the Meter is measured (e.g. kBtu, kWh, etc.)	√	√		
Flag to indicate if meter should be added to the total energy use for the Facility/Campus.	√	√		
Flag to indicate if the Meter is Active or Inactive	√	√		
The identifier for the space as defined in the utility's system	√	√		
Name of the Space	√	√		
<i>Campus Information</i>				
Name of the buildings or campus as entered by user in ABS	√	√		
The identifier for the campus account as defined in the ESP's system.	√	√		
The name/value pair for any custom IDs that have been provided and associated at the campus level.	√	√		
Full name of the campus.	√	√		
Street Address of the campus.	√	√		
City in which the campus resides.	√	√		
State in which the campus resides.	√	√		
Zip code in which the campus resides.	√	√		
<i>For buildings participating in utility commercial programs, also collect and/or obtain from utility energy efficiency program databases:</i>				
Program name	√	TBD	√	
EE upgrade type(s)	√	TBD	√	
Date(s) of upgrade installation(s)	√	TBD	√	
<b>Lower Priority Information</b>				
<i>User/Customer Information</i>				
Portfolio Manager Customer ID (customer's username for logging into Portfolio Manager)	√			
<i>Building Information</i>				
Other building characteristics data used to generate the score	√			
Most recent month of the year of the building's current ENERGY STAR score	√	√		
<i>Campus Information</i>				
The identifier for the campus as defined in Portfolio Manager.	√	√		
Campus ID in Portfolio Manager	√	√		
UniqueCampusPMMeterID	√	√		

## 6.4 Market Progress Tracking Data from EPA

EPA makes available for free to the public some variables that could potentially be used for tracking the progress of benchmarking with Portfolio Manager in California. At the national level, EPA tracks the number of buildings that have been benchmarked with Portfolio Manager and the number that have received the ENERGY STAR label. Every six months, EPA also releases a snapshot of benchmarking activity for the nation and by state, including California. The snapshot includes trends in benchmarking of commercial and industrial buildings, state-by-state activity and activity for the top Nielsen Designated Market Areas, and trends in ENERGY STAR-labeled buildings. At the state and DMA level, statistics are provided for the number and floor space of buildings scored. At the state level, statistics are also available on the number and floor space of buildings certified as ENERGY STAR. At the national level, statistics are provided on the floor space score by building type.<sup>108</sup>

Unfortunately, due to the confidentiality that EPA promises to users of Portfolio Manager, important state-level statistics such as average EUI or score for each building type are not made available. The CPUC and IOUs may wish to approach EPA to inquire about the possibility of EPA's releasing average EUI or score for each building type by state. This would help with tracking changes over time in the EUIs of different types of California buildings, and with comparing average California scores and EUIs for each building type against those of other states.

## 6.5 Initiative Performance Metrics to Consider for Tracking by Utilities

In accordance with D.09-09-047, in July 2011, the utilities provided the CPUC with the following initiative-related metrics for program year 2010, in addition to more general descriptions of each activity undertaken under the auspices of the initiatives:

- Number of buildings “benchmarked” by number of utility customers, and number of customers and of meters/service accounts associated with these buildings. In the future, the evaluation team expects that this will also include the number of buildings benchmarked by utilities via proxy benchmarking.
- Number of workshops offered and total number of workshop registrants.<sup>109</sup>

In addition to this information, some of the utilities have access to more extensive benchmarking information for customers that participated in energy efficiency programs. In most cases, the availability of this information appears spotty, but in the case of SDG&E a considerable number of customers attempted to benchmark with Portfolio Manager because of the utility's energy

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<sup>108</sup> “ENERGY STAR® Snapshot: Measuring Progress in the Commercial and Industrial Sectors.” Accessed December 7, 2011. [http://www.energystar.gov/index.cfm?c=business.bus\\_energy\\_star\\_snapshot](http://www.energystar.gov/index.cfm?c=business.bus_energy_star_snapshot).

<sup>109</sup> “Joint IOU 2010 Benchmarking Report in Compliance with Decision 09-09-047.” Accessed January 24, 2012, <http://eeqa.cpuc.ca.gov/ReportsOtherAnnual.aspx>.

efficiency program requirements described in Section 4. While the data show few SDG&E customers were able to obtain scores, EUIs were generated for many of them. It seems reasonable to assume that EUIs associated with energy efficiency program participation are likely to be of higher quality and more reliable than those not affiliated with program participation, since the utility is theoretically in the position to verify these scores. If SDG&E continues to require benchmarking for program participation, the ability to observe trends in the EUI data over time by building type, as well as comparing EUIs before and after measure implementation, could shed useful light on EPA benchmarking data for its service area.

Other initiative performance metrics that may be readily available to the IOUs and would be useful to track include:

- The number of buildings by type that customers attempt to benchmark each year.
- Data collected from workshop registrants via the registration forms and workshop evaluations. For example, PG&E collects considerably more information from workshop registrants through its workshop evaluation form than the other utilities. Some of this information, such as the number, type, and area of buildings to be benchmarked, and energy efficiency activity in the building(s) in the prior three years, could help in assessing the degree to which the workshops are reaching the most appropriate audiences as well as helping in the effort to integrate benchmarking into energy efficiency programs.
- As described in Section 5.1.2, awareness of benchmarking among non-participants is simple to measure via survey research and could be a useful progress indicator for the utilities' benchmarking initiatives. (Section 5.1.3 describes some challenges associated with surveying non-participants that should be borne in mind in planning future survey research among non-participants.)
- As described in Section 5.2.1.1, self-reported frequency of score monitoring and re-benchmarking is easily measured and could be a useful progress indicator for the initiative or for benchmarking overall. (Section 5.1.3 describes some challenges associated with surveying non-participants that should be borne in mind in planning future survey research among non-participants.)

This listing of possible metrics is intended only to generate discussion. As discussed in Section 5.7.2.3, ideally a more comprehensive, thorough, and robust listing of metrics would be developed after mapping the initiative or “program” theory in a logic model, and the identification of metrics would be based on this model. None of the utilities have developed initiative logic models or a formal written explanation of the initiative theory. Section 4.2 , describes in a general way the theory behind the benchmarking initiatives for each utility.<sup>110</sup> Section 5.7.2.3 includes a recommendation that the utilities consider working together to articulate a common initiative theory and develop a common logic model that may then be adapted for each utility's circumstances and goals.

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<sup>110</sup> The development of a logic model for the initiatives was beyond the scope of this study.

## 6.6 Research Questions Answerable with Current Initiative Data

Fortunately, most of the research questions outlined in Section 1.3 either do not require analysis of utility ABS or Portfolio Manager data, or progress toward answering them could be made without these data. However, three research questions could not be answered because of lack of data or other reasons. These were:

- 11) “Review the algorithms for estimating savings associated with the use of Portfolio Manager.”  
Since the IOUs do not claim savings from the use of Portfolio Manager, there were no algorithms to review.
- 12) “Research how customers can access benchmarking data without disclosing specific and confidential customer data.” Since customers cannot access other customers’ data in Portfolio Manager without authorization, no confidential data are disclosed.
- 13) “Research whether public access to benchmarking data increases program participation and energy efficiency.” Since customers do not currently have access to public score data, it was not possible to research this question.

## 7 Summary of Findings and Recommendations

This chapter summarizes findings for the research needs and questions listed in Section 1.3 and related recommendations. The findings and recommendations draw on detailed information presented elsewhere in the document.

### 7.1 Overview of Benchmarking with Portfolio Manager

This section addresses the following researchable needs or questions:

- 1) Overview of benchmarking with Portfolio Manager
  - a) Identify and catalogue the uses of Portfolio Manager
  - b) Identify and catalogue the challenges of Portfolio Manager
    - i) What are the most common problems with Portfolio Manager?
  - c) Identify and catalogue the use and potential impact of alternative benchmarking tools
  - d) Research the importance and potential impact of ENERGY STAR labeling and rating systems on energy consumption and commercial real estate values

According to ENERGY STAR, “energy use benchmarking is a process that either compares the energy use of a building or group of buildings with other similar structures or looks at how energy use varies from a baseline.”<sup>111</sup> This study focuses on benchmarking based on determining the energy use intensity (EUI) of facilities and rating such intensity relative to either a facility’s designed performance standard or to the EUI of similarly-situated facilities. ENERGY STAR Portfolio Manager is an online interactive energy management tool that allows users to track and assess energy and water consumption of their commercial building or portfolio of buildings. Portfolio Manager is designed for use by building owners or tenants, or their designated representatives. Utilities cannot benchmark buildings for customers using Portfolio Manager, they can only encourage their customers to do so.

It appears that a substantial portion of the state’s commercial buildings—as much as 84% of buildings and 48% of commercial floor space as of 2003—do not qualify to be benchmarked with ENERGY STAR Portfolio Manager.

#### 7.1.1 Identify and Catalogue the Uses of Portfolio Manager

##### 7.1.1.1 Customer Uses

- ❖ Reasons identified that customers might want to benchmark are:
  - To comply with local or state disclosure regulations mandating scheduled disclosures, such as the San Francisco Existing Building Energy Performance Ordinance and triggered disclosures, such as AB 1103.

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<sup>111</sup> ENERGY STAR. 2008. ENERGY STAR® Building Manual. April 2008. Accessed March 20, 2011 from [http://www.energystar.gov/index.cfm?c=business.EPA\\_BUM\\_CH2\\_Benchmarking](http://www.energystar.gov/index.cfm?c=business.EPA_BUM_CH2_Benchmarking).

- To satisfy voluntary disclosures, such as obtaining a green building label through ENERGY STAR or LEED certification.
  - To enable participation in utility energy efficiency programs or obtain a rebate.
  - To save energy.
  - To obtain value from ongoing tracking and monitoring.
  - In response to corporate environmental policy.
  - To realize higher occupancy rates, higher lease rates, and increases in building asset values.
  - To identify energy efficiency measures.
  - To help determine if buildings' energy bills can be reduced.
  - To improve profitability.
  - To enhance the building owner's or tenant's "green" image for marketing or PR purposes.
- ❖ Results from closed-ended questions suggest that voluntary disclosures (66%), triggered disclosures (43%), and qualifying for an energy efficiency program or rebate (40%) were important reasons that participants benchmarked. Results from open-ended questions suggest that saving energy (18%), obtaining value from on-going tracking and monitoring (14%), and complying with corporate environmental policy (11%) were also important drivers for this group.

