

Multifamily Audit Tool Technology & Program Needs Assessment

Final Report

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Executive Summary

This report describes an assessment of software tools that can be used to evaluate and improve the energy efficiency of multifamily properties. The report provides a detailed examination of specific software tools and categories of tools while also examining their role in facilitating energy management project processes.

The multifamily property segment is a complex blend of residential and non-residential market elements. This market segment can benefit from online software resources similar to those that are available to the broader market but also requires software solutions that target specific elements of its diverse needs.

This report explores a utility-focused approach to better identify, and provide appropriate resources for, specific online multifamily users. It evaluates software solutions that help address the complexity of the market while taking advantage of the availability and functionality of existing software tools. While existing software tools provide a basis for meeting the segment's needs, additional software development and enhancement will also be required.

While this report focuses on the organization of the utility multifamily online services, it also takes into account other utility and non-utility resources to provide a vision for an integrated utility approach. This integrated approach will provide services to even the most basic user associated with a multifamily property while guiding more sophisticated users to advanced resources.

Of the dozens of software tools explored in the context of this report, a few have risen to the top. The consensus among the evaluation team and program stakeholders is that these few "top tools," in addition to newly designed solutions, can best meet the needs of the various members of this market.

The following key recommendations are further explored in this document:

1. Enhance and develop Southern California Edison's Energy Advisor software tool, a component of the Universal Audit Tool; specifically:
 - Enhance the existing Home Energy Advisor software to better serve tenants
 - Develop a new Multifamily Property Energy Advisor software tool to better serve single property owners
2. Develop a multifamily Property Owner Portfolio process
3. Enhance integration with ENERGY STAR® Portfolio Manager

Report Background

A number of valuable statewide coordination efforts and market reports exist that add perspective on needs and characteristics of the multifamily market. These resources augment Southern California Edison's (SCE) direct market knowledge gained through the implementation of energy management programs. Motivated by recent market and regulatory changes, SCE commissioned this report that specifically evaluates online and stand-alone multifamily software tools.

A subset of the changes that motivated this report includes:

- The American Recovery and Reinvestment Act of 2009 (ARRA) funded non-utility program activity in the residential and multifamily market sectors and was supported by distinct software tools. After the ARRA period concluded, there was interest in better understanding the functionality offered by these tools and their role in the delivery of ongoing multifamily services.
- The Home Energy Rating System (HERS) program originated in the residential new construction market segment but expanded to serve existing buildings. More robust multifamily property procedures are in development though the opportunity to share data or software infrastructure was not well understood.

- Software as a service (SaaS) products developed by private sector firms and directly marketed to segment actors entered the market and offered an unknown range of services.
- Regulatory direction for the Universal Energy Audit Tool required development of a multifamily module.
- The utility role of a single point of contact to help multifamily customers navigate program services was developed by the utility.

In addition to providing perspective on the implications of these changes, SCE specifically wished to better understand how online services might be more effective in serving both small and large multifamily properties.

Report Process

The early stages of this research project included review of existing documentation, interviews with SCE program managers, and an initial examination of audit and benchmarking software options. These initial discussions centered on gaining an understanding of the various features and capabilities of the software tools that might be of interest.

Another of the early efforts was to understand the scope of the research project by considering and documenting the following set of researchable questions that established the study's focus.

- 1) Property size and target tenants:
 - a. What are the MF-audit tool needs for different size property owners/managers?
 - b. What is the role of HERS Raters and their tools in the context of multi-family market?
 - c. Who will actually use this tool?
 - d. How would they use this tool and why? What are the benefits for them?
- 2) Scope of the tool, needs, and configuration options for multi-family property owners and managers
 - a. Is this an energy audit tool or is this a energy usage monitoring tool?
 - b. What are the EE/DR/Solar/IDSM, etc. needs?
 - c. What are the data and IT needs to support benchmarking interfaces to meet requirements and to evolve with requirements?
 - d. Can these capabilities be configurable in a single tool? If yes, how? If not, how can the various tools with these capabilities be integrated in to a useful toolbox?
 - e. How can this tool help property owners/managers prioritize their investment and/or rank the expected returns on the investment?
- 3) What are the available MF-tools in the market place, including the ARRA funded Compass Multi-Family Portfolio Tracker and recently released HERS Rater tool?
 - a. What tools are available commercially? How do they work? What do they support?
 - b. How would the ARRA funded MF-audit tool compare against these commercially available products?
- 4) How can customer needs be matched to available capabilities?
 - a. Can the available capabilities meet the needs, specifically of low income properties? of large and diverse properties? of HERS Raters? What is their role and how do they fit in this?
 - b. What are the gaps? Which gap needs to be filled?
 - c. When can we make these capabilities available?

Appendix A: The Researchable Questions provides complete details and findings for these questions.

Throughout this project, the evaluation team has worked closely with SCE program managers to construct an initial project plan and to identify existing resources that could help inform the plan and assessment processes.

The research process did not proceed down a direct path to a single solution; and when we began this project, there were a fair number of unknowns. The early phases involved identifying possible roadblocks to our process and understanding the numerous challenges to our evaluation. This project was marked by a series of coordination meetings with the evaluation team and SCE, periodic draft and final status reports that represented project deliverables, which led to feedback and guidance on how to proceed. The scheduled meetings with the SCE program and evaluation teams helped to develop and refine the scope and design of the research project, and included reviewing and revising the Work Plan and researchable questions with the intention of fashioning the work to meet the needs of project stakeholders. This direct contact provided ongoing feedback, opportunities to take stock of where we were in the research process, examine our original path, make mid-course corrections, or pause to take time to digest and assess our discoveries and adjust our strategy as needed.

An example of how a change of course and focus was warranted involves the need for specific tools for multifamily property owners. While the initial research focused primarily on serving whole building single property and property portfolio owners, the California Public Utilities Commission Energy Division also emphasized the need for simplified and user-friendly self-help tools targeted to common-area assessments for multifamily property managers and owners. The evaluation team subsequently shifted focus and worked towards developing recommendations that would provide a path for multifamily properties to initially acquire easily accessible and actionable information and, as necessary, progress to more comprehensive analysis.

After reviewing previously completed studies, the evaluation team conducted interviews with SCE stakeholders to identify current and desired software functionality from the utility perspective. This was followed by an investigation into actual ARRA and market software tools.

The evaluation team and SCE reviewed several software tools—some were demonstrated in a webinar format, others through telephone interviews. Additionally, some tools were reviewed using online demonstrations, including the Performance Systems Development, Energy Benchmarking Tool for Multifamily and Commercial Buildings (Compass) and EnergyScoreCards software tools.

The evaluation team interviewed utility personnel in initial information gathering on the ENERGY STAR Portfolio Manager and the online Business Energy Advisor, which is an SCE component of the Universal Audit Tool. The evaluation team also interviewed Home Energy Rating System (HERS) Providers and Raters for an initial understanding of the HERS multifamily audit landscape.

This initial tool research reached the following conclusions:

- No single tool can meet all of the desired objectives
- Access to energy usage data is a key barrier
- Benchmarking is a key process step

With this in mind, the evaluation team analyzed the collection of tools that would meet the objectives and explored the interaction between the potential offerings.

Recommendations

The recommendations that the evaluation team developed are responsive to regulatory and energy management programmatic objectives. The recommendations include both developments of new software as well as enhancements to existing software functionality.

The evaluation team envisions enhancements to the SCE website landing page designed specifically for multifamily users, which will direct users to tools that will meet their individual needs. Specifically, those users in search of self-help tools with accessible information will be directed to Energy Advisor software tools while more comprehensive support will be provided through a programmatic process that is introduced in the table below and described in detail in the body of this report.

Figure 1 illustrates how there are several user segments whose needs are addressed by varying primary software tools. These tools will be accessed via program interfaces and will result in outcomes targeted to the user segments. (Items in bold in the table below are the specific recommendations and are described below.)

User Segment	Primary Tool	Program Interface	Outcome or Results; Comments
MF tenants	Residential Universal Audit Tool (UAT) Module – home-owner configuration Enhanced Home Energy Advisor to better serve MF tenants	Home Energy Advisor (existing software)	Survey with suggestions for low- or no-cost actions for hardware and behavior; on-going engagement
MF property owners (common area)	Property Owner UAT Module	MF Property Owner Energy Advisor (new software)	Recommendations based on data input; multi-tenant usage data unavailable
MF property owners (comprehensive)	ENERGY STAR Portfolio Manager using property-level data (DOE)	MF Property Owner Portfolio Process (program process)	Identifies appropriate software and program resources based on project needs
Utility consultants, contractors, HERS Raters	Standard available software tools (e.g., eQuest, EnergyPro, etc. energy and financial analysis, tracking)	EUC-MF add-on program service (for fee) to support energy audit, modeling, etc.	Detailed facility analysis; strategy for upgrades, change of energy use patterns, etc.
Small commercial businesses	Commercial UAT by segment	Business Energy Advisor (existing software)	Recommendations based on data input

Figure 1: Recommendations for multifamily energy efficiency software tools

Home Owner Energy Advisor

While the existing Home Energy Advisor software tool takes into consideration occupants (i.e., tenants and renters) of multifamily property units, the evaluation team envisions refinements to better tailor the user experience for different subsets of this user group. Occupants may bring different perspectives depending on whether they are a renter or an owner, and the software solution can be refined to better capitalize on these distinction. By tailoring the specific message to a specific user, the utility can better engage the user in the efficiency conversation to motivate behavioral, low- or no-cost measures, or equipment investments.

MF Property Owner Energy Advisor

To better engage multifamily property owners as a specific target group, the evaluation team recommends developing a new MF Property Owner Energy Advisor tool as an additional offering similar to that of the existing Business Energy Advisor and Home Energy Advisor tools.

The Energy Advisor series of software tools is designed to provide accessible information to online users in a self-help format.

This new software tool in the Energy Advisor series would focus on serving a single property and would provide information on specific common-area measures appropriate for multifamily properties such as pool pumps, on-site laundry, and parking lot lighting. The tool would primarily be designed to meet the immediate needs of a casual user (e.g., the multifamily property owner or manager) while striving to show the possible benefits of a comprehensive strategy of energy efficiency upgrades.

MF Property Owner Portfolio Process

While the Energy Advisor series of tools can provide a vehicle for initial customer engagement, the evaluation team envisions the design and implementation of a multifamily property owner portfolio process that would serve to guide participants through the complexity and variation that is seen in the multifamily market. Even prior to this report, SCE program staff showed strong interest in mobilizing in this direction.

This process is facilitated by a knowledgeable utility single point of contact¹ to help lead users to appropriate software and program resources. Key to this process is the concept of benchmarking as it can help property owners better understand their energy consumption and prioritize upgrade activities across multiple properties.

The utility single point of contact can better guide the property owner through the additional project process steps by directing them to programmatic resources as well as appropriate fee-for-service offerings such as software as a service (SaaS) tools, HERS Raters, or additional applicable services.

ENERGY STAR Portfolio Manager

ENERGY STAR Portfolio Manager is a well-known and respected industry-leading online energy management tool. This interactive software lets MF property owners and managers measure and track energy consumption and costs for a single building or multiple buildings and is available to users nationwide at no cost. By benchmarking properties, users can better identify and begin to address energy management opportunities whether they occur at a single building or across a number of represented properties.

Although at this time this software does not provide an ENERGY STAR Energy Performance Score (a 1-100 building rating score) for multifamily properties as it can for individual commercial buildings, it is able to provide performance metrics including weather-normalized energy use intensity (EUI). At the time of this report, this software recently completed an upgrade to make it more user-friendly and to enhance the tool's features.

The evaluation team's recommendation is to use ENERGY STAR Portfolio Manager to benchmark multifamily properties because of established working relationships between ENERGY STAR and existing utility processes. Of

¹ The role of the single point of contact was highlighted in the Southern California Edison 2013-2014 Energy Efficiency Program Implementation Plans, January 2013, in the description of the "Energy Upgrade California Multifamily Path."

particular interest to this study is ENERGY STAR Portfolio Manager ability to provide a framework for managing customer privacy considerations as well as data aggregation barriers.

Advantages to using ENERGY STAR Portfolio Manager include the availability of a no-cost framework to address complex requirements of multi-meter, multi-account holder buildings and a standardized platform that facilitate sharing customer data with third parties. Using this tool, the utility may receive information on property characteristics and can avoid significant revisions or upgrades to currently available utility software tools.

Report Structure

This report provides a detailed look at specific software tools and categories of tools while also examining the role of those tools in helping to facilitate energy management projects. The evaluation of software tools takes into account the complex market landscape.

The report is divided into five major sections:

- Multifamily Market Segment Observations – understanding the multifamily market segment, managing energy use data, and the importance of benchmarking
- Software Tool Types and Program Integration – a discussion of the different types of software tools and how they are used to provide actionable information to improve facility efficiency
- Market Summary – a description of market roles and available utility and non-utility program resources
- Recommendations – a discussion of the specific recommendations by the evaluation team
- Appendices

For readers that may be less familiar with the multifamily market space, including more recent developments such as the utility single point of contact, we recommend an initial review of the Market Summary section of the report.

Multifamily Market Segment Observations

The multifamily market segment must contend with barriers and embrace opportunities. In the context of a unique and diverse market segment, an essential consideration is managing energy use data and providing benchmarking capabilities.

Unique and Diverse Market Segment

In making services available for the entire multifamily market segment, the utility is charged with serving a broad group of actors. The responsibility of specific owners or managers can include any combination of property size and total number of properties. The two extremes are represented by the owner of a small single property with only a few tenants, and the professional manager of a large property portfolio of buildings.

Whether representative of a small or large total footprint, these property owners and managers often need assistance in assessing a unique measure mix that may not apply to traditional residential or commercial customers.

These various measures can include coin operated clothes washers and dryers, swimming pool pumps, domestic water heating, and space heating and cooling among others. The services offered must accommodate this unique measure mix and enable both self-guided and professionally managed energy management projects.

One of the challenges of this study was to gain an understanding regarding the complexity of all of the players who have interest in this topic, who might be potential users of the auditing and benchmarking software tools or may have interest in the outcomes derived from using them.

In addition to the multifamily property owners and tenants, there are other players from many organizations with differing functions and roles. Some examples include the contributing utilities that have program designers and implementers and have measurement and evaluation interests; consultants and contractors, including auditors, analysts, equipment vendors, builders, and more. In addition, providers of project financial support, such as lenders, the utilities, and regional energy networks (RENs) also are involved.

Managing Energy Usage Data

To make better energy efficiency decisions, property owners need a clear understanding as to exactly how energy is being used at their facilities. Obtaining and analyzing utility customer energy usage data is essential to this process but managing its acquisition, flow, and retention is a challenging proposition. Some online tools allow customer data to be manually entered by users. While this can be a useful alternative for self-help software used for projects with a small scope or a limited number of utility meters, it proves inadequate in more complex scenarios.

In the multifamily segment, energy advocates must overcome the barrier of securing and organizing confidential customer energy usage data. They must first associate multiple meters to a specific property and then secure actual energy use consumption for each of those individual meters. While Figure 2 on the next page helps visualize the nature of this challenge, it is important to note that this consideration can extend to the management of hundreds if not thousands of unit meters per property.

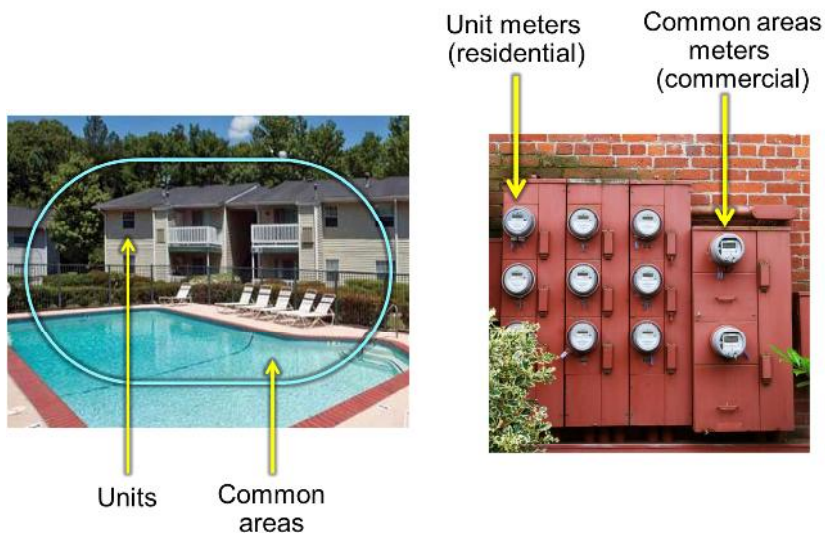


Figure 2: Multiple accounts with multiple customers of record per property

Data records maintained by the utility do not currently include building designations and the utility cannot easily or automatically provide data for a multi-meter building. This requires an energy advocate familiar with the property to associate specific meters with the specific property. Further in a multifamily property, it is rare that the owner or manager is the account holder for all of the common area and unit meters that serve a given property. Most often there are multiple utility customers, each protected by customer privacy policy, associated with any given multifamily property. To overcome the privacy barrier and gain access to meter data, the energy advocate must use Customer Information Standard Request (CISR) forms or Rule 15 /15 as data release mechanisms. Once this is accomplished, a database structure must also be available to document the findings, house the data, and operate within privacy constraints.

Releasing Customer Usage Data

The following methods for releasing customer energy usage data were considered:

- CISR form
- Rule 15/15

Customer Information Standardized Request (CISR)

The Customer Information Standardized Request (CISR) form is a document that gives a utility account owner's permission to the utility company to release confidential energy usage data to a specific third party. A sample of this form is found as an appendix to this report. Online the form is also referred to as an "Authorization Form".

In the multifamily environment where there can be a hundred or more individual account holders associated with a property, CISR forms are difficult to use. In order to have a complete picture of the energy use, each individual account holder in a target property must provide a fully executed CISR form.

The benefit of having a complete set of CISR forms for a building is to provide high resolution insight into individual usage or aggregating individual usage information together for building zone analysis (e.g., analysis to compare north side of the building to the south side.) This benefit is not realized with other forms of data release authorization as they rely on aggregating data usage.

CISR forms stay in effect for up to three years, but tenant turnover can be a barrier to data requests later in the effective period because the current account holder is required to provide the completed form. If the original tenant no longer resided in the unit, a new CISR form must be provided to capture the associated meter data.

A typical CISR process for a MF property owner to access usage information might include:

- Owner decides to take action, typically informed by contract or utility representative
- Coordinates with contractor or utility representative
- Obtains CISR form
- Identifies all the account holders in the building
- Executes CISR form with each account holder in the building
- Submits CISR form and gains access to usage information up to twice a year for up to three years if submitting manual requests or as monthly billing data is generated if using automatic benchmarking services associated with ENERGY STAR Portfolio Manager
- Utility validates that CISR forms are available for the requested meters and releases the requested and authorized data

Rule 15/15

Rule 15/15 is a rule² issued by the California Public Utilities Commission Energy Division that states that if a building has fifteen or more accounts and no single account makes up more than fifteen percent of the total energy usage, then the utility can release aggregated building energy usage information. Ideally, this rule will allow for building level energy usage information to be released without needing authorization from account holders (i.e., CISR forms.)

SCE indicated that existing programming logic was in place to make this aggregation of multiple accounts from multiple account holders possible. Other than test cases however, no actual multifamily customers have used this option. Application of this rule for benchmarking purposes would primarily occur through ENERGY STAR Portfolio Manager and a typical process is still being defined.

Storing and Processing the Data

In addition to examining methods for authorizing data release, three methods for storing and processing the acquired data were considered:

- ENERGY STAR Portfolio Manager
- My Account
- Approved utility partner

ENERGY STAR Portfolio Manager

ENERGY STAR Portfolio Manager typically relies on a property energy advocate to establish an ENERGY STAR Portfolio Manager profile for a building. SCE customers that establish a building profile can opt to have monthly usage information for one or more accounts automatically transferred from SCE to ENERGY STAR Portfolio Manager. This is accomplished by populating a list of service account numbers or meter numbers and selecting the SCE web services option in the user's ENERGY STAR Portfolio Manager profile.

Once data is populated into ENERGY STAR Portfolio Manager, access to data can also be made available to additional parties with the user's authorization. That is for those interested users, usage data can be exported to

² CPUC Rulemaking 94-04-031 Decision 97-10-031 October 9, 1997

third party tools like Building Performance Compass or Energy Scorecard thus enabling those SaaS products and the associated higher level of service.

A typical process might include:

- Property energy advocate decides to take action
- Property energy advocate physically collects meter numbers at the meter or is assisted by utility rep to identify meters numbers electronically
- Property energy advocate navigates to ENERGY STAR Portfolio Manager and manually enters meter ID associated with the building into ENERGY STAR Portfolio Manager
- Property energy advocate elects to provide energy usage information to ENERGY STAR Portfolio Manager (using the automated data upload process); as part of this same agreement, agrees to allow SCE access to building profile information in exchange for SCE providing usage data.
- The utility validates the data request, including eligibility under Rule 15/15 or completed CISR forms
- The utility releases energy usage information in aggregate or by meter numbers depending on release procedures
- Property energy advocate can authorize the release of data from ENERGY STAR Portfolio Manager to SaaS providers.

My Account

My Account is a way that SCE account holders, after logging in at Edison's website (sce.com), can gain direct access to their account information. This functionality is intended for the account holder and allows for aggregation of multiple accounts. Because billing and payment information is also available through this site, aggregating accounts from multiple account holders via My Account mechanism is not possible. My Account does not meet the needs of property owners and managers that seek to perform a portfolio or whole building approach because it does not support the typical multifamily scenario where multiple account holders are associated with property unit and common area meters.

When originally engaging in this discussion, it was thought that entering the SCE site through My Account would allow for access to secure account information and access to benchmarking tools without additional logons. This type of logon is not currently available though it is being evaluated by SCE for implementation. Currently an SCE customer is required to logon to each functional site depending on what service is being selected. As an example, account holders are required to logon to access billing and payment functionality and are required to separately logon to access Energy Advisor suite of audit services. If a single log in could be implemented, SCE account holders would have a more seamless transition from SCE core sites to approved utility partner sites such as the Home Energy Advisor and the proposed MF Property Owner Energy Advisor.

Individual account holders do have the ability to export usage and billing information via Green Button functionality but consolidating this information across a large number of account holders would prove administratively burdensome.

SCE indicated that between 35 and 40 percent of eligible service accounts have been activated and of these approximately 40 to 50 percent have accessed the site in the last 90 days.

Approved Utility Partners

Approved Utility Partners are third party actors that the utility has a formal, contracted relationship with to provide customer services. The utility is authorized³ to share customer information that would otherwise be considered private in order to enable the third party to effectively provide customer level services.

Utility Partners that gain access to usage data in this manner are also responsible for maintaining customer privacy. Because of this requirement, Utility Partners are currently best positioned to serve measure and behavioral approaches as opposed to the more complex whole building or portfolio approach efforts. In order to serve the more complex objectives, tools would need to aggregate multiple accounts from multiple account holders according to Rule 15/15 rules or track information release authorizations through properly executed CISR forms. In the software tools reviewed as part of this evaluation, features that provided active management of customer privacy concerns in multi account holder properties were not seen.

Addressing multifamily property privacy considerations may have pure software solutions for Rule 15/15 but would likely require both software and program implementation integration to manage the CISR form process.

Benchmarking Role

From a program implementation perspective, benchmarking is a primary utility interest in serving the multifamily market. Benchmarking within an organization's portfolio of facilities is particularly effective in prioritizing and evaluating projects.⁴ While benchmarking is primarily the responsibility of the customer, it holds a unique role in facilitating energy efficiency projects and success of publicly funded multifamily programs.

Benchmarking can be used to prioritize possible projects and upgrades and to effectively direct program participants to address the poorest performing facilities rather than allocating limited resources equally across multiple facilities. SCE provided an example of a MF property owner with a portfolio of 10 properties and a limited budget for upgrades and repairs of \$100,000. An observed practice is that the owners distribute available funds equally across the properties rather than focusing the available resources to address the poorest performing facilities. This simplified approach to budgeting is more likely to occur when property owners do not have software tools to benchmark the properties. When this budgeting practice does occur, it results in the total available funds being equally distributed at \$10,000 per property. This positions the poorest performing properties on an equal funding level with the best performing properties as opposed to weighting funding levels towards the property with the greatest need.

An example of benchmarking results for multiple facilities is shown below in Figure 3 below. While the results may appear to be a simple output, it provides a powerful tool for marketing and prioritization that can be used in addressing the poorest performing facilities as well as setting goals for a full property portfolio. This process not only better allocates the property owners' resources but also the utility's. Before conducting an energy audit, a preliminary benchmarking analysis that compares the energy use of each building with other similar buildings can serve to determine the priority for which buildings should be audited, and the type of audit that is appropriate.

³ CPUC Rulemaking 08-12-009 Decision 11-07-056 July 28, 2011. http://docs.cpuc.ca.gov/published/FINAL_DECISION/140369.htm

⁴ This concept is also supported in the report "Improving California's Multifamily Buildings: Opportunities and Recommendations for Green Retrofit and Rehab Programs" Findings from the Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee, April 11, 2011.

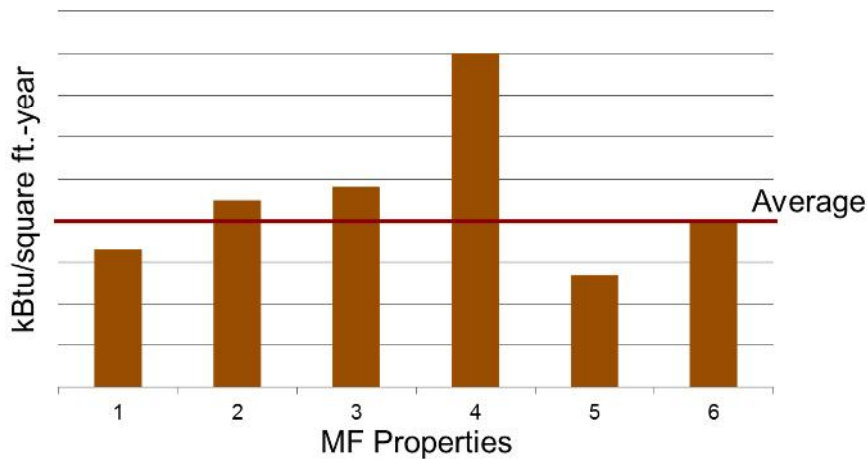


Figure 3: Example benchmarking results for a portfolio of multifamily properties

Benchmarking is also a valuable tool for single property owners in that it provides perspective on their performance relative to their peers or applicable standards. Results can help differentiate properties from competing properties by providing information to attract new or maintain current tenants. This information might appeal to environmental sensibilities of lower carbon footprints or economic realities of lower monthly utility costs. Energy Efficiency Finance Programs are still relatively new but they too can take advantage of benchmarking as a way to justify arguments of reduced risk of default.

Software Tool Types and Program Integration

In looking to potential software solutions, it was necessary to determine the underlying process that needed to be facilitated and the scope of capabilities the new software should support. While multiple stakeholders were motivated to have “audit” tools available for the multifamily market, each stakeholder had a different vision of what was meant by an audit tool. To facilitate the evaluation, specific process steps were identified so that a common understanding of functionality could be understood when reviewing specific software tools.