#### ***7.1.1.2 IOU Uses***

- ❖ The most common use of Portfolio Manager reported by the IOUs is to raise awareness about energy efficiency opportunities by providing customers with a performance score relative to other similar buildings nationwide. Another important use is in meeting the goals for buildings benchmarked within the utility service territories.

#### ***7.1.1.3 Benefits of Portfolio Manager***

- ❖ Valuable positive attributes of Portfolio Manager include that it is readily available, costs nothing to use, enjoys widespread voluntary adoption by the market and is associated with a widely recognized and valued label, ENERGY STAR. Other valuable positive attributes include the automated upload of energy use data and the ability to obtain a score with a relatively small set of data inputs and no site visit.

### **7.1.2 Identify and Catalogue the Challenges of Portfolio Manager**

#### ***7.1.2.1 Challenges Associated with Portfolio Manager***

- ❖ Top challenges associated with Portfolio Manager from the customer perspective were: (1) collecting all the data required and (2) getting the data entered into and accepted for use by Portfolio Manager. Other challenges identified included:
- Data gathering is time consuming.



- Data not readily accessible or known, with customers often unaware of how many meters are associated with their location, or of the identifier(s) used to authorize the meter.
- Lack of time to continue benchmarking facilities over time.
- Cost to collect information and continue monitoring energy performance.
- Lack of confidence that savings will materialize and energy efficiency investment will satisfy payback criteria.
- Portfolio Manager software was confusing, difficult to use.

Challenges identified by the IOUs included:

- Limited flexibility to address unique characteristics of buildings.
  - Impediments to obtaining an accurate score, including requiring a high level of attention to detail and accurate input by customers using the tool; difficulties benchmarking buildings with multiple addresses, such as high-rises and condominiums; and lack of compatibility with utility customer information systems.
  - Customers lack familiarity with Portfolio Manager and the interface is not very usable.
  - Customer confusion with regard to entering certain building space attributes into Portfolio Manager, such as square footage of specific elements of office space, like common areas, dining areas, etc.
  - Applicability to California.
  - Customer confidentiality promised by EPA.
  - Limited building types.
  - Does not identify areas for improvement.
  - Scores are vulnerable to gaming.
- ❖ Although Portfolio Manager does have a number of limitations with respect to selecting similarly situated buildings in California, the screening process does provide building owners and tenants with important information over time.

#### **7.1.2.2 *Planned Improvements to Portfolio Manager***

- ❖ The EPA is in the process of overhauling Portfolio Manager and its Automated Benchmarking System, which interfaces with the utility ABSs. Thus, many of the technical issues with Portfolio Manager and EPA's Automated Benchmarking System described in Section 3.2.6 may soon be addressed.

#### **7.1.2.3 *Challenges Associated with the Use of Utility ABSs and EPA's Automated Benchmarking System***

- ❖ Challenges associated with the IOUs' ABSs were:
- Owners of multi-tenant buildings must obtain authorization from each tenant with a meter in the building in order to use utility ABSs with Portfolio Manager.

- Certain SCE meter data must be re-entered or re-uploaded because of data incompatibility.
  - Portfolio Manager requires data at the building level; Utility customer information systems are not set up to recognize building as a characteristic of an account. The relationship between meters and buildings is complex and not one-to-one. There can be more than one meter per building, or in the case of some campuses, more than one building per meter. There is typically more than one meter per account for commercial spaces, and there can be one or more accounts per building, depending on building ownership and occupancy patterns.
- ❖ Challenges associated with the EPA's Automated Benchmarking System were:
- Limited flexibility for customizing the graphical user interface within Portfolio Manager that customers use to sign up for utility ABSs.
  - Limitations of Automated Benchmarking System web services (e.g., deletion/de-authorization is not included in database schema for the ABS data, so IOUs must manually process customer's deletion/de-authorization of specific meters, etc.).
  - Lack of technical support Only a single customer-level account number can be entered by a customer. Customers with several legal entities in IOU billing systems must submit third party authorization forms to receive data under a single Portfolio Manager/ABS account or set up multiple Portfolio Manager accounts.

### **7.1.3 Alternative Benchmarking Tools**

#### **7.1.3.1 BEARS**

- ❖ The California BEARS tool is still under development and as a consequence there are no BEARS data for analysis. BEARS is a proposed asset rating tool that develops a model-based estimate of energy use for the building using data gathered from an on-site visit by a certified rater.
- ❖ Once BEARS is developed, IOUs could support the implementation of AB 758 by fielding pilot tests of asset rating tools and starting to build BEARS into efficiency programs. This would need to be done with great care so as not to conflict or overlap with IOU support for Portfolio Manager , or introduce confusion into the marketplace with the availability of different results from different tools.

#### **7.1.3.2 CalArch and EnergyIQ**

- ❖ Both CalArch and EnergyIQ are operational rating tools. According to interviewees familiar with the tools, CalArch has been superseded by EnergyIQ, which is a tool based on more recent CEUS data. EnergyIQ can be used to benchmark buildings, track energy use, and identify possible energy-saving actions and likely return-on-investment (ROI). Utility energy use data cannot yet be uploaded automatically into EnergyIQ. The CEC is planning to link EnergyIQ with the AB 1103 website in order to increase consumer awareness.

### **7.1.3.3 National versus California Benchmarking Tools**

- ❖ Interviews identified pros and cons of requiring the use of Portfolio Manager as part of AB 1103.
  - Pros: The ENERGY STAR brand has credibility, which gives it value and great spillover effects. Different tools can be used on the same building and can complement each other.
  - Cons: There are different ways to benchmark; each has strengths and weaknesses. That AB 1103 specified Portfolio Manager may lessen the likelihood that building owners will use multiple tools to benchmark.

### **7.1.4 ENERGY STAR Labeling and Rating Systems, Energy Consumption & Commercial Real Estate Values**

- ❖ A review of the literature suggests that interest in energy efficiency in the Commercial Real Estate sector continues to increase; albeit at a slower pace than five years ago. Increased awareness of such matters appears to have manifested into more companies adopting corporate-wide sustainability goals. Among these goals, companies are actively seeking to acquire a well-recognized green building designation such as ENERGY STAR or LEED.
- ❖ The literature shows that occupancy and rental rates in green buildings are higher, and operating expenses lower, than those in standard buildings. As of 2008, occupancy rates for LEED- and ENERGY STAR-certified buildings were about 4 percentage points higher than for standard buildings. Currently, the rent premium for LEED-certified buildings is roughly 8 percent, while there appears to be no rent premium for ENERGY STAR-certified buildings. Together, these results provide evidence that asset values of green buildings are higher relative to standard buildings. The literature suggests that while the premium commanded by green buildings has decreased somewhat since the financial crisis, the value of green buildings is starting to be reflected back into transaction values.

## **7.2 Utility Benchmarking Initiative Descriptions and Program Theory**

This section addresses the following researchable needs or questions:

- 3) Describe the initiatives and how they are administered and delivered, including program theory
- ❖ The evaluation team found that logic models had not yet been created for the initiatives, and no formal descriptions of program theory were available. (This may be due to the fact that the benchmarking initiatives do not have formal “program” or “subprogram” status.) The evaluation team interviewed initiative staff and EPA staff, and reviewed initiative documents and relevant literature to develop detailed and short descriptions of program theory for both the initiatives and for benchmarking with Portfolio Manager.

- ❖ The utility benchmarking initiatives are “non resource [sic] initiative[s] designed to educate and motivate customers to benchmark their facilities.”<sup>112</sup> To this end, the utilities offer the following six forms of support for benchmarking. Of these, the first five are “customer-driven” and the sixth is utility-driven or “proxy” benchmarking.
  1. Automated Benchmarking Services (utility ABS)
  2. Technical support for Portfolio Manager and utility ABS
  3. Benchmarking workshops
  4. Participation in benchmarking working groups and policy development,
  5. Evaluating California Energy Commission (CEC) and other energy benchmarking tools
  6. Technical development, marketing design, and delivery of proxy benchmarking data to customers
- ❖ Education and information for customers to benchmark their commercial buildings using Portfolio Manager is provided through items 2 and 3, the technical support and benchmarking workshops. Motivation to benchmark is provided through item 1, ABS, which is a key enabler for policy development and implementation meant to lower the substantial barrier of the time needed to collect and enter data into Portfolio Manager; and 6, the delivery of proxy benchmark scores to customers. Proxy score delivery also serves to promote awareness of building benchmarking. (Mandatory initiatives such as AB 1103, and voluntary building labeling programs such ENERGY STAR, are of course also important motivators for building owners and operators to benchmark buildings.) Detailed information about each of these offerings can be found in Section 4.
- ❖ The initiative theory was described by staff at PG&E, SCE and SoCalGas as follows: Customers will become aware of benchmarking through utility outreach as well as other sources. Their knowledge of benchmarking and awareness of its benefits will increase when they take utility benchmarking workshops. By using the benchmarking tools supported or provided through the initiatives (Portfolio Manager and ABS, respectively) to obtain information about their commercial buildings’ energy use, customers will be motivated to monitor their energy use and improve the scores or EUIs of buildings that are not performing well compared to an internal or external benchmark.<sup>113</sup> The improvements could involve any or all of the following: developing an energy plan, choosing to participate in a utility energy efficiency program, and making adjustments to settings or other behavioral changes. These changes are expected to lead to energy savings in the buildings benchmarked. Over time, the positive feedback obtained by customers tracking benchmark scores may encourage them to undertake still more energy efficiency activities, and possibly participate in more utility programs. The value placed on ENERGY STAR certification should further reinforce this

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<sup>112</sup> Decision 09-09-047, California Public Utilities Commission (adopted September 24, 2009). Accessed December 13, 2011. <http://docs.cpuc.ca.gov/Published/Graphics/107829.pdf>.

<sup>113</sup> Internal benchmarks include other buildings in the portfolio or the same building over time. External benchmarks include similar buildings across the nation, state, or other comparison group outside the building owner/operator's portfolio.

mechanism. This theory hews closely to the description of the theory behind offering Portfolio Manager, as described by EPA interviewees.

- ❖ While SDG&E offers the same six forms of support as the other utilities, SDG&E also requires that customers wishing to participate in commercial programs for which benchmarking is relevant benchmark with Portfolio Manager.
- ❖ SCE has developed a methodology for calculating proxy benchmark scores for a subset of their commercial customers and has begun to send scores to customers. PG&E is completing development of its proxy score calculation methodology and expects to begin delivering proxy scores to customers in 2012. SDG&E and SoCalGas were still exploring methodologies for calculating proxy benchmark scores at the time of this study.