Through the process of evaluating software tools, it became apparent that there were at least three general categories of tools. A summary matrix of the specific tools that we reviewed is provided at the end of this section with more detailed tool specific information found as an appendix to this report.

Process Steps for Energy Management Projects

Software evaluated as part of this effort is intended to facilitate key process steps that are applicable to energy management projects. These process steps were identified through our review of existing market studies, interviews with SCE program management staff, as well as professional experience. These functional process steps include benchmarking, auditing, energy analysis, financial analysis, and implementation/tracking.

The evaluation team’s review of available software tools showed that no single tool was positioned to meet all the process steps and that multiple tools would be required. This conclusion held true at the software tool level and was further reinforced after considering the objectives of the various potential users. Meeting primary user objectives may include a need for simplified savings calculators for specific equipment, management of broad building portfolios, or whole building analysis. Filling each of these objectives requires a unique functionality in one or more of the identified process steps.

The requirements pointed to the need for a range of tools from self-help formats that require no previous familiarity with the software, up to and including professional grade software packages that require high levels of familiarity and training. While self-help tools offer accessibility of simplified information to a broad group, professional grade software packages offer very detailed site or property portfolio analysis.

Figure 4 outlines the identified process steps. Self-help tools provide simplified introduction to many of the other elements. Benchmarking tools are used to compare similar buildings; examples include ENERGY STAR Portfolio Manager, Building Performance Compass, and EnergyScoreCard. Auditing tools are used to collect facility data, which can be as simple as a “clipboard” (screening) audit to a more comprehensive investment grade audit. Energy Analysis software tools are used to calculate energy use and savings; examples tools include EnergyPro, eQuest, and MICROPAS. Financial analysis tools, are used to project and track project costs, monetary savings, utility company incentives, life cycle costing, funding sources, and other purposes; and finally implementation and tracking tools facilitate project implementation management for contractors and subcontractors, incentives payments, energy savings vs. baseline operations, measurement and evaluation (M&E), and more.

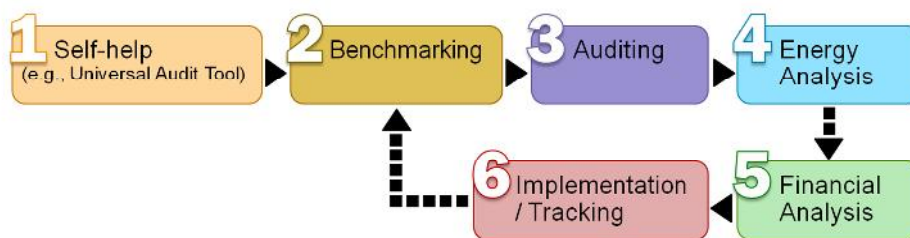


Figure 4: Process steps for comprehensive projects

General Software Tool Categories

The evaluation team observed a wide range of capabilities and identified three general categories of software tools:

- Traditional self-help energy auditing tools
- Software-as-a-Service (SaaS)
- Tools used by professionals

ENERGY STAR Portfolio Manager falls outside of these three categories and is discussed later in this report as a distinct product.

Traditional Self-Help Energy Auditing Tools

The traditional self-help energy auditing tools are typically user-friendly and address the identified process steps in a simplified form through the use of algorithm-based savings calculations that focus on specific measures within individual properties. This is in contrast to more advanced tools that apply building simulation models or serve multiple property portfolios.

The utility was very familiar with this class of software product and had both previous and current relationships with primary vendors to provide perspective on capabilities. Tools were generally focused towards residential or commercial customers and messaging was typically not tailored to the multifamily property segment. The simplified approach was not conducive to whole building analysis that would normally require detailed engineering analysis. The tools were also incapable of handling the data complexity that accompanies multi-customer, multi account properties required to perform portfolio approach analysis. Generally the providers of these tools are open to adapting their code framework based on client need and interest (such as customizing capabilities or adding features, creating new subroutines, etc.)

Software-as-a-Service

Software-as-a-Service (SaaS) products have recently entered the market and demonstrate new capabilities. The companies representing these software products are establishing their approach to the market that can be direct-to-market or utility supported. A number of similar products were observed, and while each generally had a distinguishing characteristic, none were positioned to lead in all aspects of the multifamily market. Some characteristics included:

- Focus is on making use of more readily available energy use consumption data to benchmark facilities.
- Typical features help prioritize projects and track implemented projects through ongoing data analysis.
- The tools generally do not evaluate specific energy efficiency measures but provide a framework to track and evaluate performance of proposed measures once measure performance parameters are established. As an example, these systems would not help calculate the savings from replacing a one hundred watt incandescent lamp with a twenty five watt compact fluorescent, but after informed that the CFL would save 12 kWh annually, the tool would analyze energy use consumption data to help evaluate whether those savings were actually realized.
- These products are limited by the privacy and aggregation issues associated with the management of utility customer energy use data and operate under the assumption that the utility or customer will provide the data.
- While potential users would need time to familiarize themselves with the software processes and capabilities, reasonably computer literate users would be able to manage the software after a short orientation, which can be provided in conjunction with managing their specific properties.

For an additional fee, some SaaS providers augmented their software offering with building science professionals to provide measure level recommendations and analysis. While these building science professionals were not HERS Raters, they filled some of the same functions that might be provided by HERS Raters.

Tools Used by Professionals

The tools that are typically used by professionals employ more sophisticated computer building models that make use of detailed data inputs.

- Users likely require specific training on the software itself prior to the consideration of a specific project.
- Users benefit from having a formal or informal background in building sciences.
- These tools can be applied to evaluate specific measures within a property or to assist in a whole building analysis.
- Historic energy usage information can help calibrate the tool output to increase confidence that the savings predictions can be relied on.
- At the hands of a well-trained user, these tools can be relied upon to predict savings with a high degree of accuracy.

Tool Matrix

Each of the process steps described above may have software tools that add value by converting data into information or by reducing the utilization costs associated with providing a given step. Some tools serve multiple process steps while other tools are specific to only one area.

To better understand the possible configurations, the evaluation team surveyed a number of software tools. The matrix shown as Figure 5 on the following pages provides each software package as a column in the table with evaluation metric listed as rows of the table. A number of software tool providers indicated that they had established development paths that were being pursued and that these activities could be adjusted depending on client commitments and objectives.

The provided matrix is intended to summarize the various tools and their relative functionality at the time of the evaluation. It provides a high level gap analysis. Usability of features varies between tools and functionality may not be attributed if overly complex for target audience or multiple manual process steps are required. In the evaluation metric “Target User”, the value “Advocate” refers to the property Energy Advocate as defined later in this report and is different than a typical “customer” in that the Energy Advocate is assumed to have some minimal background in energy or general project implementation process steps. For tools with multiple target users, functionality may vary between the target user groups meaning that a utility representative may have access to broader functionality than a customer even if they were both using the same tool.

Evaluation Metric	Home Energy Advisor	Business Energy Advisor	Energy Star Portfolio Manager	Building Performance Compass	AUMScore	Energy Score Cards
User						
Target User	Customer	Customer	Utility/ Customer/ Advocate	Utility/ Customer/ Advocate	Customer/ Advocate	Utility/ Customer/ Advocate
Training Requirement	None	None	Low	Medium	Low	Medium
Features / Tool						
Benchmarking	√	√	√	√	√	√
Auditing	√	√	...	...	...	...
Measure energy analysis	√	√	...	...	...	...
Financial analysis	√	√	...	...	...	...
Project tracking & evaluation	...	...	...	√	√	√
Identifies EE options	√	√	...	...	...	...
Markets						
MF tenant—renter	√	...	...	...	...	...
MF tenant—owner	√	...	...	...	...	...
MF property owner single-site	...	...	√	...	√	√
MF property owner multiple-site	...	...	√	√	√	√
Small commercial	...	√	...	...	...	...
Integration						
Portfolio Manager data compatibility	...	...	√	√	√	√
Automated utility usage data support	√	√	√	...	...	...

Figure 5: Tool Matrix (page 1)

Evaluation Metric	WegoWise	First Fuel Building Energy Analytics	eQuest	EnergyPro	Micropas
User					
Target User	Customer/ Advocate	Consultant	Consultant	Consultant	Consultant
Training Requirement	Low	High	High	High	High
Features / Tool					
Benchmarking	√	√	...	...	...
Auditing	...	√	...	...	...
Measure analysis	...	√	√	√	√
Financial analysis	...	√	√	√	√
Project tracking & evaluation	√	√	...	...	...
Identifies EE options	...	√	√	...	...
Markets					
MF tenant—renter	...	...	...	...	...
MF tenant—owner	...	...	√	...	...
MF property owner single-site	√	...	√	√	√
MF property owner multiple-site	√	...	...	...	√
Small commercial	...	...	√	√	√
Integration					
Portfolio Manager data compatibility	√	√	√	√	√
Automated utility usage data support	...	...	...	...	...

Figure 5: Tool Matrix (continued)

Market Summary

The following qualitative summary demonstrates the complexity of the multifamily segment and delineates available program resources that can be used to meet the needs of specific actors.

The section below on principal actors describes the types of multifamily actors that may seek services; the actor engagement section describes different service expectations that each might have. Project roles then describes the typical roles that need to be filled in order to complete energy management projects while a section on program resources details both utility and non-utility services that can assist in the process.

This background is provided for a better understanding of the opportunity and requirements of software solutions intended to serve the multifamily market. While barriers specific to low income properties are not called out by this report, the sub segment shares common barriers with market rate properties and so benefits from mitigation of these common barriers.⁵

Principal Actors

The evaluation team identified two distinct principal actor types: occupants and multiple property owners. The specific needs for auditing and benchmarking software tools must be met for these two types of potential users. The actors can be further categorized to distinguish between income or equity property owners, self-managed or professionally managed properties, and low-income or market-rate properties.

Multifamily Occupants

Occupants of multifamily properties can be either owners or renters of units found within a particular property. In most situations, occupants are responsible for the energy consumption within the unit, but may receive centralized heat, air conditioning, or hot water from systems maintained by the property owner.

Multifamily Property Owners

Property owners may control a single multifamily property or multiple multifamily properties. These properties may be self-managed or may be managed through a property management firm.

Typically property owners are responsible for energy consumption in common use areas and any additional services that the property may provide, such as centralized heat, air conditioning, or hot water. A given property may represent as few as two units or as many as hundreds or even thousands of units.

Actor Engagement

The utility's engagement with the market actor will vary depending on the type of market actor that is seeking services and the specific objectives that are being pursued. Multifamily occupants are most likely interested in reducing energy consumption through the implementation of specific measures, such as installing energy-efficient lighting, ENERGY STAR refrigerators and other appliances (if not provided by the property owner), or through behavioral approaches, such as turning off lighting, adjusting the thermostat or water heater setting, closing or opening windows or curtains, etc.

⁵ In Improving California's Multifamily Buildings: Opportunities and Recommendations for Green Retrofit and Rehab Programs report, low income properties were found to share all five common barriers associated with market rate properties while facing a unique financing barrier. As such, by addressing the five common barriers, the proposed framework serves both low income and market rate properties.

Owners of single or multiple multifamily properties may also share this perspective, or may prefer a more holistic, whole-building approach to energy efficiency; owners of multiple properties face a unique challenge of assessing needs and distributing resources across multiple properties.

Measure and Behavioral Approach

The measure and behavioral engagement approach focuses on a specific piece of equipment or behavioral measure and helps the user evaluate the value of adopting the measure. It requires measure specific information but does not consider the system in the context of the overall property.

The benefit of this approach is that it can directly address a specific opportunity identified by the user; the downside is that it may not identify more valuable opportunities that are present on the property. The level of sophistication applied to this approach can range from simplified self-help approaches to a detailed engineering approach.

Whole Building Approach

The whole building approach considers the range of opportunities present at the multifamily property and the interrelation of those opportunities with each other. Assuming adequate availability of funding, this more sophisticated, comprehensive approach can result in deeper energy savings per facility but likely requires a higher level of commitment by the owner and more advanced knowledge of energy management principals. For all but the most advanced owner, this approach likely requires external professional consulting.

Portfolio Approach

Owners of multiple properties may be interested in taking a portfolio approach that leverages benchmarking principals to determine which of their properties would most benefit from energy management activity.

This approach is used to identify relative energy consumption usage between different properties in a portfolio so that properties can be prioritized by need. Properties with similar characteristics that point to an energy efficiency opportunity can be grouped together to take advantage of the economies of scale. For example if a property owner has multiple facilities showing high base load consumption, they may opt to hire a lighting contractor to serve all the properties identified with a high base load. Because of the larger project, the owner will be able to better negotiate price with the contractors. Once prioritized, an owner can adopt a measure or whole building approach depending on objectives and familiarity with the property.

Project Roles

For multifamily owners, energy efficiency projects run smoother if certain project roles are filled. Depending on the size and scope of a given project, some of these roles may be condensed and filled by a single person that wears “many hats.”

Single Point of Contact

A key idea involves the availability of a SCE representative that acts as a single point of contact to support MF facility owners or operators. (The importance of this role was highlighted in the Southern California Edison 2013-2014 Energy Efficiency Program Implementation Plans, January 2013, in the description of the “Energy Upgrade California Multifamily Path,” and in other research the evaluation team has done.)

The single point of contact will play an integral role in both the whole building and portfolio approach and will help interpret initial benchmarking information. The single point of contact will present programmatic resources the customer might leverage and encourage customers to actually initiate projects. The degree of

involvement and the exact role is something that is to be determined by SCE program staff. Conceptually, this individual may also be responsible for tracking major project milestones and notifying appropriate stakeholders of key decisions that need to be made or project roadblocks that need to be overcome. SCE may utilize existing Account Executives to serve the role of single point of contact for the MF owner. These Account Executives already have established relationships with select MF facility property owners and managers and will be able to quickly develop trust and rapport with decision makers in this market segment.