### 7.3 Describe the Types of Customers Using Benchmarking

This section addresses the following researchable needs or questions:

- 4) Describe the types of customers using benchmarking
  - a) Characterize the types of customers using benchmarking, and the different ways they use benchmarking.
    - i) Is it a single business, a multiple store or franchise, a regional or nationwide chain, a city, county or other government entity, or a property management business? Each of these entities will likely use benchmarking differently.
    - ii) Property / Rental / Real Estate uses of benchmarking
- ❖ The results of the participant survey are representative only of workshop participants. While workshop participation is open to all, customers receive notification of workshops based on contact information available to the utility. Customers for whom utilities have individual contact information may not be representative of all utility customers with buildings that could be benchmarked with Portfolio Manager.

#### 7.3.1 Customer Types

##### 7.3.1.1 General Types and Distribution

- ❖ The research identified four general types of customer audiences for benchmarking tools that participated in benchmarking workshops, and the rates at which they were found in the sampled populations:
  1. Utility customers who own and manage facilities that they either lease to others or occupy themselves (48% of participants, 63% of non-participants),
  2. Utility customers who occupy and manage facilities that they lease from an owner or property management firm (17% of participants, 37% of non-participants),
  3. Facility or Property Management companies who manage buildings on behalf of utility customers, but do not own them (9% of participants), and

4. Commercial real estate consultants and third party vendors, such as engineering firms or ESCOs (27% of participants).
- ❖ Staff at SDG&E, where benchmarking is required for program participation, speculated that over 90% of users of SDG&E's ABS/Portfolio Manager in their service territory are vendors of some kind who are addressing the benchmarking requirement to ensure that their customers' rebates can be processed. The rate of vendors among the SDG&E participant sample, 25%, was not significantly different from the rate for the rest of the sample. While workshop participants do not represent the universe of users of SDG&E's ABS and Portfolio Manager, this finding suggests that staff's concern may have been unfounded.

### **7.3.1.2 Industries and Distribution**

- ❖ It appears that the most common facility type benchmarked using Portfolio Manager by SCE ABS users is "office" (44% of participants). A comparison of the SCE NAICS codes analysis with the survey data suggests that customers benchmarking municipal buildings may not be availing themselves as much as they could of the opportunity to take a benchmarking workshop. It also suggests that there may be an opportunity for IOUs to increase awareness of benchmarking among types of businesses and buildings other than municipal and office buildings.
- ❖ A comparison of the different rates at which the participant groups benchmark buildings suggests that non-profit and municipal customers (School/Education/Library, Municipal/Local Government Building, and Community Service/Church/Temple) are more likely to benchmark their buildings themselves, and customers running hotels or motels are less likely to benchmark their buildings themselves.
- ❖ Participants who had *not* benchmarked buildings are more likely than other participants to report building types that either cannot be benchmarked using Portfolio Manager or face particular benchmarking challenges. This may help in part to explain why this group of participants has not benchmarked.
- **Recommendation:** Given the paucity of data from utility ABSs at the time of the study and the importance of understanding the market for benchmarking in light of the state's interest in this approach to energy efficiency, the CPUC may want to consider conducting a market segmentation study for benchmarking in the future. (A full-blown market segmentation was outside of the scope of this study.)

### **7.3.2 Customer Awareness of Benchmarking**

- ❖ The survey set a baseline of awareness among non-participant customers. Unaided, 16% of non-participants indicated that they had previously heard about benchmarking; adding aided to unaided, a total 24% had heard of it.
- **Recommendation:** Awareness of benchmarking among non-participants is relatively simple to measure via survey research and could be a useful a progress indicator for the utilities'



benchmarking initiatives. Section 5.1.3 describes some challenges associated with surveying non-participants that should be borne in mind in planning future survey research among non-participants.

### 7.3.3 Rates of Benchmarking

- ❖ The rate at which end-user participants reported having completed benchmarking at least one building in the three years prior to the survey was 45%. For vendors, the rate was 28%. Four non-participants (5%) reported having completed benchmarking at least one building in the three years prior to the survey—similar to what would be expected given numbers from ENERGY STAR of California buildings benchmarked using Portfolio Manager as of December 2010. As the non-participant sample comprised customers most likely to qualify for and readily be able to benchmark with Portfolio Manager—i.e., medium and large customers who were sole tenants of commercial buildings—this suggests the rate of benchmarking outside of those among all commercial customers who have not taken a benchmarking workshop is similarly low. The sample size of non-participants who had benchmarked buildings was too small to make meaningful comparisons between participants who had benchmarked and non-participants who had benchmarked.
- ❖ The rate at which end-user participants reported having completed benchmarking at least one building in the three years prior to the survey, along with other data presented in this section, lends support to conclusions described elsewhere in this section that the workshops have been effective in providing customers with the information and skills needed to benchmark their buildings.
- **Recommendation:** In planning for initiative tracking and future evaluation, the CPUC or IOUs may want to consider fielding a survey designed specifically to understand progress made on benchmarking by non-participants. The evaluation team’s experience is that non-participants are a much more difficult group to recruit for a survey than are participants. This is due to the fact that frequently only the name and phone number of a corporation, rather than an individual contact, is available from the CIS for customers who have not participated in a utility workshop or program, and that benchmarking is a topic of low salience outside of workshop participants. Any study focusing on surveying non-participants will need to be carefully designed to boost response rates under these circumstances.

### 7.3.4 Customer Understanding of Benchmarking and Perception of Value

- ❖ The data suggest that among the population represented by the non-participant sample, a majority of those who have heard of the term “benchmarking” have a reasonable understanding of benchmarking. Three-quarters of non-participants who were aware of benchmarking exhibited at least a moderate understanding of it.
- **Recommendation:** Like awareness, understanding of benchmarking among non-participants is simple to measure via survey research and could be a useful a progress indicator for the utilities’ benchmarking initiatives. Section 5.1.3 describes some challenges associated with



surveying non-participants that should be borne in mind in planning future survey research among non-participants.

### 7.3.5 Customer Interest in Benchmarking

- ❖ Of those organizations that do not benchmark fairly soon after sending staff to a workshop, about one-half were still interested in benchmarking while about a third were not. Initiative staff told the evaluation team that they continue to send workshop announcements to past registrants.
- **Recommendation:** Given the rate of interest in benchmarking that remains among organizations that do not benchmark fairly soon after the workshop, it makes sense for the IOUs to continue the practice of sending workshop announcements to past registrants.

### 7.3.6 Length of Experience with Benchmarking

- ❖ About two-fifths of participants and vendors reported having started benchmarking buildings in 2010 or 2011, within the range of time in which they had registered for a workshop. This finding is to be expected given that workshop participants prior to 2010 were not included in the data request.

### 7.3.7 Customer Decision-making

- ❖ When it comes to benchmarking, the building owner is not necessarily the decision-maker.
- ❖ Buildings at or over 50,000 square feet are more likely to be operated by a property management firm or by a building operator or facilities manager.
- ❖ At a property management firm with a large portfolio of buildings, the corporate Vice President for facilities is likely to be the decision-maker. For a large individual building, the facilities manager is likely to make the decisions.
- ❖ Smaller buildings are less likely to have an on-site building manager, in which case the decision to benchmark is likely to be made by the owner or a tenant.
- ❖ If a tenant makes the decision, typically they occupy either all, or the lion's share, of the building they lease.

### 7.3.8 Firmographics

#### *7.3.8.1 Number of Buildings Owned, Occupied or Managed*

- ❖ End-user participants who had benchmarked buildings reported larger portfolios of buildings owned, occupied or managed (49%) than both participants who had not benchmarked (33%) and non-participants (22%).

#### *7.3.8.2 Area of Buildings Owned, Occupied or Managed in California*

- ❖ Participants reported owning, occupying, or managing both larger portfolios of buildings and larger buildings than did non-participants. Nearly two-fifths of participants who reported the total conditioned square footage of their buildings via the survey reported a total area of

400,000 square feet or more, compared to one-seventh of non-participants; two-fifths of the participants reported a total area of less than 100,000 square feet as compared to two-thirds of non-participants. Interviewees have pointed out that benchmarking should be supported for smaller buildings as well, although this does not necessarily mean smaller buildings are not being benchmarked, as participants may have large numbers of small buildings that add up to large total square footages.

- **Recommendation:** As the initiative matures, initiative designers may want to give further consideration to how better to meet the needs of smaller customers.

#### ***7.3.8.3 Customers with Buildings Served by Multiple Utilities***

- ❖ About three-fifths (61%) of participants and about four-fifths (81%) of non-participants reported that all of their buildings were served by the same utility. (Some of the IOUs provide both electric and gas service to the majority of their customers.)

### **7.3.9 Benchmarking as a Business Offering**

- **Recommendation:** Participant survey data reported in this subsection suggest that there is an emerging business of benchmarking services. Initiative designers may wish to consider whether and how this emerging business could be leveraged to increase the rate of benchmarking.

#### ***7.3.9.1 Degree of Experience***

- ❖ Vendors are doing more than just exploring benchmarking as a business opportunity—about half (51%) of participant vendors reported having benchmarked five or more buildings, and nearly a quarter (24%) reported having benchmarked 25 or more buildings.

#### ***7.3.9.2 Client Base***

- ❖ Nearly three-quarters of vendors (74%) identified large office building owners or managers as the type of client who in their experience had expressed the strongest interest in benchmarking. After Office, vendors reported the following primary activities in buildings they benchmarked in California: Hotel or Motel (9%), non-food Retail (9%), and Health Care other than Hospital (8%).

#### ***7.3.9.3 Vendor Perception of Demand***

- ❖ The data suggest that there is a substantial base of demand for vendors to benchmark buildings for clients.

### **7.3.10 Property/Rental/Real Estates Uses of Benchmarking**

- ❖ The findings suggest that a subset of workshop registrants who have benchmarked buildings—perhaps about one-quarter—are using the results of benchmarking for real estate business purposes.

- ❖ By far the most common use is to market buildings or differentiate their business (53%), followed by playing a role in the acquisition of new buildings (35%), most commonly to evaluate the cost of operating or upgrading the building, helping value buildings for leases (26%), helping market buildings to potential tenants (24%), and playing a role in the sale of buildings in their portfolio (17%).
- ❖ The profiled interviewees pointed to some limitations to the real estate uses of benchmarking.

## 7.4 Describe How Customers are Using Benchmarking

This section addresses the following researchable needs or questions:

- 5) Describe how customers are using benchmarking
  - a) Describe benchmarking implementation by customers
    - i) How often are benchmark scores updated? To what extent is benchmarking a useful tool for ongoing energy efficiency tracking and management?
    - ii) Timing and uses of benchmarking services
    - iii) Is benchmarking moot after measure decision is made?
    - iv) Is the score used as a tool for tracking the actual savings from implementing measures?

### 7.4.1 Updating and Monitoring of Benchmark Scores

- ❖ Taken together, the findings in this section suggest that about half the participants who benchmarked buildings are undertaking the kind of monitoring and re-benchmarking that is envisioned as an outcome of using Portfolio Manager. For example, nearly half of end-user participants who benchmarked (48%) strongly agreed that someone in their organization routinely monitors benchmark scores or EUIs. Of end-user participants whose organizations re-benchmark routinely, more than half (58%) reported doing so at least four times a year, and nearly a third (29%) reported doing so at least twelve times a year. The majority of end-user participants (64%) agreed that someone in their organization usually checks the benchmark score or re-benchmarks after making a building or equipment change.
- ❖ Self-reported frequency of score monitoring and re-benchmarking is easily measured and could be a useful progress indicator for the initiative or for benchmarking overall.

### 7.4.2 Use of Other Benchmarking Tools

- ❖ Portfolio Manager was by far the most commonly reported benchmarking tool or resource currently in use among both the participants (63%) and vendors (65%).

### 7.4.3 How Customers Use Benchmark Scores

- ❖ The ways that end-users most frequently reported having used the information was to set a baseline score or EUI for future comparison (85%). End-users reported using the information to identify energy efficiency opportunities in the building nearly as frequently (84%) for a baseline for future comparison, despite the fact that Portfolio Manager is not designed to identify specific energy-saving opportunities within buildings.
- ❖ Two-thirds (67%) of participants said they had used the information to identify which buildings needed the most improvement in their energy performance and a slightly smaller percentage had used it to set goals for facility performance (63%).
- ❖ The results suggest that there is a need for a tool that identifies energy efficiency opportunities within a building. The new module being developed for EnergyIQ is designed to meet this need, and an asset rating tool such as BEARS seems better suited to this purpose than Portfolio Manager. However, as an operational rating tool that does not require the use of a certified rater, it seems likely that EnergyIQ would be more popular as a supplemental tool than BEARS among users of Portfolio Manager.

#### Recommendations:

- Given the desire of users of Portfolio Manager to identify energy-saving opportunities within their buildings, IOUs may want to consider exploring ways to facilitate this in association with the benchmarking initiatives. In addition to connecting customers who have benchmarked with appropriate utility programs to help with this, supplemental use of the new EnergyIQ module or another benchmarking tool may help meet this desire. Any exploration should be mindful of the value of the ENERGY STAR label in the eyes of customers and in the commercial building marketplace, and be careful about how the use of supplemental tools is framed, lest this value be eroded.
- Given the desire of Portfolio Manager users to identify energy-saving opportunities within their buildings, the utilities may wish to consider encouraging or collaborating with the EPA to include more diagnostic functionality in Portfolio Manager, either by adding this as content or allowing customization of the displayed information for utility customers.

#### 7.4.3.1 Vendor Perception of Customer Interest in and Use of Scores

- ❖ About four-fifths (81%) of vendors believed clients to be at least somewhat interested in seeing the benchmarking results, while about three-fifths (62%) believed clients to be very interested.
- ❖ Nearly nine out of ten (88%) of the vendors believed that customers used the score to learn new information about their building's energy performance, over two-thirds (71%) believed the score was used to confirm or provide proof for management of what they already knew about their buildings performance, and about three-fifths (59%) believed it was used to fulfill a requirement for utility program participant or certification. (Only SDG&E customers are required to benchmark for commercial program participation. However, benchmarking with Portfolio Manager is among the offerings of some utilities' other commercial programs.)

## 7.5 Use of Internal versus External Benchmarking

This section addresses the following researchable needs or questions:

- 6) Use of internal versus external benchmarking
  - a) What is the relative use of internal versus external benchmarking?
- ❖ Of the three basic ways that organizations use benchmarking tools— to compare buildings within a portfolio of buildings against each other, to compare a building or portfolio of buildings against a national index, and to compare a building with itself over time—the most common use from the perspective of end-users is to compare building energy performance with itself over time (81%), a form of internal benchmarking. The second most common use is to compare a building or portfolio of buildings against a national index, a form of external benchmarking (65%) and third is to compare buildings within a portfolio of buildings against each other, another form of internal benchmarking (48%).

## 7.6 Customer Experiences with Benchmarking Participation

This section addresses the following researchable needs or questions:

- 7) Customer experiences with benchmarking participation<sup>114</sup>
  - a) What has been the experience, including successes, challenges and lessons learned, of the Automated Benchmarking System?

### 7.6.1 Rate of Use of Portfolio Manager

- ❖ Nine out of ten (90%) participants who had benchmarked reported having used Portfolio Manager to benchmark a least one building in the previous three years. However, just 63% of end-user participants who had benchmarked currently use Portfolio Manager to benchmark buildings..

### 7.6.2 Role of Participants

- ❖ Of workshop participants who benchmarked buildings, nearly three-quarters (73%) work for organizations that benchmark for themselves; 23% hire a vendor to benchmark.

### 7.6.3 How Customers Learn About Benchmarking

- ❖ The most common ways that participants had first learned about benchmarking were through utility or EPA websites or email, through a utility energy efficiency program, through industry or trade journals, and through legislation.
- ❖ Participants who benchmarked were less likely than participants who had not benchmarked to have first heard about benchmarking from a utility account manager or representative (6%

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<sup>114</sup> 7b, b) What has been the experience, including successes, challenges and lessons learned, of proxy benchmarking? is addressed in Section 7.9, Effectiveness of Initiatives and Opportunities for Improvement.

versus 28%), and more likely to have heard about benchmarking from a vendor (7% versus 0%) or from legislation (6% versus 0%).

## 7.6.4 Workshop Experience

### 7.6.4.1 *Opinions of Workshops*

- ❖ EPA, stakeholders, and initiative staff expressed very positive opinions of the benchmarking workshops.
- ❖ Reports provided by the utilities summarizing workshop evaluations showed that the workshops uniformly received high ratings and very positive feedback from attendees.

### 7.6.4.2 *Challenges Associated with Workshops*

- ❖ Workshops are offered in few locations, making them difficult for many customers to attend.

### 7.6.4.3 *Why Customers Attend Benchmarking Workshops*

- ❖ The most common reasons that participants attended the workshop were to learn to use the Automated Benchmarking Service (26%), to better understand benchmarking performed by others (21%), and to learn about Portfolio Manager or benchmarking in general (21%).
- ❖ In interviews, SDG&E staff expressed concerns about whether requiring benchmarking for program participation would lead to the desired outcomes as envisioned by EPA. Compared to other utilities' service territories, more of the workshop participants in the SDG&E service territory attended because they are required to benchmark (17% SDG&E versus 3% PG&E and 0% SCE and SoCalGas). (Only SDG&E customers are required to benchmark for commercial program participation.)

### 7.6.4.4 *Is Workshop Training Sufficient to Benchmark?*

- ❖ Four out of five (82%) participants stated that the training had been sufficient to allow them to benchmark buildings on their own. This result provides evidence that the workshops have been effective in providing customers with the information and skills to benchmark their buildings.
- ❖ A significantly higher percentage of PG&E participants reported that training had been sufficient than did participants from the other three utilities (94% PG&E versus 77% SCE, 69% SDG&E, and 73% SoCalGas).
- **Recommendation:** Considering the fact that PG&E uses the same trainer as SDG&E and SoCalGas, members of the IOU Benchmarking Working Group may wish to discuss among themselves and investigate what aspects of PG&E's workshops or other benchmarking support could be responsible for this outcome and if or how these might be replicated by other utilities.

## 7.6.5 Customer Experience with Portfolio Manager and Utility ABSs

### 7.6.5.1 Rates of Success Benchmarking with Portfolio Manager

- ❖ About nine out of ten (89%) participants who had benchmarked had successfully benchmarked using ENERGY STAR Portfolio Manager.
- ❖ PG&E (94%) and SDG&E (90%) participants reported significantly higher rates of success benchmarking with Portfolio Manager than did SCE participants (60%). Given that not all customers are aware of when they are using Portfolio Manager versus a utility's ABS, this suggests that SCE customers may be experiencing more difficulties with the SCE ABS than are customers using the ABSs of other IOUs.
- **Recommendation:** It may be advisable for SCE to investigate the possible sources of customer problems with Portfolio Manager, which may be related to SCE's ABS.

### 7.6.5.2 Difficulties Using Portfolio Manager

- ❖ About one-half (51%) of participants who benchmarked buildings reported having had difficulties using Portfolio Manager. One-fifth (20%) of participants with difficulties said the program had been confusing or difficult to use, 13% had difficulty identifying or measuring each space in the building, especially for irregular buildings, and 12% experienced automatic reporting flaws or inaccurate scores.

### 7.6.5.3 Ways to Improve Portfolio Manager

- ❖ Profiled customers suggested a variety of ways that Portfolio Manager could be improved. Some of these may already be addressed among the changes EPAs plans for Portfolio Manager in 2013 or in regular updates of Portfolio Manager.
  1. Make information easier to enter.
  2. Make Portfolio Manager scores applicable to more building types.
  3. Make more smaller buildings and special-use buildings eligible for an ENERGY STAR score.
  4. Provide more information on how to generate Portfolio Manager reports.
  5. Make updates to Portfolio Manager sooner than the planned date of 2013.

### 7.6.5.4 How Customers Transfer Data to Portfolio Manager

- ❖ About four in ten (39%) end-user participants reported transferring the data manually (even after having taken the workshop), over one-third (36%) used a utility ABS to transfer the data automatically, and about one-tenth (11%) used a bulk upload option.
- ❖ End-user participants (42%) used ABS significantly more frequently than vendors (24%).
- **Recommendation:** The CPUC, CEC, and IOUs may wish to further investigate the reasons that customers do not use utility ABSs as part of evaluating potential approaches to addressing impediments to benchmarking due to privacy requirements.