Additionally, the owners or managers of the larger MF facilities may have alternative resources available and may only need a single point of contact to acquire program incentive information.

Energy Advocate

Another key player in this process is the energy advocate or property champion, who is tasked with facilitating the process and actively driving a project forward. This individual could be someone at the customer's facility such as the owner or property manager or an outside consultant or contractor.

The energy advocate role might be used in different capacities at different phases of energy management projects and may be taken on by different people throughout the project. Further, the energy advocate functions may vary based on the type of project and characteristics of the multifamily property portfolio. For example, there may be an in-house energy manager for larger companies or facilities. For properties that cannot provide someone internally, this role may be assumed by the utility single point of contact, a vendor, or an energy consultant. Regardless of who assumes this role, there must be constant leadership and communication with all parties.

Consultants and Contractors

Consultants and contractors play a vital role in completing projects and they may be associated with a utility program, the HERS program, or an equipment distributor or manufacturer. For more complex projects, multiple contractors and consultants may be involved. This group is engaged by the energy advocate and helps to identify the specifics of a project and facilitates project execution. They may receive additional context and information from the utility single point of contact as appropriate.

Figure 6 below illustrates the various players and their relationships in the larger structure of implementing building analysis and energy efficiency upgrade projects.

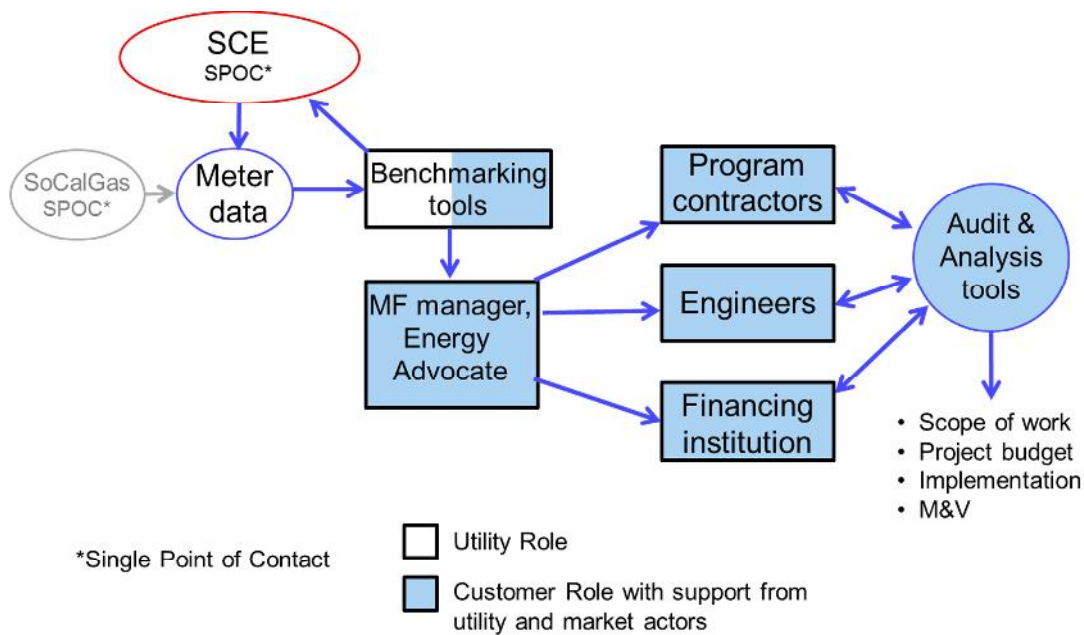


Figure 6 Relationships of Project Roles

Non-Utility Program Resources

While a customer energy advocate will likely be able to navigate simple objectives on their own, the majority of users seeking assistance with property portfolio analysis or whole building measures will likely require additional support.

It is the role of the utility single point of contact to understand what resources are available and how those resources might be used to advance a customer’s energy management objectives. In addition to in-house utility energy management programs, the single point of contact will be available to help navigate additional resources as appropriate. Two such resources are the Home Energy Rating System (HERS) program and the ENERGY STAR Portfolio Manager software.

Home Energy Rating System (HERS)

While HERS is intended to work within the multifamily market segment, policy development still needs to occur prior to being a reliable scaled resource. The HERS Provider CalCERTS has submitted a proposal to the CEC to develop and finalize CA standards regarding the HERS multi-family building approach and modeling but a regulatory calendar for evaluation of this proposal has not been established. As far as integration with utility programs, HERS Providers do not share reports and expect incentive programs to work directly with the HERS Rater or building owner to gain access to any individual property report as necessary. The remainder of this section provides some detail as to the history and outputs of the HERS Program so as to better understand their potential role in serving the multifamily market.

HERS Background

Public Resources Code (PRC) Section 25942 directed the California Energy Commission (CEC) to adopt a HERS program for residential dwellings.

- In 1999 Phase I (HERS I) established a basic operating framework for Raters to perform field verification and diagnostic testing for compliance with Title 24.
- In 2009 Phase II (HERS II) extended the original scope to include whole house home energy ratings of existing and newly constructed single family home and multi-family buildings of 3-stories or less.

The CEC approves HERS Providers who in turn train, certify, and audit HERS Raters. As of the writing of this report, there were three HERS Providers:

- California Certified Energy Rating & Testing Services (CalCERTS). Approved Activities: Field Verification for Newly Constructed, Additions, and Alterations of Residential & Nonresidential Buildings; California Whole-House Home Energy Ratings; HERS Building Performance Contractors.
- U.S. Energy Raters Association (USERA). Approved Activities: Field Verification for Alterations of Residential & Nonresidential Buildings; Enalays as Third-Party Quality Control Program for Alternations of Residential & Nonresidential Buildings.
- ConSol Home Energy Efficiency Rating Services, Inc. (CHEERS). Approved Activities: Field Verification for Newly-Constructed Residential Buildings.

HERS Raters are independent contractors that perform site audit assessments and ratings, producing the HERS index value and HERS reports. A HERS Building Performance Contractor is a HERS Rater specifically designated by the CA Whole-House Home Energy Program.

HERS Reports

HERS Full Report is not a template report, but uniquely assembled by the HERS Rater to provide detailed feedback on a property. A HERS Full Report can sometimes reach 80 pages or more and provides a comprehensive review of the audit and assessment of the property. These detailed reports are generated only as needed. In addition to HERS Full Reports, modeling software produces briefer template outputs that the HERS Rater can modify as needed. Template outputs include:

- A HERS Index is a score rating the energy use of a home on a scale from 0 to 250.
- HERS Rating Certificate is a label that displays the HERS Index, energy impact, energy efficiency features.
- HERS Standard Approach Recommendations Report is a single page report covering recommendations for EE improvements, energy savings for each improvement, and HERS Index reduction for each improvement.

Figure 7 provides a sample of the California Home Energy Rating Certificate. The certificate provides a homeowner with some useful information about the house:

- An official HERS Index efficiency rating on a 0 to 250-point scale.
- The house's major energy-efficiency features as determined by the HERS Rater.
- An estimate of the house's annual energy use, operating cost, and greenhouse gas emissions.

A lower HERS Index indicates a more energy efficient home. A HERS Index of zero indicates a very-efficient "Net Zero Energy Home." This home consumes no more energy than it produces with solar or other renewable sources. A home with a score of 100 uses the same energy as a new home that meets California's 2008 Building Energy Efficiency Standards. And a home with score of 250 or more most likely has very high energy bills and many opportunities for efficiency improvements.

Other information provided is the house’s carbon footprint, indication of which features in the house use the most energy (which are often opportunities for upgrades), details about the house’s insulation, windows, heating and cooling system, and water heating system.

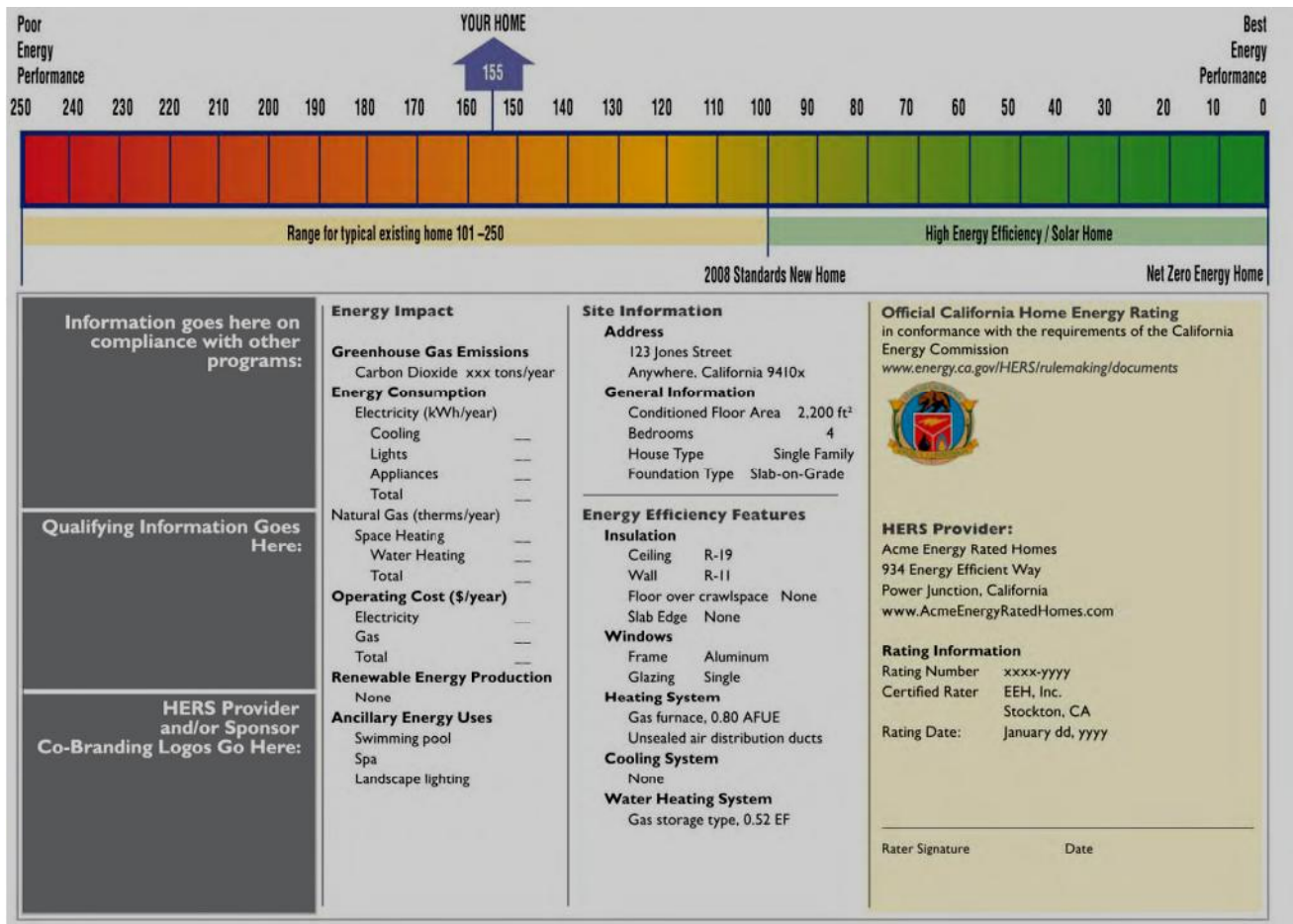


Figure 7: Example California Home Energy Rating Certificate

HERS Software

For property specific analysis, HERS uses EnergySoft programming – specifically, an EnergyPro Residential module called Residential CalRate Pro (RM5) that is intended for use by professionally trained individuals. This module was developed in partnership with CalCERTS Residential.

High rise multifamily buildings must rely on alternative software including:

- The nonresidential EnergyPro software.
- The GreenPoint Rated calculation which combines the HERS low rise application modeling with the high rise envelope.
- The nonresidential Title 24 Performance calculations (not a good fit as it applies to Title 24 rules).
- EnergySoft. (Open to adding high rise calculations into the HERS module as a pilot project.)

In addition to the actual modeling software, each HERS Provider has a registry/repository that is separate from the other providers. Due to the ongoing policy development for the multifamily market, few multifamily reports are developed by HERS Raters or recorded in these registries.

A secondary clearinghouse resource might be the CA Tax Credit Allocation Committee. They have collected HERS reports for financing homes that demonstrate reduction in HERS II ratings by 10% (mostly impacts affordable housing homes, as opposed to market rate). Due to the same policy development constraints, this is primarily targeted for single family homes.

ENERGY STAR Portfolio Manager

The Environmental Protection Agency's (EPA) ENERGY STAR Portfolio Manager is an online energy management and tracking tool. In simple terms, this program allows building owners to track a building's energy (electricity, natural gas, or other energy sources) and water consumption, prioritize between property level energy efficiency investment opportunities, and verify improvements over time.

ENERGY STAR Portfolio Manager is a widely used commercial building benchmarking tool. The features that the literature emphasizes are the ability to identify under-performing buildings, verify efficiency improvements, and receive EPA recognition (an ENERGY STAR Rating) "for superior energy performance." ENERGY STAR Portfolio Manager is intended for comparing one building to other similar buildings nationwide and is not intended for use to evaluate projects at a given facility. ENERGY STAR Portfolio Manager also allows users to "connect" with utility billing systems to automatically receive energy usage data and to transfer data from ENERGY STAR Portfolio Manager to SaaS tools such as Compass and EnergyScoreCards.

For multifamily facilities, ENERGY STAR Portfolio Manager can be used to manage energy usage and help control energy consumption and operating costs. Within an energy advocate's building portfolio, it has been used to facilitate energy management competitions that encourage benchmarking energy performance, tracking improvements over time, and comparing usage against peers.