#### **7.6.5.5 Use of Multiple Utilities' ABSs**

- ❖ Three-quarters (75%) of participants who had benchmarked buildings reported having used ABS to transfer data from a single utility and about one-fifth (21%) had used ABS to transfer data from two utilities.

#### **7.6.5.6 Problems Using Utility ABSs**

- ❖ Of the 25 participants who had used ABS to automatically transfer energy consumption data, 70% reported that they had encountered difficulties successfully authorizing meters or receiving data for authorized meters. The most frequently mentioned difficulty was problems obtaining utility usage data.
- ❖ About one-quarter of respondents who reported using some data entry method other than ABS said that their organization had tried to use ABS to automatically transfer building energy use data in the last three years. The range of reasons why they had stopped included that ABS was confusing or difficult to use, they had problems getting authorizations from tenants, they could not identify all meters, they had technical problems enrolling in ABS, they received confusing error codes, the company's focus changed, and that they help customers get set up with ABS but do not use it themselves.
- **Recommendation:** The IOUs may wish to investigate ways to improve users' experiences with utility ABSs, such as simplifying the process of enrolling in utility ABSs, authorizing meters, clarifying error codes, or other suggestions mentioned in this document.

#### **7.6.5.7 Improvements to Utility ABSs**

- ❖ The profiled customers offered the following suggestions for improving their utilities' ABSs:
  - Develop a uniform process for using ABS across all four IOUs.
  - If privacy requirements allow, provide electricity consumption information to owners when tenants have the meters.
  - Fix the SDG&E and SoCalGas requirement to use the back button to accept terms and conditions.
  - Where not already in place, add automated alerts when information is not automatically updated.
- **Recommendation:** The IOUs may wish to investigate the appropriateness and viability of customer-suggested changes for their ABSs.

#### **7.6.5.8 Customer Experiences with Utility Technical Support**

- ❖ SDG&E participants who had benchmarked buildings contacted technical support significantly more frequently than did all benchmarking participants together (62% versus 41%). While the data provide no indication if this difference is related to SDG&E's requirement that customers benchmark building(s) as a prerequisite for program participation, it seems logical that SDG&E customers would have more incentive than other utilities' customers to follow through with technical support to complete benchmarking.

- ❖ PG&E participants reported the lowest frequency of contacting technical support (30%).
- ❖ Over two-thirds (70%) of these participants reported that technical support had resolved their problem.

#### ***7.6.5.9 Satisfaction with Technical Support***

- ❖ Two-fifths of participants who had benchmarked buildings and contacted technical support (40%) indicated a very high level of satisfaction, while 15% indicated a very low level of satisfaction.
- ❖ Among the respondents who reported low levels of satisfaction with technical support, three said that technical support had not known the system or had not been able to provide the information needed, one said that it had taken a long time to get an answer, and one said that the problem had not been fixed.
- **Recommendation:** The IOUs may wish to improve their tracking of technical support requests in order to provide insights for future improvements to utility ABSs, for future recommendations for Portfolio Manager revisions, and to serve as data for future initiative evaluation.

## **7.7 Describe Benchmarking Participation Motivations and Barriers**

This section addresses the following researchable needs or questions:

- 8) Describe benchmarking participation motivations and barriers
  - a) Why do some building owners/operators decline benchmarking?
  - b) Importance of ENERGY STAR label/rating
    - i) What is the perceived importance of the ENERGY STAR Rating?

### ***7.7.1.1 Reasons for Using Portfolio Manager to Benchmark***

- ❖ The top reasons that participant end-users and participant vendors who benchmarked buildings used Portfolio Manager include that it is widely recognized, it is associated with the ENERGY STAR label, and that it is considered an industry standard (28% total across all three).
- ❖ Other reasons for using Portfolio Manager: Portfolio Manager was recommended by their utility (20%), it is easy to use or readily accessible (18%), it is free (15%), and it is required for certification or rebate or is mandated by law (13%).
- ❖ Another reason cited by stakeholders was the ability to obtain a score with a relatively small set of data inputs and no site visit.

### ***7.7.1.2 Customer Reasons for Declining Benchmarking***

- ❖ About one-half (49%) of participants who were aware of benchmarking but did not benchmark buildings reported the existence of challenges or barriers to the activity.
- ❖ The most common reasons that organizations did not benchmark were the cost to collect information and continue monitoring energy performance (16%), followed by the fact that

data gathering is time consuming (15%), and that the respondent's organization or building was too small to benchmark (14%). The most common challenges or barriers identified by these organizations were a lack of resources, followed by the difficulty of using Portfolio Manager software, a lack of information, and that no category for their facility existed.

- ❖ Among non-participants who had not heard of benchmarking, one third (33%) said that the cost to collect information and continue monitoring energy performance might prevent their benchmarking. Other barriers cited were a lack of resources and lack of information, including not knowing how to benchmark.

#### **7.7.1.3 Perceived Importance of ENERGY STAR Label/Rating**

- ❖ The bulk of data regarding the importance of the ENERGY STAR label support observations made elsewhere in this report that the ENERGY STAR label has considerable value for building owners.

## **7.8 Effectiveness of Benchmarking at Eliciting Energy Savings**

This section addresses the following researchable needs or questions:

- 9) Assess the effectiveness of benchmarking at eliciting energy savings from commercial customers
  - a) How effective is customer-driven benchmarking at
    - i) Encouraging participation in utility programs?
    - ii) Encouraging more comprehensive retrofits?
    - iii) Encouraging better operations and maintenance practices?

### **7.8.1 Benchmarking and Subsequent Building Energy Management and Improvements**

- ❖ Benchmarking appears to have resulted in about three-fifths (62%) of participants taking energy management actions in their buildings, such as monitoring of controls, thermostats, buildings, or electrical or steam usage. When this group of participants was asked to rate how much of an influence benchmarking had had on how their organization managed building energy use, all said that it had had at least some influence, and 62% indicated that it had had a great or very great deal of influence. When asked how benchmarking had changed their organizations' energy use, participants who benchmarked most frequently reported monitoring of controls, thermostats, buildings, or electrical or steam usage (25%), followed by identifying areas or buildings for reducing energy use (22%).
- ❖ Thirty-four participants—84% of all participants who benchmarked—indicated that they had planned or implemented improvements to benchmarked buildings since benchmarking. These participants identified two measure upgrades most frequently—lighting upgrades (96%) and HVAC improvements (83%)—followed by three management or behavioral changes: adding energy management system or controls (82%), conducting energy audits or feasibility studies (81%) and changing thermostat set points and turning off lights (80%).

- ❖ The benchmark scores or EUIs were at least somewhat important to the decision-making for subsequent changes that were made or planned for the buildings benchmarked by 67% of participants who benchmarked, and very important to 35% of all participants who benchmarked.
- ❖ Since the participants studied had taken the first step of voluntarily making the decision to participate in the workshops, it is possible that they were already pre-disposed to making energy efficiency improvements. Thus, it may not be possible to extrapolate these results to customers who benchmark but did not volunteer to attend a utility energy efficiency workshop.

#### ***7.8.1.1 Benchmarking and Utility Program Participation***

- ❖ The survey data suggest there is a positive relationship between benchmarking and utility program participation among participants. About four-fifths (81%) of participants who had planned or made changes to buildings subsequent to benchmarking said at least some of the changes were associated with energy-efficiency programs offered by their utility.

#### ***7.8.1.2 Benchmarking and More Comprehensive Retrofits***

- ❖ The survey data suggest that benchmarking encourages more comprehensive retrofits among participants. More than one-half (53%) of participants agreed (6-10 on a scale of 0-10) and nearly two-fifths (37%) strongly agreed (8-10) with the statement “You implement more comprehensive energy efficiency measures in the buildings you benchmark.”

#### ***7.8.1.3 Use of Benchmarking in Rewarding Staff Performance***

- ❖ The survey data suggest that benchmarking is being used to some extent in performance assessments among the organizations of nearly half (48%) of participants.
- ❖ That nearly one-fifth (17%) of participants strongly agreed, and a similar proportion (18%) at least somewhat agreed, with the statement “Your organization considers benchmarking scores in the bonuses of building engineers or property managers,” suggests that among participants’ organizations benchmarking plays a more limited role—but a role nonetheless—in the bonuses of some building engineers or property managers.

### **7.8.2 Opportunities to Improve Benchmarking Outcomes**

#### ***7.8.2.1 General Opportunities***

- ❖ Interviewees identified a number of general opportunities to improve the outcomes from benchmarking activities in California. These include:
- ❖ Clarify Regulation and Change Regulatory Structure or Process. (1) A regulatory structure may be needed to encourage benchmarking on an ongoing basis, not just real estate transactions. (2) The CPUC may wish to consider assessing the clarity of the state’s laws and regulations regarding the privacy of energy use in relation to benchmarking of commercial buildings, and clarifying customer privacy requirements as appropriate to

facilitate benchmarking of the maximum number of buildings in the state. (3) Greater engagement between CPUC staff and the staff of state agencies working on benchmarking could result in more integrated efforts, mutual reinforcement of agencies' work, and faster implementation of AB 1103. In this vein, the CPUC may wish to take a more active role in understanding the issues and potential solutions around customer privacy for benchmarking, and collaborate with the IOUs, CEC, and other stakeholders to put the necessary regulatory framework in place that would enable an optimum solution. (3) Explore the possibility of regulatory action to require IOUs to add the building attributes to their customer information systems, to add total square footage and building type to the building attributes, and to obtain this information from their customers.

- ❖ Provide More Inducements to Benchmark. Since AB 1103 only applies to buildings at the time of sale or lease of an entire building, and only to buildings over a certain size, many commercial customers will not be affected by AB 1103 either any time soon or at all. It may be worth investigating what additional inducements beyond those already supplied by current regulation and the initiatives could help increase benchmarking.
- ❖ Enhance or Expand Benchmarking through the Initiatives. Consider addressing benchmarking at the system level (e.g. benchmarking of lighting or HVAC systems).
- ❖ Improve Portfolio Manager or ENERGY STAR Certification Process. While the IOUs already provide feedback to EPA about Portfolio Manager, they could help improve Portfolio Manager by making a stronger push for additional building types to be included in it, and by motivating EPA to address gaps in features of Portfolio Manager and the underlying methodology.