An ENERGY STAR Portfolio Manager update was released July 17, 2013 and a multifamily specific update is to follow that general update according to the development calendar. Currently multifamily properties are not among the building types that can receive an ENERGY STAR Benchmark Rating; however, according to the EPA website, "Multifamily housing communities can use Portfolio Manager to track weather-normalized energy use intensity (EUI), energy costs, greenhouse gas emissions, and water consumption." EUI is a useful tool in comparing relative efficiency of facilities in an owner's portfolio while an ENERGY STAR Rating is comparable to a peer benchmark.

A potential barrier property energy advocates may encounter in creating building profiles is the need for meter numbers. Energy advocates can collect meter numbers for both common use and tenant spaces at the meters. As manual collection of meter numbers becomes impractical with buildings with a large number of units, SCE staff indicated that they may in some cases explore leveraging their Customer Service System (CSS) to identify meter numbers for a given multifamily property. The energy advocate would still be required to manually enter each meter number as a part of creating the overall building profile, but they would receive support in identifying the appropriate meters.

SCE already has automated the process of uploading customer energy usage data to ENERGY STAR Portfolio Manager. Release of meter-level data requires customer authorization but aggregate data may be released according to Rule 15/15. As part of creating the automatic data transfer relationship between ENERGY STAR Portfolio Manager and the utility, the customer also authorizes SCE to receive associated property profile information including detailed inputs and benchmarking results. Figure 8 illustrates this relationship. This

attractive aspect of ENERGY STAR Portfolio Manager allows SCE to maintain visibility to the user-created building profile for further engagement with the property energy advocate.

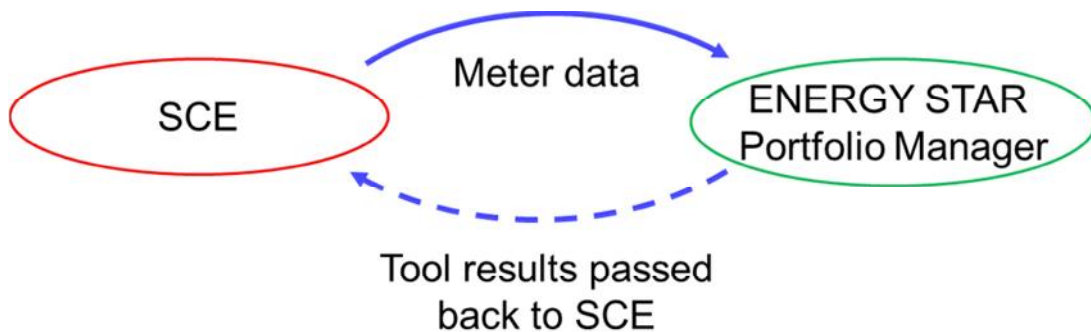


Figure 8: Data flow to and from ENERGY STAR Portfolio Manager

Recommendations

Based on the capabilities of available software and identified multifamily market segment needs, the evaluation team recommends enhancements to existing functionality as well as adding completely new functionality. Key recommendations include:

1. Enhance and develop Southern California Edison’s Energy Advisor software tool, a component of the Universal Audit Tool; specifically:
 - Enhance the existing Home Energy Advisor software to better serve tenants
 - Develop a new Multifamily Property Energy Advisor software tool
2. Develop a multifamily Property Owner Portfolio process as a program process
3. Enhance integration with ENERGY STAR Portfolio Manager

Energy Advisor

The SCE Energy Advisor offering is currently made up of the Home Energy Advisor and the Business Energy Advisor online software tools. The utility currently contracts these software tools from a service provider, and these tools are intended to provide SCE customer self-help resources to manage energy consumption. Though in simplified form, these self-help tools do assist the utility customer in the identified key process steps for energy management projects.

As there are not readily available alternatives that provide self-help functionality tailored to the multifamily market in the broad market or within the current SCE infrastructure, software development will need to occur to provide the desired functionality. Traditional self-help audit software packages are not tailored to the multifamily market segment while newer SaaS development focuses primarily on the benchmarking and project tracking process steps. If relying solely on existing tools, resulting gaps for the multifamily market segment is then observed in the auditing, energy analysis, and financial analysis process steps. SoCal Gas recently developed a multifamily tool but obtaining a demonstration of the tool was not feasible within the timeline of this evaluation.

In order to comprehensively address these gaps, enhancements to the Home Energy Advisor should occur and a new MF Property Owner Energy Advisor should be developed.

Home Energy Advisor Software Tool Enhancements

The Home Energy Advisor Software tool can be further refined to better distinguish between potential users that are single family property owners, multifamily unit owners, and residential tenants. While similar, these three groups generally have distinct priorities as detailed in Figure 9. By tailoring the messaging to these different occupant types, customer engagement can potentially increase.

Residential Occupant Type	Measure Applicability
Single family property owners	Building shell, appliance, lighting loads, plug loads, behavioral
Multifamily unit owners	Appliances, lighting loads, plug loads, behavioral
Residential tenants	Lighting loads, plug loads, behavioral

Figure 9: Measure applicability based on residential occupant type

MF Property Owner Energy Advisor Software Tool Development

Distinct from the previous three residential occupant types are multifamily property owners and managers. Because this group is also different from both residential and business customers, the evaluation team recommends developing a unique Energy Advisor Tool. This tool would be an additional offering similar to that of the existing Business Energy Advisor and Home Energy Advisor tools. Initial focus will be on serving a single property and provide information at the measure level. A number of specific measures would be required and will include measures tailored to multifamily properties such as pool pumps, on-site laundry, and parking lot lighting. The tool would be designed to meet the immediate need of a casual user by providing quantified information on measure and behavioral recommendations. As this is intended as a self-help tool, it is recommended that it not attempt to address the more advanced concepts associated with the whole building approach or the multiple account and multiple property portfolio benchmarking approach.

MF Property Owner Portfolio Process

To guide customers that require additional services beyond what is provided via the Energy Advisor series of tools, the evaluation team recommends the development of a multifamily property owner portfolio process, which will take advantage of the utility's existing plans for the development of a single point of contact role and help direct specific customers through the identified energy management project process steps.

The multifamily property owner portfolio process will identify and employ an Energy Advocate within the building owner's or manager's organization.

As discussed earlier, benchmarking is a valuable engagement and prioritization step, but it can be difficult to establish in the multifamily market segment because of the privacy and aggregation complexities associated with the release of building level energy use data. Energy Advocates will need to understand the value of benchmarking and the best strategies for conducting one. How a benchmark is carried out may vary depending on the priorities communicated by the Energy Advocate. As an example of the possible tradeoffs, Rule 15/15 may provide a simplified way to gain access to user data, but use of CISR forms can provide a more detailed data set for zone analysis within a property.

Whether the Energy Advocate decides to ultimately use ENERGY STAR Portfolio Manager for benchmarking, Energy Advocates will be encouraged to take advantage of its functionality for reasons further discussed in the next section.

After a benchmark has been established, the single point of contact can provide guidance to the Energy Advocate on how to perform the additional steps in the process that were described earlier, that typically include auditing, energy analysis, financial analysis, and implementation and tracking. Again, the approach to these steps will vary depending on the technical capabilities of the Energy Advocate and existing software infrastructure within the customer's organization.

The implementation team, including the property manager or owner, Energy Advocate, and the single point of contact will have many resources available to them. These various tools and resources can be discussed with property owners and managers.

Options available through utility programs may be appropriate to complete some of these steps. Where utility programs do not provide the level of service necessary to fulfill the needs of the given customer, additional information can be provided on market, or fee-for-service, resources including those offered by SaaS providers, HERS Raters and Green Physical Needs Assessments.

The table in Figure 10 below provides a review of the energy management project process steps as well as resources that might help facilitate the step.

Process Step	Utility Resources	ENERGY STAR Portfolio Manager	SaaS	HERS Rater	SaaS with Building Science Support
Benchmarking		X	X		X
Auditing	X			X	X
Energy Analysis	X			X	X
Financial Analysis	X			X	X
Implementation and Tracking			X		X

Figure 10: Multifamily property energy management project process steps and resources

ENERGY STAR Portfolio Manager

The position of ENERGY STAR Portfolio Manager in the market and its ability to offer a standard data platform that enables third party tools points to further development of the already existing utility relationship. A recent SCE enhancement to the process includes the ability of the utility to release customer usage information associated with multi dwelling residential rates. Future enhancements should include the distribution of property profile and benchmark information within the utility from the corporate office out to account representatives acting as the newly created single point of contact.

Benefits of enhancing the current functionality include the ability of the utility to leverage a free nationally available tool to facilitate benchmarking properties with multiple meters and account holders. Performing this function is currently not possible through the Energy Advisor tools that provide benchmarking services for single account properties. Building this functionality into Energy Advisor would require significant software and programmatic process development while still not providing as much functionality as is offered by ENERGY STAR Portfolio Manager.

By focusing on ENERGY STAR Portfolio Manager as a platform to distribute customer energy usage information, the utility enables customers to take advantage of services available in the market while at the same time controlling administrative cost associated with release of the data. Release of data would be done following an established process, in a standard format, and to a single entity. Many providers of SaaS tools are already familiar with securing energy usage data from ENERGY Star Portfolio Manager. In the complex multifamily property environment, the utility would benefit from ENERGY STAR Portfolio Manager’s ability to act as an account aggregator where other more simplified energy use data requests can take advantage of upcoming Green Button functionality.

The other concrete benefit is the value of the property profile and resulting benchmarking information that is available through ENERGY STAR Portfolio Manager. Access to this information would not be directly available to the utility if users went straight to SaaS providers since these providers would be under no obligation to share the information and would likely not volunteer it due to customer privacy concerns.

The concurrent development of the ENERGY STAR Portfolio Manager functionality and the single point of contact role are well timed. Property profile information and benchmarks can be made available as utility

representatives are assigned to help interpret the information for each multifamily building owner. Now that the pieces are in place, the infrastructure to distribute the information should be developed.

Appendix A: The Researchable Questions

Researchable Questions identified in the Scope of Work for this project provided guidance throughout the evaluation process. Part 1 of this project helped clarify basic elements of the study as well as reach common understanding of both utility and non-utility capabilities and structure. Part 2 of the project collected additional detail and provided perspective on implications of the new and clarified information.

1) Property size and target tenants:

a. What are the MF-audit tool needs for different size property owners/managers?

Through various interactions with stakeholders over the course of the evaluation period, the evaluation team helped clarify and build consensus on what functionality an “audit tool” actually possessed. In order to help clarify the possible expectations of a MF audit tool, the team defined energy management project process steps that included benchmarking, auditing, energy analysis, financial analysis, and implementation and tracking capabilities. While some stakeholders defined an audit tool as being more similar to that of the traditional self-help audit tools, other stakeholders defined an audit tool as being more similar to that of the functionality seen in SaaS tools.

From one perspective, both small and large customers can benefit from tools that support a high-level measure approach or whole-building approach and selecting the correct tool is more a question of the level of engagement and sophistication for a particular user rather than the size of the user. Key observations include:

- While both small and large property owners/managers can benefit from the accessibility of self-help audit tools, larger property owners are likely more aware of more advanced tools and familiar with consultants or contractors and, as a result, may be less inclined to find and use self-help tools.
- Larger property owners/managers can likely realize increased benefits from benchmarking services that, among other common benefits, help prioritize investment opportunities across multiple properties within a managed portfolio.
- Regardless of size, customers seeking more advanced goals associated with the whole building approach would likely need the support of a variety of professional level software tools.
- Currently, the utility can release aggregate energy usage for properties with 15 or more meters and where no single customer representing more than 15% of the total building consumption by leveraging Rule 15/15. This may simplify customer usage data access issues for properties that meet the criteria.

b. What is the role of HERS Raters and their tools in the context of multi-family market?

Through the course of the evaluation, additional clarity was obtained as to the current and potential role of HERS Raters. HERS policy regarding multifamily properties is still under development and there is no established policy development timeline. HERS has historically served the single family residential market. Three HERS Providers have been authorized by the California Energy Commission and together they oversee a broader number of HERS Raters. (Two of the three are approved for new construction, two of the three for residential alterations and additions.) HERS Raters contract directly with residential customers or property representatives. While each of the three HERS Providers independently maintain an electronic repository for HERS reports, these reports are generally saved in flat PDF formats and are not publically available. Analysis performed by HERS Raters is done in software that is oriented towards professional users and so is not easily transferrable to the broader market.

Under current market conditions, HERS Raters are seen as a future fee-for-service resource to owners and managers of multifamily property specifically oriented toward the auditing, energy analysis and financial analysis energy management project process steps. While some HERS Raters do currently serve multifamily properties, additional HERS policy development should occur prior to the utility relying on this as a broadly available service. With a stronger policy in place, the utility could be more secure in recommending the HERS system to multifamily property actors since the HERS output, as it relates to the multifamily market segment, would be better defined. Systematic sharing of reports between the utilities and HERS Providers is not currently done and would require regulatory intervention if deemed warranted.

c. Who will actually use this tool?

Different users are expected to use the multiple software resources envisioned by this report and basic computer literacy would be required. Distinct user objectives and potential user groups include those that are interested in:

- Self Help Measure and Behavioral Approach (Energy Advisor Series)
 - Owners
 - Managers
 - Tenants
- Portfolio Approach (ENERGY STAR Portfolio Manager)
 - Owners
 - Managers
 - Energy Advocate
- Portfolio Approach (SaaS tools)
 - Owners
 - Managers
 - Energy Advocate
 - Consultants (may include HERS Raters)
 - Contractors
 - Financial Institutions
- Whole Building Approach (Professional Building Modeling Tools)
 - Utility contractor
 - Consultants (may include HERS Raters)
 - Contractors
 - Financial Institutions

For all but the first tool, a casual user would likely not dedicate sufficient time to navigate the functionality of a sophisticated tool, which is just one reason why energy advocates will in many cases be needed to facilitate the process. This advocate will either work with software tools directly or through utility staff, consultants, or contractors. The advocate will then present to owners or managers the outputs from the benchmarking or auditing tools.