**Recommendations:**

- The CPUC and CEC may wish to consider assessing the clarity of the state's laws and regulations regarding the privacy of energy use in relation to benchmarking of commercial buildings, and clarifying customer privacy requirements as appropriate to facilitate benchmarking of the maximum number of buildings in the state.
- Greater engagement between CPUC staff and the staff of state agencies working on benchmarking could result in more integrated efforts, mutual reinforcement of the different agencies' work, and faster implementation of AB 1103. The CPUC may wish to take a more active role in understanding the issues and potential solutions around customer privacy for benchmarking, and collaborate with the IOUs, CEC, and other stakeholders to put the necessary regulatory framework in place that would enable an optimum solution.
- The CPUC, CEC, or other appropriate agency, in collaboration with the IOUs, may wish to investigate whether some other regulatory approach, such as an expansion of the building stock to which of AB 1103 applies, or an expansion of the benchmarking initiatives, could encourage benchmarking on an ongoing basis.
- The CPUC may wish to explore the possibility of regulatory action to require IOUs to add the building attribute to their customer information systems, to add total square footage and

building type to the building attribute, and to obtain this information from their customers. In considering this possibility, it should be taken into consideration that there may be (1) technical or other limitations to the ability of IOUs to add this information, and (2) substantial costs associated with such changes. The costs could include, and may not be limited to, those of soliciting, obtaining, and inputting the information from customers; maintaining the information given the dynamic nature of non-residential building stock; and technical changes that would likely need to be made to customer information system software.

- The CPUC and/or IOUs may wish to investigate whether there may be inducements not yet tried, and worth considering, that could encourage more customers to benchmark.
- The CPUC may wish to investigate what system-level benchmarking entails and its possible use as a tool to help achieve the state's energy efficiency goals.
- The CPUC, CEC, and other stakeholders interested in the benchmarking of California's commercial buildings may want to further engage the EPA to identify existing gaps in Portfolio Manager by expanding the list of eligible buildings, facility and space types and by modifying the underlying methodologies used to create scores.

#### ***7.8.2.2 Potential Issues with Implementation of AB 1103***

The stakeholders interviewed identified a number of issues with the potential to impede AB 1103 in improving the energy efficiency of commercial buildings:

- ❖ Depending on when during a real estate transaction benchmarking is required, the results may not be available to the purchaser to help in selecting or valuing the building.
- ❖ Some real estate transactions that would be subject to AB 1103 may not be. For example, a single building is often leased to multiple tenants, so a change in tenancy in one part of the building will not subject the building to AB 1103 requirements. Even when an entire building transfers ownership, this often takes place a portion at a time in order to avoid new tax assessments, thus allowing the building to avoid being subject to AB 1103.
- ❖ Where a change in ownership or tenancy is likely to introduce a substantial change in operational energy use, taking an operational rating into account in building valuation could be misleading.

## **7.9 Effectiveness of Initiatives and Opportunities for Improvement**

This section addresses the following researchable needs or questions:

- 10) Assess the effectiveness of the benchmarking initiatives and identify opportunities for improvement
  - a) How effective is the benchmarking support in driving customers to benchmark their buildings?
  - b) What are the successes and challenges of implementation of customer-driven benchmarking, and how could the implementation be improved?



- c) How effective is proxy benchmarking at
  - i) Encouraging participation in utility programs?
  - ii) Encouraging more comprehensive retrofits?
  - iii) Encouraging better operations and maintenance practices?
- d) What are the successes and challenges of implementation of utility-driven proxy benchmarking, and how could the implementation be improved?
- e) Are there savings from benchmarking, and if so, how far should we go in trying to characterize them?

This section also addresses 7 (b), What has been the experience, including successes, challenges, and lessons learned, of proxy benchmarking?, as part of 10 (d).

### **7.9.1 Effectiveness of Benchmarking Support in Driving Customers to Benchmark**

- ❖ The initiatives facilitate, rather than drive, customers to benchmark their buildings with Portfolio Manager.
- ❖ While the results suggest that requiring benchmarking for commercial program participation might indeed result in somewhat greater rates of benchmarking, there are reasons that mandatory benchmarking might not produce the behavioral outcome envisioned for the initiatives. For example, benchmarking conducted only in response to a requirement may be produced with less attention to detail than voluntary benchmarking, and thus the accuracy of the score could suffer. Also, the appropriate customer staff might not become aware of their energy use when benchmarking is mandatory, especially if a vendor benchmarks on behalf of a customer just so that the customer can qualify for a rebate. Such customers may also be less likely to re-benchmark or monitor benchmarking scores after the rebate requirement is satisfied.

### **7.9.2 Customer-driven Benchmarking: Successes, Challenges & Lessons Learned**

#### **7.9.2.1 Successes**

- ❖ As described in Section 5.4.4.4, the survey results provide evidence that the workshops are effective at providing customers with the information and skills to benchmark their buildings. Four-fifths (82%) of participants stated that the training had been sufficient for them to benchmark their buildings on their own.
- ❖ Interviewees hold the initiative support in high regard. They identified some specific strengths, including the pioneering nature of the initiatives, strong utility ABS support, workshops that offer hands-on experience using Portfolio Manager and utility ABSs, and utilities' benchmarking websites.



### 7.9.2.2 Challenges

- ❖ Utilities cannot use Portfolio Manager to benchmark on behalf of a customer. This makes it very difficult for the IOUs to meet the CPUC's goals for benchmarking specific numbers of buildings through Portfolio Manager.
- ❖ Utility CISs are organized around meters and accounts, not around individual buildings. This makes it very difficult for utilities to seamlessly provide energy use information for Portfolio Manager, identify buildings that could qualify to be benchmarked by customers, and set and assess progress towards goals related to the numbers of buildings that have been, or could be, benchmarked.
- ❖ Defining a "customer" for purposes of benchmarking and tracking progress toward goals is not a simple matter. The customer of record may not be the individual or organization that owns the facility, the facility manager may also not work for the same organization as the building owner, and a vendor may conduct the actual building benchmarking.
- **Recommendation:** Since utilities cannot use Portfolio Manager to benchmark on behalf of a customer, and this was not taken into consideration when the goals for buildings benchmarked by the end of 2012 were adopted, the CPUC may wish to consider relaxing the goals for buildings benchmarked that were set for the utilities.

### 7.9.2.3 Opportunities for Improving Initiative Implementation/Assistance/Services

- ❖ A variety of ideas were offered by interviewees and survey respondents for improving implementation and assistance or services to increase the likelihood of benchmarking. Among other ideas, these include utilities taking a more involved approach to ensuring that customers capture all meter data and accurately input other characteristics for buildings they benchmark both to help alleviate the impediments created by data privacy issues and improve the quality of scores and EUIs; encouraging the use of asset ratings and of California-specific benchmarking tools in addition to Portfolio Manager; and increasing customer awareness of benchmarking.

#### **Recommendations:**

- To help increase interest in the workshops among building types that are less frequently benchmarked with Portfolio Manager, the IOUs may wish to consider hosting more facility- or industry-specific workshops.
- The IOUs may wish to explore what, if any, additional information, financial assistance, or other assistance could be provided through the initiatives to help customers benchmark.
- The IOUs may wish to explore ways to work more pro-actively with customers to identify and upload meters for multi-tenant buildings and ensure that facility attributes required by Portfolio Manager are accurate and complete. One example of such an approach is that of Commonwealth Edison.
- If they have not already done so, utilities would benefit from sharing information with each other resulting from their investigations of or experiences with possible approaches to facilitate benchmarking of multi-tenant buildings under existing privacy requirements.

- As benchmarking data become publicly available or available through the utilities' local government programs, utilities could consider the possibility of using these data to identify the highest and lowest performers across the cities and provide targeted support, perhaps as part of local government partnership programs. The utilities could also use data available via ABS and proxy benchmarking to do this internally for marketing and sales. This could help improve the delivery and effectiveness of utility commercial programs.
- A better understanding of the market for benchmarking could help in determining how best to expand the use of Portfolio Manager outside of office and municipal buildings, tailoring marketing communications to different customer types or local situations. Given the degree of information from workshops and from utility ABSs about initiative participants, and the importance of understanding the market for benchmarking in light of the state's interest in this approach to energy efficiency, the CPUC may want to consider conducting a market segmentation study for benchmarking in the future.<sup>115</sup>
- Utilities may wish to increase consumer awareness of benchmarking by judiciously expanding both the range of marketing channels used and their marketing budgets. To increase awareness and encourage greater use of benchmarking they may also wish to increase engagement with industry associations of companies that own and operate commercial buildings, and reach out to associations representing industries that use buildings that can be benchmarked with Portfolio Manager.
- The benchmark score in itself does not provide guidance on actions that could help improve a building's energy use. Other than informing workshop registrants what utility programs are available to them as part of workshops,<sup>116</sup> the initiatives generally lack any other mechanism to provide customers with the information they need—and appear to want—to get to the next step of identifying opportunities within a building. The utilities may wish to give further thought to the initiative design to help customers get the most from utility benchmarking support.
- Articulating the initiative theory and laying it out in the form of a logic model could help in identifying each of the customer segments that use, or could benefit from, benchmarking. It could also clarify ways to maximize the initiatives' abilities to reach each segment, and help in identifying meaningful progress indicators that can be measured efficiently. Given the similarities among the utilities' efforts, and the fact that some of the audiences for benchmarking have buildings in multiple service territories, the utilities may wish to work together to articulate a common initiative theory and develop a common logic model that may then be adapted for each utility's circumstances and goals.
- Incentives could in theory be offered to encourage customers to benchmark and to share their benchmarking data. The CPUC and IOUs may wish to explore how incentives might be used to encourage benchmarking, and examine whether it is desirable or appropriate to do so given that no savings are claimed from benchmarking.

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<sup>115</sup> (A full-blown market segmentation was outside of the scope of this study.)

<sup>116</sup> The "Benchmarking—What's Next?" advanced workshop provides information to customers about both possible actions to perform and available utility programs.