Our observations indicate some users would benefit from a simple, easy-to-use benchmarking tool, one that is at least as friendly to use as ENERGY STAR Portfolio Manager, although for some, the use of even this tool will be a challenge. The coordination necessary to deal with the multi-meter, multi-account-holder privacy and data aggregations issues in the multifamily market will be a barrier. While the utility may make some programmatic resources available, this barrier may limit benchmarking activities for a subset of users.

d. How would they use this tool and why? What are the benefits for them?

The evaluation team envisions the use of multiple programmatic and software tools to meet the multifamily market segment needs. MF actors may directly interact with self-help tools similar to the Energy Advisor series of tools that SCE currently makes available to the residential and commercial market sector. They may interact with ENERGY STAR Portfolio Manager for basic benchmarking capabilities directly or through an Energy Advocate while they may choose to secure more advanced benchmarking and project tracking functionality through fee-for-service SaaS tools. Use of more advanced modeling software tools can then be accessed through utility services, consultants, contractors, or HERS Raters.

For each class of tool, we have identified the key benefits.

Self Help Measure and Behavioral Approach (Energy Advisor Series)

- Ease of use
- Saving calculations for specific measures
- Common area measures specific to the multifamily market segment
- Receive orientation to more advanced energy management approaches

Portfolio Approach (ENERGY STAR Portfolio Manager)

- Use of national standard tool
- No cost to user
- Indirect cost to utility to facilitate energy use data transfer
- Define building portfolios
- Associate multiple meters to a property
- Benchmark properties
- Prioritize investments across properties
- Automated data link for transferring customer energy usage consumption
- Receive energy use intensity per property
- Receive ENERGY STAR score (anticipated)
- Easily transfer monthly energy use consumption data to SaaS provider

Portfolio Approach (SaaS tools)

- Energy efficiency measure prioritization
- Post installation monitoring
- Access to building science professionals (optional and varies between providers)

Whole Building Approach (Professional Building Modeling Tools)

- Identify building envelope measures
- Increased accuracy on savings and cost estimates for recommended measures

2) Scope of the tool, needs, and configuration options

a. Is this an energy audit tool or is this a energy usage monitoring tool?

Key stakeholders had different visions on the necessary tools to serve the multifamily market segment, and as the approaches were not mutually exclusive, it was determined that each could likely be pursued. A simplified self-help audit tool that is readily accessible to a broad proportion of the market segment is intended to facilitate measure and behavior-based activities and introduce more complex objectives. To actually meet the more complex objectives, the utility expressed a desire for tools that focus on

benchmarking and energy usage monitoring instead of an audit tool. An energy monitoring tool can be used to prioritize limited audit resources whether provided by the utility or property representative. More advanced audit tools are too complex for the basic user but provide the appropriate resource for the professional user.

As the evaluation progressed, the need for a self-help auditing tool and a benchmarking tool were solidified. The complexity and diversity of needs also pointed to a more flexible process that helped multifamily actors identify and secure the appropriate programmatic or software resource.

b. What are the EE/DR/Solar/IDSM, etc. needs?

In addition to energy efficiency objectives, any developed multifamily self-help audit tool should also include information on demand response and solar opportunities. Within this format, demand response recommendations are likely to focus on behavioral opportunities. These opportunities may include suggestions such as to common area lighting control, HVAC set points, and time-of-use considerations for appliances. Existing solar calculators developed for the residential and commercial market sectors should be easily transferrable for use in the multifamily market sector.

For whole building efforts, the multifamily market segment can provide significant opportunities for both demand response and solar opportunities. Evaluating these opportunities was seen as outside of the scope of software solutions and seen as more effectively being addressed through programmatic constructs. Demand response program implementers should be engaged to determine minimum loads shifts that would be desirable for formal participation in the programs. Formal participation in demand response programs comes at an administrative cost for both the customer and the utility and better understanding the value proposition from both the customer and utility perspectives would facilitate whether formal IDSM activity should be encouraged.

c. What are the data and IT needs to support benchmarking interfaces to meet requirements and to evolve with requirements?

Providing access to customer energy usage information to outside parties and distributing benchmarking results to internal utility actors are two areas that warrant ongoing attention to support benchmarking activities.

Access to customer energy usage information

Access to customer energy usage information is vital to benchmarking and the functionality associated with most SaaS tools. The utility is faced with two barriers associated with meeting this data need: customer privacy and multi-customer usage aggregation. These barriers are similar to multi-tenant commercial properties.

As described more fully in the body of the report, the utility can currently rely on Rule 15/15 and CISR forms to avoid privacy concerns that would otherwise restrict the release of customer energy usage data. Rule 15/15 deems the privacy is sufficiently protected if there are 15 or more associated meters and none of the meters make up more than 15 percent of the aggregated usage. This will be a valuable tool for properties with 15 or more meters; CISR forms are most likely to only be used with smaller properties due to the administrative burden that they impose as they require each account holder to provide written release of energy usage information to an identified third party (utility, account holder, third party actor.) While these mechanisms provide the ability to release what is otherwise considered private information, they are imperfect mechanisms that do not eliminate privacy requirements from being an active barrier.

Multi-customer energy usage data integration is also a barrier. Within its current data systems, the utility does not have a building or property level field as part of the account record. This means that a unique identifier for a given building does not exist to associate multiple accounts or meters to a physical building. As such, a mechanism to identify meters that are associated with a single property is necessary prior to being able to aggregate the building level data.

While multiple providers can provide this service, ENERGY STAR Portfolio Manager provides distinct advantages due to its market position, existing data portals with the utility, and its ability to pass data to third party SaaS providers with appropriate customer authorization. Additional benefits include utility access granted to building profile information that is created within ENERGY STAR Portfolio Manager and reduced administrative burden realized by dealing with a single entity as opposed to multiple market actors. A limitation is that ENERGY STAR Portfolio Manager imports monthly data. While many benefits are available with monthly usage data, access to hourly or daily data provides distinct advantages that can enable additional functionality in a subset of SaaS tools.

Distribution of benchmarking results to internal utility actors

As mentioned, ENERGY STAR Portfolio Manager provides the utility any building profile information associated with customers that take advantage of automatic benchmarking functionality. Due to the low volume of data that is currently being transferred, this benchmark and building profile information is received at the utility corporate office but is not parsed out by market segment or distributed to program staff. At the time that this opportunity was communicated by SCE, it was also expressed that they were open to distribution of the data once a better understanding of what the actual data request consisted of.

d. Can these capabilities be configurable in a single tool? If yes, how? If not, how can the various tools with these capabilities be integrated in to a useful toolbox?

As described throughout this report, the identified key process steps that are applicable to energy management projects are not configurable within a single tool while also still meeting measure approach, whole building approach, and portfolio approach objectives. Even if such an all-inclusive tool existed, it would require a high level of utility program funding to make the tool available and a high level of involvement from a trained energy advocate to actually use the tool. While a single tool would not be able to meet the needs, a combination of enhancements to existing functionality as well as the addition of new functionality would meet the needs.

The below table provides a summary that can meet the objectives.

User Segment	Primary Tool	Program Interface	Outcome or Results; Comments
MF tenants	Residential Universal Audit Tool (UAT) Module – home-owner configuration Enhanced Home Energy Advisor to better serve MF tenants	Home Energy Advisor (existing software)	Survey with suggestions for low- or no-cost actions for hardware and behavior; on-going engagement
MF property owners (common area)	Property Owner UAT Module	MF Property Owner Energy Advisor (new software)	Recommendations based on data input; multi-tenant usage data unavailable
MF property owners (comprehensive)	ENERGY STAR Portfolio Manager using property-level data (DOE)	MF Property Owner Portfolio Process (program process)	Identifies appropriate software and program resources based on project needs
Utility consultants, contractors, HERS Raters	Standard available software tools (e.g., eQuest, EnergyPro, etc. energy and financial analysis, tracking)	EUC-MF add-on program service (for fee) to support energy audit, modeling, etc.	Detailed facility analysis; strategy for upgrades, change of energy use patterns, etc.
Small commercial businesses	Commercial UAT by segment	Business Energy Advisor (existing software)	Recommendations based on data input

e. How can this tool help property owners/managers prioritize their investment and/or rank their expected returns on the investment?

ENERGY STAR Portfolio Manager provides basic benchmarking services. Whether for a single facility or a portfolio of facilities, understanding relative and gross energy usage and cost provides a basis for making strategic business decisions such as determining which measures to implement or properties to attend to first. The various tools reviewed in our investigation suggest that these are core functionalities to this class of software. While there are specific advantages and disadvantages to each tool, they all do well at providing the necessary information to make informed decisions.

For owners or managers of broad building portfolios, it is recommended to assess capabilities of any internal software tools that may be available and as necessary augment those tools with fee-for-service SaaS tools. While they provide better service, specific SaaS tools may fit specific users better than others, given the diverse need of the potential users. The research direction of this study did not allow for further evaluation of which SaaS tool had the broadest applicability.

3) What are the available MF-tools in the market place, including the ARRA funded Compass Multi-Family Portfolio Tracker and recently released HERS Rater tool?

a. What tools are available commercially? How do they work? What do they support?

Commercially available tools primarily support benchmarking of facilities, defining of projects and monitoring of performance of implemented projects. Most do not support actual identification or analysis of potential projects. (These are identified from an audit and data analysis. For these tasks, there are load calculation tools like Energy Pro or WrightSoft.)

We have identified some commercially available tools that can be used to perform different process steps that are applicable to energy management projects. Some of these tools (or tool boxes) address more than one of the five process steps.

b. How would the ARRA funded MF-audit tool compare against these commercially available products?

The tool used in support of the ARRA funded program is actually a “commercially available tool.” There is not a set of open source tools that were developed for this market. The tool used in the ARRA program has a program administrative focus that is not seen in the other commercially available tools.

This specifically refers to the Compass tool. We have provided some information about this tool and how it compares with some of the other commercially available products. The Compass tool is a very complex and sophisticated set of functions that is suited to incentive application fulfillment processes. Also, the Compass tool provides functions that, if implemented, would require the utility to overhaul their operations.

4) How can customer needs be matched to available capabilities?

The ability of a tool to meet user needs is based on its capabilities and what needs the tool is trying to serve. A tool that meets all possible needs can be expected to come at a very high development cost and ongoing administrative cost.

a.i.1 Can the available capabilities meet the needs, specifically of low income properties?

As described by the Multifamily Subcommittee of the California Home Energy Retrofit Coordinating Committee, five of six of the identified needs of this sub-segment are the same as the general segment with the exception of the availability and access to financing. As such, a set of tools that meet the needs of the general market will provide significant value to the low income sub-segment. It is recommended that development at this time focus on delivering value to the entire market and once that is provided then focus on augmenting those services to address the one specific need of the low-income submarket.

a.i.2 Can the available capabilities meet the needs, specifically large and diverse properties?

While a pure software solution is not likely, significant value can be provided through pairing a strategic energy efficiency program design with an appropriate, limited software solution as well as integration with the single point of contact. Our current findings seem to indicate combined programmatic and software availabilities do meet the needs if deployed as envisioned.

a.ii.1 Can the available capabilities meet the needs, specifically of HERS Raters? What is their role and how do they fit in this?

HERS raters have access to and currently use professional software that enables their efforts in the residential sector.

Within the existing utility program and HERS system designs, there is not currently a strong enough value proposition from either the utility or HERS Rater perspective to justify robust coordination at this time. A higher level of coordination may become more applicable with the development of HERS multifamily policy but there is no set timeline associated with that development. Once a multifamily HERS procedure is established, there may be the opportunity to identify specific HERS raters that focus on the MF segment. These raters can then be targeted by utility programs.

b. What are the gaps? Which gap needs to be filled?

Gaps of the current offering include the inability to benchmark multifamily properties due primarily to the data aggregation barrier and the absence of an accessible self-help measure auditing tool. These gaps would be reduced through the implementation of the recommendations in this report however they will continue to be ongoing challenges. While a strategy to mitigate the data aggregation has been developed, it still requires a motivated energy advocate to take action that may be considered administratively burdensome. At one level, this is a challenge, but it also provides indication as to their willingness to take meaningful action to address energy management issues. Once a self-help measure auditing tool is established, making the availability of that tool known to the target market actor may be a challenge. An ongoing gap will likely be the ability to address the needs of the underserved members of this market, which are most often the smaller single facility owners who may have minimal computer skills.

c. When can we make these capabilities available?

Self Help Measure and Behavioral Approach (Energy Advisor Series): SCE is currently negotiating with the current provider of the Home Energy Advisor and Business Energy Advisor tool with revised tools scheduled to be available by early 2013. Multifamily elements will follow the updates to the base components and are scheduled to be available in the fourth quarter of 2014.

Portfolio Approach (ENERGY STAR Portfolio Manager): ENERGY STAR Portfolio Manager can currently be used to establish energy use intensity (EUI) values for commercial properties. SCE is currently testing procedures for release of multifamily residential energy use information to ENERGY STAR Portfolio Manager. Once this functionality is confirmed, ENERGY STAR Portfolio Manager can be used to establish EUI values for multifamily properties. SCE has a goal of benchmarking 100 multifamily properties through ENERGY STAR Portfolio Manager in 2013 using “automated benchmarking” that transfers customer energy usage data directly from the utility to ENERGY STAR Portfolio Manager.

Once a sufficient number of multifamily benchmarks have been created, distribution of ENERGY STAR Portfolio Manager information from SCE corporate office out to SCE Account Representatives or assigned Single Point of Contacts will be explored. Establishing this data flow is targeted for the first quarter of 2014.

Whole Building Approach (MF Property Owner Portfolio Process) is currently undergoing a 20 property pilot with initial results anticipated for late 2013 or early 2014. A longer term program process that then incorporates lessons from the pilot will then be developed.