- Utilities are already leveraging billing data to develop proxy scores which are intended to encourage customers to benchmark their buildings. However, currently it is not possible to calculate proxy scores for all commercial customers, nor is the score for a particular building necessarily available to all customers in the building. Utilities could explore ways to improve how building energy use data are communicated in monthly bills, so as to encourage customers to benchmark their buildings with Portfolio Manager and manage their buildings' energy use—or in the case of tenants, to request the building owner to do this.
- While benchmarking with Portfolio Manager is part of some commercial offerings for some of the utilities, for the most part the connection between the benchmarking and a utility's other programs is made primarily through the information about other utility programs that is included in the workshops. Initiative staff may wish to give some thought to other ways that customers who are benchmarking with Portfolio Manager could be informed about and encouraged to participate in the utility's other commercial programs. Conversely, they also may wish to give some thought to ways that the commercial programs could more actively encourage customers to benchmark with Portfolio Manager, check scores, and manage energy use on a regular basis. Findings on the value of benchmarking, especially in implementing comprehensive building upgrades, may indicate that there could be opportunities to improve whole-building upgrade programs and energy audits through incorporation of benchmarking.
- In addition to more closely integrating benchmarking into the utilities' other commercial programs, there may be opportunities to use the benchmarking activities of customers with buildings in multiple service territories to coordinate the delivery of commercial programs across those service territories. For example, utilities could ask commercial program participants about buildings they have in other service territories, and help to connect these customers with benchmarking support and commercial program staff at the utilities serving these territories. The utilities may wish to explore how they might be able to cross-market benchmarking where appropriate and desirable.

### **7.9.3 Effectiveness of Proxy Benchmarking**

As only one utility, SCE, had begun delivering proxy benchmark scores to customers at the time of this study, this study stops short of answering the question “How effective is proxy benchmarking at encouraging participation in utility programs, more comprehensive retrofits, and better operations and maintenance practices?” As noted in Section 4.5, SCE will continue to deliver proxy scores to customers in 2012, and PG&E expects to begin to deliver scores to customers during this same period.

### **7.9.4 Proxy Benchmarking: Successes, Challenges and Lessons Learned**

#### ***7.9.4.1 Challenges and Observations***

##### **❖ Challenges**

- Utility CISs do not lend themselves to the calculation of proxy benchmark scores.

- Proxy benchmarking won't be viable for all commercial customers.
- Even the "low hanging fruit" of parcels with one building and one customer is challenging to reach.
- Numerical goals may not be attainable by all utilities even using a proxy approach.
- Multi-tenant buildings may not be viable proxy benchmark candidates.

❖ **Observations**

- The primary benefit of the proxy benchmark scores is likely to be building awareness of benchmarking and related tools among the recipients. Internal use as marketing and sales data is another potential benefit.
- While the proxy scores could motivate some customers to benchmark their buildings, they could also demotivate others.

- **Recommendation:** Utilities sending out proxy scores should make it clear to recipients that Portfolio Manager will give them a more accurate score, and that it is likely to vary from the proxy score.

#### ***7.9.4.2 Successes***

- ❖ SCE has managed to develop a methodology by which to calculate proxy scores for at least a portion of their commercial customers. PG&E is working on a methodology and is expected to deliver scores to customers in 2012.
- ❖ The forthcoming summary of in-depth interviews with proxy score recipients is expected to shed further light on successes associated with the proxy benchmarking approach.

#### ***7.9.4.3 Opportunities for Improvement***

- ❖ Opportunities for improvement of outcomes from the delivery of proxy scores to customers include implementing a delivery strategy designed to increase the likelihood that customers will notice the information and act, such as that developed by SCE; tailoring messages to go with specific ranges of proxy scores or proxy EUIs; and beefing up technical support to prepare for the anticipated increase in benchmarking with Portfolio Manager and utility ABSs if proxy scores succeed in encouraging large numbers of commercial customers to benchmark with Portfolio Manager.

#### **Recommendations:**

- Previous research in benchmarking also suggests that benchmarking may be more effective as a motivator to action in cases where the score is within striking distance of the ENERGY STAR label. In planning for proxy score pilots, utilities may want to consider tailoring the framing of the message about the proxy score to particular score ranges and planning to test differences in outcomes as part of the evaluation of their pilot studies.
- The delivery of the proxy scores should be planned with care to boost response rates over standard direct mail marketing and increase the likelihood that customers will notice the information and act on it.

- The proxy score efforts at the other utilities would be benefited by taking into account the results of SCE's evaluation of the proxy score pilot study.
- Customer usage of technical support is likely to grow as the IOUs make progress toward meeting their benchmarking goals. The IOUs should consider increasing the resources devoted to technical support.

### 7.9.5 Savings from Benchmarking

- ❖ The findings described here provide evidence that there are savings from benchmarking, that a substantial portion of the savings is associated with programs, and that it should be possible to measure the savings. Of participants who said that the benchmark scores or EUIs had a great deal of influence on how their organization manages energy use (8 or more on a scale of 0 to 10), 28% reported that since benchmarking they have monitored controls more frequently, 25% had identified areas or buildings for reducing energy use, 21% had participated in energy efficiency programs, and 13% had implemented automated controls. Of participants who said the benchmark scores or EUIs were very important (8 or more on a scale of 0 to 10) to their decisions to make energy efficiency improvements in the buildings benchmarked, 100% had added an energy management system or controls to one or more buildings or areas of buildings, 97% each had upgraded lighting or installed HVAC measures, 83% had made energy efficiency changes to motors, and 70% to refrigeration. Seventy-three percent each undertook energy audits or feasibility studies or made behavior changes affecting energy use.
- ❖ Since the participants studied had taken the first step of voluntarily making the decision to participate in the workshops, it is possible that they were already pre-disposed to making energy efficiency improvements. Thus, it may not be possible to extrapolate these results to customers who benchmark but did not volunteer to attend a utility energy efficiency workshop.
- **Recommendation:** Given that this study suggests that savings could result from benchmarking buildings, the CPUC and utilities may wish to further explore the possibility of estimating the savings from measures implemented as a direct result of using the Portfolio Manager tool. These measures may be installed through a utility energy efficiency program or outside a utility energy efficiency program. In both cases, this savings would require a much more detailed investigation of the activities undertaken in a sample of buildings, including establishing causality through investigating the role of benchmarking in the decision-making about these activities, than was possible to do in this study. It would benefit from detailed benchmarking data for each building, if available, and measure information at the individual building level, rather than in the aggregate as was requested in the participant survey. The CPUC may also wish to commission the development of a battery of questions for use in evaluations of commercial energy efficiency programs to assess the influence of benchmarking with Portfolio Manager on the decision to install rebated measures.

## 7.10 Evaluability Assessment

This section addresses the following researchable needs or questions:

- 2) Perform evaluability assessment
    - a) Review and assess available benchmarking data and performance metrics to answer the research questions:
      - i) What benchmarking data is available for analysis by CPUC evaluation teams? Could this be improved, and how?
      - ii) Assess what primary data should be collected to address the questions:
        - (1) What is the potential of benchmarking as a tool to track progress of building energy use intensities over time, for tracking of energy efficiency potentials, or serving as market effects indicators? What performance metrics would be useful to track for benchmarking implementation?
        - (2) In anticipation of building labeling, are there some parameters that should be gathered and tracked?
- ❖ There was not as much benchmarking data as originally anticipated available for analysis by the evaluation team. The reasons for this include that the utilities were not readily able—or not able at all—to connect building-level utility ABS data to customer data at the meter level; two of the four utilities currently gather minimal information through their ABSs; and most utilities collect only very limited data for initiative tracking.
  - ❖ One set of utility ABS data, from PG&E, was complete enough to warrant analysis. The data set included a much higher percentage of very low (1) and very high (80-100) scores than would normally be expected. This caused the team to question the validity and usefulness of these data for tracking benchmarking progress.
  - ❖ Interviews with initiative staff and EPA revealed that Portfolio Manager and utility ABSs both lack mechanisms to ensure the readiness of benchmarking data for analysis. Until this is resolved, the only benchmarking data likely to be worth analyzing are those of ENERGY STAR certified buildings. These data are unavailable for analysis from EPA because of promises of confidentiality made by EPA to users of Portfolio Manager. The research identified a number of ways that the quality of benchmarking data that might in future become available from the IOUs for analysis by the CPUC's evaluators could be improved. These are described in the Recommendations for this section.
  - ❖ The team identified a prioritized listing of utility ABS variables that should be technically feasible for all utilities to track. Three impediments would need to be addressed for coordinated tracking of selected ABS data by utilities to happen. (1) Some of the utilities' ABS on-line Terms and Conditions of Use would need to be modified to allow the utilities to capture the data that flows through their ABSs and share these data with the CPUC for evaluation purposes. (2) The utilities would need to devote the IT resources to enable tracking. (3) Assuming that the first two impediments are addressed, the utilities would then need to agree on which variables to track.



- ❖ The CPUC or IOUs may wish to explore, with providers of benchmarking and billing services such as AdvantageIQ and Siemens, the possibility of obtaining information about the number of buildings benchmarked in the state, and include this information in tracking progress toward goals.
- ❖ Given the data quality challenges found with the scores and EUIs available from utility ABSs, at the current time the data produced every six months to one year by EPA ENERGY STAR appear to be the most reliable and readily available sources of information for developing market effects indicators for building benchmarking. However, due to the confidentiality that EPA promises users of Portfolio Manager, these data do not include average EUI or score for each building type by state, which severely limits their usefulness for tracking of changes over time in the EUIs of different types of California buildings.
- ❖ The evaluation team identified a number of possible initiative performance metrics not currently tracked that may be readily available to the IOUs, or be relatively simple to collect and track over time through survey research. These are listed in the recommendations for this section.
- ❖ Of the original research questions listed in Section 1.4, numbers 11 through 13 could not be answered with the data available:
  - 11. Review the algorithms for estimating savings associated with the use of Portfolio Manager.
  - 12. Research how customers can access benchmarking data without disclosing specific and confidential customer data.
  - 13. Research whether public access to benchmarking data increases program participation and energy efficiency.

**Recommendations:**

- The limited ABS data currently collected by utilities could be made more useful for initiative and market progress tracking by expanding what is collected by each of the utilities. Some potential items for tracking are listed in Section 6.5, Table 6-1. Modifications would be required to the IOUs' ABS Terms and Conditions of Use to allow all the utilities to gather data via ABS and provide these data to the CPUC for evaluation purposes. The CPUC and IOUs may wish to work together to facilitate development by the IOUs of consistent Terms and Conditions of Use that meet CPUC needs for evaluation data, and to prioritize indicators to use for tracking initiative progress and progress toward the state's broader goals for benchmarking. Whether to require utilities to revamp their ABSs or CISs to enable tracking of specific indicators across all utilities is a policy decision that the CPUC may also wish to consider.
- One possible approach to the benchmarking data quality issues described here that may be worth investigation is a modification to Portfolio Manager to enable users to indicate if all the meters known to be associated with the building, and all the facility's attributes, had successfully been entered. If technically feasible, such a modification should have the



potential to render the score and EUI data worthy of analysis and use in market progress and initiative tracking, tracking of energy efficiency potentials, and tracking associated with AB 1103. The CPUC and IOUs may wish to explore with EPA the possibility of EPA's making such a modification to Portfolio Manager.