5) A list of recommendations for the Universal Audit Tool for future development and integration actions. To complete this task, discussion with the current tool developer.

Due to ongoing contract negotiations between SCE and their supplier, the evaluation team was asked not to pursue this question.

Appendix B: Targeted Tool Research Findings

It currently appears that the ENERGY STAR Portfolio Manager is the “hub” through which the rest of the tools pass. That is, utility data is entered into ENERGY STAR Portfolio Manager, which then can be exported to populate other market-ready tools. Below we present characteristics of several benchmarking and audit tools:

- ENERGY STAR Portfolio Manager developed by the EPA and DOE
- Building Performance Compass, Energy Benchmarking Tool for Multifamily and Commercial Buildings by Performance Systems Development
- EnergyScoreCards by Bright Power
- Universal Audit Tool and SCE’s Business Energy Advisor (by C3)
- Home Energy Rating System (HERS)
- WegoWise
- American Utility Management Statistical Comparison of Relative Efficiency (AUM SCORE)
- First Fuel Building Energy Analytics
- Open Studio
- Other general online benchmarking and audit tools

ENERGY STAR Portfolio Manager

The Environmental Protection Agency’s (EPA) ENERGY STAR Portfolio Manager is an online energy management and tracking tool. In simple terms, this program allows building owners to track a building’s energy (electricity, natural gas, or other energy sources) and water consumption, identify energy efficiency investment priorities, and verify improvements over time. ENERGY STAR Portfolio Manager is a widely used commercial building benchmarking tool that can be applied to a variety of purposes. An ENERGY STAR Portfolio Manager update was implemented on July 17, 2013.

The features that the literature emphasizes are ENERGY STAR Portfolio Manager’s ability to identify under-performing buildings, verify efficiency improvements, and receive EPA recognition (an ENERGY STAR Rating) “for superior energy performance.”

For multifamily facilities, it can be used to manage energy usage to help control energy consumption and operating costs, and to establish an energy management program that includes benchmarking energy performance to track improvements over time.

This tool will likely see an increase in interest when the California Commercial Building Energy Use Disclosure Program (AB 1103) takes effect. (The initial compliance date for this law has been extended to September 1st, 2013.) With any whole-building commercial real estate transaction (sale, lease, or financing), this bill requires building owners to benchmark their facility using ENERGY STAR Portfolio Manager, then to release to parties involved the data and ratings for the previous 12 months. Also, AB 1103 requires electric or gas utilities in California to maintain their customer’s energy use data in a format compatible for uploading into ENERGY STAR Portfolio Manager. The major utilities have automated the uploading process and some utilities also have tools to receive data back from ENERGY STAR Portfolio Manager, such as facility square footage, ratings, and EUIs, so that in the future they can help their clients with their efficiency-improvement projects.

Note that while multifamily properties are not among the building types that can receive an ENERGY STAR Benchmark Rating, using ENERGY STAR Portfolio Manager multifamily properties can currently calculate energy use intensity (EUI) values. (EUI is a useful tool in comparing relative efficiency of facilities in an owner’s portfolio; an ENERGY STAR Rating is comparable to a peer benchmark.) According to the EPA website, “Multifamily

housing communities can use ENERGY STAR Portfolio Manager to track weather-normalized energy use intensity (EUI), energy costs, greenhouse gas emissions, and water consumption.”

ENERGY STAR Portfolio Manager is intended for comparing one building to other similar buildings and is not intended for use to evaluate projects at a given facility. ENERGY STAR Portfolio Manager also allows users to “connect” with utility billing systems to automatically receive energy usage data and to transfer data from ENERGY STAR Portfolio Manager to third party tools such as Compass and EnergyScoreCards.

The ASW Team anticipates that further research will be needed to discover possible future enhancements to ENERGY STAR Portfolio Manager that will benefit and be usable by the multifamily segment as well as data platforms being developed such as the Standard Energy Efficiency Data (SEED) Platform.

Building Performance Compass

The Building Performance Compass, Energy Benchmarking Tool for Multifamily and Commercial Buildings (also called Building Performance Compass—Software for Energy Efficiency Program Optimization) is a tool developed by Performance Systems Development (PSD) and was used in California for programs funded by the American Recovery and Reinvestment Act (ARRA). Compass is a robust multi-faceted tool that focuses on program administration and is described as “software for energy efficiency program optimization.”

The Compass software is an integrated web-based platform that can be used to manage the myriad data types needed for energy efficiency programs. We consider the Compass program as a “tool box” that can provide organization to a set of external (such as engineering analyses, etc.) and online tools.

It is an administration management tool that enables building owners to input their building information for analysis, allows energy consultants to submit improvements, measures, and analysis, and lets program managers track project progress. Compass supports a variety of program types including home performance, direct install, benchmarking, multifamily, and commercial. Compass is able to accept input data from a variety of software sources in a variety of data formats, and has benchmarking capability. Compass is fully integrated with ENERGY STAR Portfolio Manager and can facilitate workflow management and post-retrofit savings tracking.

Compass is primarily seen as a tool that might be offered through or sponsored by the utility—that is, the utility or some other organization might pay for use of the tool so that they can facilitate incentive fulfillment and the customer base will have access at no cost to them. This approach is from the perspective of using the tool’s administration functionality.

Alternatively, to use this software, customers register an account with Performance Systems Development and then purchase the software through the online store. PSD anticipates making a version of the software available to large portfolio owners or managers.

Software Features

The Building Owner Mode begins with an initial assessment, which compares energy information for each of the customer’s buildings to help the customer identify the best candidates for an energy audit.

- Once the user has begun the audit process, the Compass software also allows the user to track predicted versus actual savings starting with the first post-retrofit energy bill. This part of the program compares the user’s monthly demand to show the actual energy savings relative to the predictions made during the energy audit.
- This program also allows audit consultants to import energy models from other programs such as Energy Pro and eQuest. In addition, Excel spreadsheets may be uploaded or downloaded as both .xls and .csv file types. The Consultant Mode can also perform failure analysis on data uploaded by the consultant.

The Administration Mode is intended for use by the utility to keep track of projects as they progress through the program.

- This part of the program allows for a great deal of customization to meet the utility's specific needs. The utility can set up access for users to perform QA reviews, approve/reject project proposals.
- This part of the program can interact with Customer Relationship Management (CRM) systems as well. (The CRM is a utility tracking system.)

This program lets you define multiple levels of user groups:

- Examples of user groups include property representatives, energy consultants, utility administrative staff, utility account managers, financial institution managers, HERS Raters, etc.
- User groups are enabled with various levels of functionality as well as access to appropriate subsets of property level information.

This program also lets you manage multiple processes:

- Multiple processes can be created and managed concurrently with each process engaging actors from various user groups; supporting documents can be uploaded.
- Multiple processes might include facilitating two separate applications for different incentive programs.
- Once defined by the administrator, processes are facilitated by user dashboards and email communications. These help facilitate projects by defining required next steps by specific users.

While multiple user groups are engaged in fulfilling a given process, the functionality is intended to facilitate program administration instead of facilitating property-manager-level process flows. As examples, the processes facilitate application submittals, inspection scheduling, and payment processing. However, it does not enable items such as project evaluation, procurement, and commissioning.

While process flows focus on program administration, Compass does provide access to a multi-facility benchmarking.

- Benchmarks can be performed within a given owner's portfolio of buildings, within a single facility for different time periods, and against an anonymous peer set.
- The peer set can be created by seeding the database, through growth as participation increases, or by synthetic modeled analysis based on energy standards or codes.
- Each of these methods for establishing a peer set offer advantages and disadvantages.

At the moment, single and multi-family analyses are not available because the utility-ENERGY STAR Portfolio Manager interface, the current mechanism to acquire customer usage data, does not recognize residential tariffs, which is an issue that the utility will need to resolve. We need to examine both the functionality of the tool itself as well as the availability of the data that the tool can process. The tool can perform the functions if it is provided the appropriate data.

Compass does provide the ability to save audit and savings estimate documents, but it is not intended as an audit engine. If an engineering analysis of an efficiency measure is performed, Compass can accept the predicted savings, etc., but Compass does not itself facilitate the engineering analysis.

Compass is compatible with modeling programs including Performance Systems Development 's TREAT and eQUEST, and possibly EnergyPro.

Targeted Retrofit Energy Analysis Tool (TREAT) is energy audit software used for comprehensive energy analysis and building modeling and is intended for professional users. TREAT is home energy audit software that claims

to be “the only energy audit software approved by the DOE for all residential housing types – including multifamily.” TREAT features onboard SUNREL energy modeling (also PSD software), dynamic links to local weather logs, and energy savings reports to ensure that projected energy savings are reliable.

In April 2012, the statewide IOUs multifamily program team attended a debriefing hosted by the Hescong Mahone Group (HMG), PSD Consulting and other third parties to demonstrate the capabilities of the Compass tool. At this session several apparent drawbacks were identified:

- The Compass tool offers features that may be obsolete due to expiration of the ARRA funds (i.e., Funding Finder feature used to match ARRA funding sources with needs)
- It appears to have features so complex that its use may be limited to a special set of property owners or managers, perhaps the larger and more sophisticated accounts
- It has other tool design features that would require modification and assessment such as provision for data base inputs, etc. before such a tool could be deployed by the program teams.

Because of this relationship and training requirements for advanced functions, Compass is best suited for users managing a large portfolio of buildings or a single facility that is very closely managing their energy usage. Representatives of a single building who are looking for a quick analysis or advice would not be well served by this tool.

In the table below are key characteristics, features, and associated functionality of the Compass software.

Compass Summary	
Characteristic	Comments
Program Management	<ul style="list-style-type: none"> • Strong functionality; a robust program encompassing a wide range of functions • Can establish and manage multiple utility process flows • Users are granted role-based functionality and access to customer information
Project Management	<ul style="list-style-type: none"> • Defines projects at the facility level and through utility lens • Facilitates process steps with multiple users through active email communication and through dashboard • Permits document upload
Benchmarking	<ul style="list-style-type: none"> • Robust benchmarking ability • Flexible in establishing peer dataset, but data set can be improved
Funding Finder	<ul style="list-style-type: none"> • Not incorporated within the tool itself • Requires knowledgeable energy advisors • Views Energy Upgrade California’s Funding Finder as an entry point to tool operation
Auditing and Savings Estimates	<ul style="list-style-type: none"> • Does not have calculation engine built in • May interact with Energy Pro and TREAT that require trained users • Can compare base case versus retrofit if given measure level savings figures
IDSM	<ul style="list-style-type: none"> • Able to create distinct process flows for each IDSM element
Primary Users	<ul style="list-style-type: none"> • Utility program management staff • Energy advisor (utility or non-utility)
Supported Users	<ul style="list-style-type: none"> • Property owners and managers • Consultants and others
Small / Large Distinction	<ul style="list-style-type: none"> • None
Approach to market	<ul style="list-style-type: none"> • Utility partner • Large property owner (In development)
Cost	<ul style="list-style-type: none"> • To use this software, the user must register an account with Performance Systems Development, and then purchase use of the software through the online store. Pricing TBD.

Other software features include:

- Hosted, web-based solutions with security features
- Reports available as Adobe Acrobat PDF files
- Ability to integrate with customer’s internal program tracking databases
- Integrated help desk

EnergyScoreCards

EnergyScoreCards is an online energy management and benchmarking tool for multi-tenant buildings offered by Bright Power. It is designed to track building energy consumption over time to give building owners insight into how their properties use energy, energy costs, and how their performance compares to similar properties. EnergyScoreCards supports financial planning for energy improvements, can organize energy and water usage data, and can track the progress of energy efficiency projects.

Its benchmarking functionality analyzes utility bills, local weather data, and basic property information to create a Property ScoreCard which summarizes annual utility expenditures, and provides letter grades (A through D) to indicate how a property compares to other similar properties.

Some key EnergyScoreCards features include:

- Benchmarking functionality
- ENERGY STAR Portfolio Manager integration
- Multiple levels of user groups can be defined
- Automatic utility bill retrieval (where online utility bill access is available)
- Energy efficiency retrofit project tracking and recordkeeping
- Analysis of pre- and post- retrofit building performance
- Scoring for buildings (whether or not tenant utility bill data is available)
- Carbon footprint calculator
- Analysis capabilities that are compliant with International Performance Measurement and Verification Protocol (IPMVP) Option C
- Financial forecasting tools
- Can upload documentation in support of defined projects
- User groups have access to the same functionality but can view different subsets of properties depending on their role
- Potential measures can be structured to indicate applicable programs. (For example, if weather stripping is the measure, unique listings can be created for each program so that the user is aware of the various incentive offers that can assist them with weather stripping.)

Features EnergyScoreCards does not have:

- Program administration functionality
- Funding Finder functionality
- Measure level calculation tool

The available multi-facility benchmark improves on the functionality offered through ENERGY STAR Portfolio Manager. Bright Power claims their EnergyScoreCards provide “more useful and informative analysis than what is provided through standard Portfolio Manager benchmarking.”

- Benchmarks can be displayed across any number of metrics while comparing facilities within a given owner’s portfolio of buildings and easily compares weather corrected performance of selected facilities in separate time periods.
- EnergyScoreCards provides each facility a letter grade compared to an anonymous peer set, which is based on other facilities within the system. The peer set population is currently estimated at four thousand facilities and two hundred and fifty thousand units.

- While the peer set cannot be filtered by the users, Bright Power has separated buildings into a handful of categories based on the distribution of tenant and owner financial responsibility.

EnergyScoreCards does provide the ability to save audit and savings estimate documents but is not intended as an audit engine.

Through use of both letter grades and energy use intensity (EUI) metrics, EnergyScoreCards is usable by both basic and sophisticated users. Its range of capabilities is beneficial to sophisticated users, and basic users can also benefit from using this tool if they also work with an energy advocate.