- The CPUC and IOUs may wish to explore the possibility of conducting more research to gather data on the EUIs and other characteristics of different types of buildings in California, and supporting similar national efforts to do so. This could include investigation of how many buildings have energy consumption data needs that do not come from a utility, for example on-site generation or meters that serve multiple buildings and therefore require sub-metering. Such research would help with tracking changes over time in the EUIs of different types of California buildings, and with comparing average California scores and EUIs for each building type against those of other states.
- The CPUC and IOUs may wish to explore the possibility of tracking the following indicators for the purposes of tracking initiative performance, benchmarking progress across the state, or both:
  1. The number of buildings by type that customers attempt to benchmark each year.
  2. Data collected from workshop registrants via the registration forms and workshop evaluations, including the number, type, and area of buildings to be benchmarked and energy efficiency activity in the building(s) in the prior three years.
  3. Awareness of benchmarking.
  4. Self-reported frequency of score monitoring and re-benchmarking.

## 7.11 Suggestions for Future Research

A variety of suggestions for future research were offered in various recommendations throughout this report. These are copied below to facilitate consideration.

Research to facilitate progress tracking or to meet future initiative evaluation needs:

- In planning for initiative tracking and future evaluation, the CPUC or IOUs may want to consider fielding a survey designed specifically to understand progress made on benchmarking by non-participants. The evaluation team's experience is that non-participants are a much more difficult group to recruit for a survey than participants. This is due to the fact that frequently only the name and phone number of a corporation, rather than an individual contact, is available from the CIS for customers who have not participated in a utility workshop or program, and that benchmarking is a topic of low salience outside of workshop participants. Any study focusing on surveying non-participants will need to be carefully designed to boost response rates under these circumstances.
- Awareness of benchmarking among non-participants is relatively simple to measure via survey research and could be a useful a progress indicator for the utilities' benchmarking initiatives.

- Like awareness, understanding of benchmarking among non-participants is simple to measure via survey research and could be a useful a progress indicator for the utilities' benchmarking initiatives.

Research to improve initiative performance or better understand outcomes from building benchmarking:

- Given that this study suggests that savings could result from benchmarking, the CPUC and utilities may wish to further explore the possibility of estimating the spillover-like savings associated with the use of the Portfolio Manager tool. This would most likely require a much more detailed investigation of the activities undertaken in a sample of buildings, and the role of benchmarking in the decision-making about these activities, than was possible to do in this study. Detailed benchmarking data for each building, if available, and measure information at the individual building level would be beneficial.
- The CPUC and IOUs may wish to explore the possibility of conducting more research to gather data on the EUIs and other characteristics of different types of buildings in California, and supporting similar national efforts to do so. This could include investigation of how many buildings have energy consumption data needs that do not come from a utility, for example on-site generation or meters that serve multiple buildings and therefore require sub-metering. Such research would help with tracking changes over time in the EUIs of different types of California buildings, and with comparing average California scores and EUIs for each building type against those of other states.

Given the degree of data available from utility ABSs at the time of the study and the importance of understanding the market for benchmarking in light of the state's interest in this approach to energy efficiency, the CPUC may want to consider conducting a market segmentation study for benchmarking in the future.

## Appendix A References

For this report, we reviewed the following documents.

1. Barr, A., D. Mahone, T. Silver-Pell, T. Narel, and M. Brook. 2010. "Benchmarking California's Buildings: Lessons Learned on the Road to Energy Use Disclosure." In *Proceedings of the ACEEE 2010 Summer Study on Energy Efficiency in Buildings*, Pacific Grove, CA, August. Accessed February 14, 2012 from <http://eec.ucdavis.edu/ACEEE/2010/data/papers/2061.pdf>.
2. Costa, D.L., and M.E. Kahn. 2010. "Energy Conservation 'Nudges' and Environmentalist Ideology: Evidence from a Randomized Residential Electricity Field Experiment." NBER Working Paper 15939, April. Accessed February 14, 2012 from <http://papers.nber.org/papers/w15939>.
3. Dillman, Don A. 2000. *Mail and Internet Surveys: The Tailored Design Method*. New York: John Wiley & Sons, Inc.
4. Dunskey, Phillipe, Jeff Lindberg, Eminé Piyalé-Sheard and Richard Faesy. 2009. "Valuing Building Energy Efficiency Through Disclosure And Upgrade Policies: A Roadmap For The Northeast U.S." November. A Dunskey Energy Consulting report in collaboration with Vermont Energy Investment Corporation for Northeast Energy Efficiency Partnerships. Accessed January 14, 2012 from [http://neep.org/uploads/policy/NEEP\\_BER\\_Report\\_12.14.09.pdf](http://neep.org/uploads/policy/NEEP_BER_Report_12.14.09.pdf).
5. Guevarra, Leslie. "SF Requires Energy Audits, Benchmarking for Commercial Buildings." *Greenbiz.com*, Accessed February 10, 2011, <http://www.greenbiz.com/news/2011/02/10/sf-requires-energy-audits-benchmarking-commercial-buildings>
6. Lisauskas, Sara. 2011. "Building Energy Rating Systems: Operational Ratings." Presentation made at the AESP-NEEC Annual Conference, Westborough, MA, November.
7. Lowenberger, Amanda, Jennifer Amann, Adam Hinge, and Kim Lenihan. 2010. "What Drives Energy Performance Scores: Benchmarking NYC High Rise Building Stock." *Proceedings of the ACEEE 2010 Summer Study on Energy Efficiency in Buildings*, Pacific Grove, CA, August. Accessed February 14, 2012 from <http://www.aceee.org/proceedings-paper/ss10/panel03/paper15>.
8. Mathew, Paul, Robert Clear, Kevin Kircher, Tom Webster, Kwang Ho Lee, and Tyler Hoyt. 2010. "Advanced Benchmarking for Complex Building Types: Laboratories as an Exemplar." In *Proceedings of the ACEEE 2010 Summer Study on Energy Efficiency in Buildings*, Pacific Grove, CA, August. Accessed February 14, 2012 from <http://eec.ucdavis.edu/ACEEE/2010/data/papers/2004.pdf>.
9. Pande, Abhijeet, Ryan Schmidt, Douglas Mahone, Edward DeBellevue and Peter Turnbull. 2010. "Breaking Market Barriers to Major Demand Side Management Investments in a Large Financial Institutions." In *Proceedings of the ACEEE 2010*

- Summer Study on Energy Efficiency in Buildings*, Pacific Grove, CA, August. Accessed February 14, 2012 from <http://eec.ucdavis.edu/ACEEE/2010/data/papers/2046.pdf>.
10. Sarno, Carolyn. 2011. "Building Energy Rating." Presentation made at AESP-NEEC Annual Conference, Westborough, MA, November.
  11. Sharp, T. "An Advanced Building Energy Performance Rating System for the State of California." Oak Ridge National Laboratory, August 29, 2010, DRAFT.
  12. Sullivan, Michael J. "Behavioral Assumptions Underlying Energy Efficiency Programs for Businesses." California Institute for Energy and Environment. January 2009. Accessed October 18, 2011, [http://fscgroup.com/news/Behavioral\\_Assumptions\\_Underlying\\_Energy\\_Efficiency\\_Programs\\_for\\_Business.pdf](http://fscgroup.com/news/Behavioral_Assumptions_Underlying_Energy_Efficiency_Programs_for_Business.pdf).
  13. Vaidya, Rohit, Arlis Reynolds, Gail Azulay, David Barclay, and Betty Tolkin. 2009. "Energy STAR Portfolio Manager and utility benchmarking programs: Effectiveness as a Conduit to Utility Energy Efficiency Programs." *In Proceedings of the 2009 International Energy Program Evaluation Conference*, Portland, Oregon. Accessed January 26, 2012, <http://www.iepec.org/2009PapersTOC/papers/084.pdf#page=1>.
  14. US EPA. 2012. Energy Star Portfolio Manager. Accessed February 14, 2012 from [http://www.energystar.gov/index.cfm?c=guidelines.guidelines\\_index](http://www.energystar.gov/index.cfm?c=guidelines.guidelines_index).
  15. Criteria for Rating Building Energy Performance: Operating Characteristics Portfolio, updated March, 2011. Accessed February 14, 2012 from [http://www.energystar.gov/ia/business/evaluate\\_performance/OperatingCharacteristics.pdf](http://www.energystar.gov/ia/business/evaluate_performance/OperatingCharacteristics.pdf).
  16. PORTFOLIO MANAGER Quick reference Guide. [http://www.energystar.gov/ia/business/downloads/PM\\_QuickRefGuide.pdf](http://www.energystar.gov/ia/business/downloads/PM_QuickRefGuide.pdf).
  17. Automated Benchmarking System Design Overview, Version 3.4. Accessed February 14, 2012 from <https://www.energystar.gov/istar/has/>.
  18. "ENERGY STAR® Snapshot: Measuring Progress in the Commercial and Industrial Sectors." Accessed December 7, 2011 from [http://www.energystar.gov/index.cfm?c=business.bus\\_energy\\_star\\_snapshot](http://www.energystar.gov/index.cfm?c=business.bus_energy_star_snapshot).
  19. Comparison of Commercial Building Energy Rating and Disclosure Policies, IMT and BuildingRating.org. Accessed February 14, 2012 from [http://www.buildingrating.org/sites/default/files/documents/Commercial\\_Benchmarking\\_Policy\\_Matrix.pdf](http://www.buildingrating.org/sites/default/files/documents/Commercial_Benchmarking_Policy_Matrix.pdf).
  20. ENERGY STAR Performance ratings – Technical Methodology, U.S. Environmental Protection Agency. March 2011. Accessed September, 2011. [http://www.energystar.gov/ia/business/evaluate\\_performance/General\\_Overview\\_tech\\_methodology.pdf](http://www.energystar.gov/ia/business/evaluate_performance/General_Overview_tech_methodology.pdf).