- As an example, the letter grade for weather dependent electric consumption is separate from the proportion of energy consumption attributed to that category.
- While a facility may have a poor grade, it may be in a category that has relatively small impact on overall consumption. Making this connection may be easy for an energy advocate but not apparent to the basic user.
- Some functionality is also likely to be beyond the first-time user's understanding. Overall the system provides digestible feedback to basic users while also maintaining value to the more sophisticated ones.

EnergyScoreCards has been applied in a variety of applications.

- Individual property owners have used the tool both voluntarily and in response to mandatory reporting requirements (such as in the New York area). Of these users, Bright Power estimates that seventy-five percent used the tool voluntarily.
- Additionally, EnergyScoreCards has been used in limited roles by financial clients such as Bank of America and JP Morgan.
- This tool is being used in a utility-level effort in the Midwest.

A summary of key characteristics of EnergyScoreCards is provided in the below table.

EnergyScoreCards Summary	
Characteristic	Comments
Program Management	<ul style="list-style-type: none"> • Not specifically supported • Users granted access to customer information
Project Management	<ul style="list-style-type: none"> • Defines projects at the facility level • Records line item project detail • Allows for document upload
Benchmarking	<ul style="list-style-type: none"> • Robust benchmarking ability • Data set is not robust; can be improved
Funding Finder	<ul style="list-style-type: none"> • Not incorporated within the tool itself • Requires knowledgeable energy advocate • Can support project through creation of intelligent naming conventions for measures
Auditing and Savings Estimates	<ul style="list-style-type: none"> • Does not have calculation engine built in • Can forecast usage if given measure level savings information
IDSM	<ul style="list-style-type: none"> • Nominal support
Primary Users	<ul style="list-style-type: none"> • Property owners and managers • Energy advocate (non-utility) • Single point of contact (utility)
Supported Users	<ul style="list-style-type: none"> • Others
Small / Large Distinction	<ul style="list-style-type: none"> • Provide letter grade and Energy Use Index (EUI)
Approach to Market	<ul style="list-style-type: none"> • Direct to market • Financial institution partner • Utility partner
Cost	<ul style="list-style-type: none"> • A subscription service for about \$500 per year

Universal Audit Tool and SCE's Energy Advisor Tools

The Universal Audit Tool (UAT) is a collection of all of the online audit tools that SCE puts into service and software tools that the utilities have been assigned by the CPUC to create and integrate. These tools are made available by the utility to their customers as free, online applications.

The two main software tools that currently reside under the UAT umbrella are:

- Business Energy Advisor
- Home Energy Advisor

The Energy Advisor series of software tools is designed to provide accessible information to online users in a self-help format. SCE describes Energy Advisor as a set of tools that helps SCE customers find ways to save energy, see where they are using energy most, and learn about other SCE programs that help them save on energy costs. These tools are more user-friendly and provide information in a simplified form through the use of algorithm-based savings calculations that focus on specific measures within individual properties. Using these online programs, users answer questions to get an analysis of energy use, along with customized recommendations for how they can start saving and what to do first. This is in contrast to more advanced tools that apply building simulation models or serve multiple property portfolios but that may not provide the programmatic landscape that the Energy Advisor series provides. Based on data they enter, users can receive customized recommendations, can create a plan for saving energy, and can track savings over time.

SCE is likely to add functionality in the near future that will allow multiple commercial accounts to be aggregated as part of a single analysis. If this is undertaken, further investigation will be needed to determine the ability of the tool to aggregate both commercial and residential accounts, and provide a measure mix that is applicable to the multifamily segment. It is SCE's intent to add to this series of tools so that multifamily specific functionality is created to support common use areas of single facility multifamily properties.

Home Energy Rating System

Because we are considering the HERS framework as a possible research path, we are including the following background information.

HERS Providers are entities that are recognized by the California Energy Commission. The Providers sponsor HERS Raters who conduct efficiency tests in residential and commercial buildings after the installation of certain, code-related equipment, such as new air conditioning system, insulation installations, and more.

The HERS and building code framework distinguishes between low-rise and high-rise buildings.

- Low-rise multifamily buildings, those with three or fewer habitable floors, are predominantly compared against the residential building code (with some system specific exceptions);
- High-rise buildings are treated as commercial buildings.

HERS Raters are independent businesses certified through one of the HERS Providers. They are typically commissioned by a building owner or developer and generate four typical outputs.

- The HERS Index is a score relative to the energy use of a home, on a scale from 0 to 250.
- A HERS Rating Certificate is a label that displays the HERS Index, energy impact, energy efficiency features.
- The HERS Standard Approach Recommendations Report is a single-page report covering recommendations for energy efficiency improvements, energy savings for each improvement, and HERS Index reduction for each improvement.

- The HERS Full Report is not a standard report—it is unique for each building and is assembled by the HERS Rater, and is sometimes 80 pages long. The report is a comprehensive review of the audit and assessment of the building.

Some reports are submitted to the HERS Provider, mostly those for single family buildings. Because there is no official multifamily approach, multifamily outputs typically are not posted.

Each HERS Provider has its own, unique registry (document repository), separate from the other providers. This contains a collection of the registered HERS forms and summary project information. Providers do not share this information and expect utility programs to work with HERS Raters or building owners to gain access to summary data or reports.

Another clearinghouse resource is the California Tax Credit Allocation Committee that collects HERS reports for financing homes that demonstrate reduction in HERS II ratings by 10%. This is mostly applicable to affordable housing homes, as opposed to market rate, and is primarily for single family homes. (Ownership of the actual reports was uncertain but we were able to determine that the report does stay with the property upon sale.)

Approval of HERS rating software is required as part of the approval and certification of a HERS Provider. HERS Providers also are required to certify various levels of staff that support the HERS process. Chapter 8 of the HERS Technical Manual provides a detailed description of the various roles.

Field Verification and Diagnostic Testing Rater and the California Whole House Home Energy Rater are two high-level roles that support completely separate functions.

- The Field Verification and Diagnostic Testing Raters are involved with establishing compliance with the 2008 Building Energy Efficiency Standards;
- The California Whole-House Home Rater generates recommendations for improvements in existing buildings.

HERS Raters in this area have tended to focus on single family homes rather than multifamily homes, but HERS Providers are working with the California Energy Commission to better align processes to the multifamily sector.

Part of our investigation may be to determine whether HERS auditing or benchmarking is a path that warrants further investigation. We will need to consider the advancement of HERS in the MF context.

Thus far, we have identified three HERS Providers:

- One focuses on new construction; the other two do new construction and existing buildings.
- One is working with the CEC to develop a MF specification or process (the development timeline is vague) but we do know there's a proposal in development. The MF protocols are not yet defined, and it will probably be two to three years until it is finalized.

Appendix C: General Third Party Online Tools

There are additional audit tools found online worth mentioning that provide core benchmarking functionality as well as other usable features.

The tools of this type that we considered are:

- American Utility Management Statistical Comparison of Relative Efficiency (AUM SCORE)
- WegoWise
- FirstFuel Building Energy Analytics
- Open Studio

AUM SCORE

The American Utility Management Statistical Comparison of Relative Efficiency (AUM SCORE), developed in conjunction with Georgia Tech University, is a benchmarking tool. The creators of this tool made a concerted effort to establish a dataset of multifamily properties by interviewing 300 property owners representing over 2,400 properties.

The top performing facility within a given subset of properties is given a score of 100 and subsequent properties are then compared to that performance. This score is combined with a color coding to easily communicate relative position of a given property within a dataset. It further uses the top performing facility to determine ideal usage for properties in a given dataset. The distinguishing characteristic of AUM SCORE is this statistical approach to benchmarking.

This tool's approach to energy efficiency benchmarking considers properties with similar configurations, geographic regions, property types, and other characteristics to determine energy efficiency among its peer group. Using this tool, owners can compare a property's energy efficiency to other similar properties in their portfolio or in a given region. After benchmarking scores are determined, the tool helps identify potential improvement options. Also, AUM has energy professionals available to provide advice regarding ways to make the properties more energy efficient.

WegoWise

WegoWise is a cloud-based set of tools by WegoWise, Inc. used to track and evaluate the energy and water use in multi-family buildings.

WegoWise can link automatically to a building's utility bills, then display online consumption and costs over time. It also can compare a building's use to other buildings in a portfolio and to other, similar buildings using real-world data from their database of building performance information. WegoWise can let owners or managers know which buildings are performing poorly, annual energy use, and savings that are a result of energy efficiency upgrades. It offers tools for advanced users to create custom benchmarks.

Users can access certain features online at no cost:

- Automatically updated utility data
- Track unlimited number of buildings
- Comprehensive building-level analytics
- Building upgrade tracking and analysis
- Custom benchmarking
- Data exporting

- View data shared by other users

For advanced features such as sharing data with others and multi-facility comparisons you pay a fee that starts at five dollars per building per month goes up to \$20 per building per month.

In one data view, it offers a color coded scatter plot of facilities with the X-axis representing relative cost and the Y-axis representing relative efficiency. The source of the dataset used for creating benchmarks was not readily apparent, but WegoWise benchmarks a given facility against both similar buildings and efficient buildings. Further, it has functionality to track the impact of efficiency improvements.

WegoWise provides a way for owners to understand the performance of their entire portfolio. This tool does advanced analysis based on the buildings' physical characteristics and utility data (which is collected automatically if the utility has the capability of providing the data). Monthly energy use data can be passed through to ENERGY STAR Portfolio Manager which can then pass the information and data on to third party.

FirstFuel Building Energy Analytics

FirstFuel Building Energy Analytics provides remote auditing services to a single building or a portfolio of buildings through a combination of software analytics and building science staff.

Building benchmarks are created based on a physical address and access to 15-minute utility data. Building science staff then interprets the information in conjunction with satellite imagery of the individual facility. They coordinate with end use customers to determine low- or no-cost measures as well as investment opportunities.

Initial pricing indicates that the service is made available to customers at \$5,000 to \$7,500 per facility with ongoing monitoring available at an additional \$2,500 annually.

Open Studio

OpenStudio is a free, open-source, whole-building energy simulation software program developed by the National Renewable Energy Laboratory (NREL) and the U.S. DOE. It is a collection of software tools to support whole building energy modeling using EnergyPlus and advanced daylight analysis using Radiance (programs from the SketchUp environment).

OpenStudio adds the building energy simulation capabilities of EnergyPlus to the SketchUp environment. This program models heating, cooling, lighting, ventilation, and other energy flows in buildings.

Using this suite of tools, users can create the building geometry, open and edit existing EnergyPlus input files, run EnergyPlus (and Radiance), and view the results. After the building geometry has been created using SketchUp and the OpenStudio plug-in, there are additional applications to further modify and analyze the building energy model.

Appendix D: Summary of Existing Reports

This appendix presents a summary of some of the publically available reports and documents that can provide interested parties a broader background of the interests of the multifamily market segment.

File Name	Document	ID, If Applicable	Type
Advice 2681-E-B	Advice 2681-E-B	Advice 2681-E-B	Filing
2013-2014 EE Application - Exhibit SCE-4A.pdf	Customer Energy Efficiency & Solar Division Program Implementation Plans 2013-2014		Filing
2013-2014 EE Application - Exhibit SCE-4B.pdf	Customer Energy Efficiency & Solar Division Program Implementation Plans 2013-2015		Filing
HEER__BCE_083012_FINAL	Program & Technology Review of Two Residential Product Programs: Home Energy Efficiency Rebate (HEER) / Business & Consumer Electronics (BCE)	SCE0306	EM&V
SCE_MFEER_Process_Evaluation_Final_Report	Process Evaluation of Southern California Edison's 2006-2008 Multifamily Energy Efficiency Rebate (MFEER) Program	SCE0279	
PGE_SCE Combined MFEERP Process Evaluation Findings OUT TO CLIENT 120518	PGE and SCE Multifamily Energy Efficiency Rebate Program Process Evaluation Findings	PowerPoint	PowerPoint
MultiFamily Family Pilot Proposal 10-1-12	Multifamily EE Financing Pilot Proposal		Proposal
OBR_PPT_20120912	Onbill repayment PowerPoint: No Title Page	PowerPoint	Proposal
Statewide_Benchmarking_Process_Evaluation_Report_CPU0055	Statewide Benchmarking Process Evaluation Volume 1: REPORT	CPU0055.01	EM&V
LMT_Workbook_Final_Report_2-24-12	Development of a Lighting Solutions Workbook for the LMT Program	SCE0308	EM&V
CPUC Rulemaking 94-04-031 Decision 97-10-031 October 9, 1997	CPUC Rulemaking 94-04-031 Decision 97-10-031 October 9, 1997		
CPUC Rulemaking 08-12-009 Decision 11-07-056	This decision is available online at http://docs.cpuc.ca.gov/published/FINAL_DECISION/140369.htm		
MF HERCC_Multifamily Program Design_Final_04112022	Improving California's Multifamily Buildings: Opportunities and Recommendations		
0901_CCAHandbookChapter1	The CCA Handbook: A Guide to Conducting Business with SCE under Community Choice Aggregation		

Appendix E: Sample CISR Form

Filename: FINAL MF Audit Tool Technology Program Needs Assessment
Directory: C:\Users\aalzugaray\Documents
Template: C:\Users\aalzugaray\AppData\Roaming\Microsoft\Templates\Normal.d
otm
Title:
Subject:
Author: Alex Alzugaray
Keywords:
Comments:
Creation Date: 7/26/2013 4:22:00 PM
Change Number: 30
Last Saved On: 7/27/2013 10:28:00 PM
Last Saved By: Alex Alzugaray
Total Editing Time: 385 Minutes
Last Printed On: 7/27/2013 10:53:00 PM
As of Last Complete Printing
Number of Pages: 55
Number of Words: 20,251 (approx.)
Number of Characters: 115,433 (approx.)