

The State of Illinois

Report on Building Benchmarking and Labeling

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Table of Contents

- Acknowledgements..... 1
- Table of Contents 2
- Executive Summary 3
- 1.0 Introduction..... 5
- 2.0 Related Illinois Public Policy Directives 7
 - 2.1 Overview of Public Act 096-0896 7
 - 2.2 Executive Order Number 11 (2009) 7
- 3.0 The Process of Analyzing Existing Building Energy Consumption..... 8
 - 3.1 Collecting and Processing Energy Data..... 8
 - 3.2 Using an Energy Rating or Label to Compare Energy Use 8
 - 3.3 Disclosing the Information 9
- 4.0 Building Energy Tracking in Other Midwest States..... 9
- 5.0 Project Development..... 10
 - 5.1 Benchmarking and Labeling Tool Selection..... 11
 - 5.2 Methods of Data Collection..... 13
 - 5.3 Training of Stakeholders and Potential Users..... 15
- 6.0 Conclusions Derived from the Data and Analysis Performed..... 15
 - 6.1 Confirming Whether a Building Qualifies for an EPA ENERGY STAR Label 15
 - 6.2 Analyzing Energy Use of Building Types Unable to Receive a Label..... 17
- 7.0 Possible Future Initiatives or Policies..... 18
 - 7.1 Complete a Comprehensive Energy Analysis of All State-Owned Buildings..... 18
 - 7.2 Integrate Energy Data within Capital Improvement Projects 18
 - 7.3 Improve Energy Efficiency Rebate Programs 19
 - 7.4 Consider Benchmarking of Private Sector Buildings 19
 - 7.5 Incorporate Building Component Work in Energy Upgrade Projects 19
 - 7.6 Increase Energy Managers Ability to Collect Data 20
- Appendix A - Referenced Tools 21
- Appendix B – Data Compiled in EPA ENERGY STAR Portfolio Manager 23
- Additional Resources 24

Executive Summary

The goal of this study was to gain a perspective of the current status of building energy use and how energy labeling could be applied to state and public buildings. Due to the lack of an existing building energy and asset database, buildings owned by the State of Illinois were used as a case study to establish how building energy labels could be used as a method of comparing energy usage. Attempts were made to include a wide variety of building types and locations throughout the State to compare these processes with different viewpoints.

The process of tracking the actual energy consumed, over time, of an existing building and comparing the results to similar buildings or an applicable standard is often termed “benchmarking.” Benchmarking helps reduce energy and maintenance expenditures in buildings, by providing information on the performance of existing buildings.

Building energy rating is the process of measuring, labeling, and disclosing information on the energy use of both existing and new structures. Building energy rating tools assess, compare, and score the energy used between similar types and sizes of existing structures in order to understand and manage overall energy consumption. Building energy data derived from benchmarking can also be used to generate an energy performance “rating” or “label.” Further, a public means to display this resulting energy use score is through an energy “label” or scale metric. Using these means of measurement allows for accurate comparison between similar facilities by assessing each building’s operational energy performance within a single figure.

To effectively understand the energy picture of all state-owned buildings, this report concludes with an outline or “roadmap” of the following recommendations:

1. Continue compilation and correction of utility billing information for all state-owned facilities.
2. Complete comprehensive energy performance benchmarking and energy performance labeling of all state-owned buildings, following a similar approach outlined in this pilot study.
3. Create a central repository to contain the data collected/created from the above two directives for State use and available for private entity comparisons (with read-only access).
4. Use data accumulated from benchmarking and labeling of existing buildings to make informed choices to optimize existing building envelope, mechanical, and electrical systems. Employ this information to determine if and where energy investments should be made.
5. Consider offering a similar labeling program structured for privately owned buildings.

The goal of this study, as stated in Public Act 096-0896, was to pilot a method of identifying, collecting, and analyzing building energy data to create a clear and identifiable building label. For this study, stakeholders¹ found the best source of data was the State of Illinois facilities management data. Existing databases and no cost tools were implemented to compile building asset and energy consumption information into a benchmarking database. By processing this data within an energy rating tool, energy consumption amounts were compared across building types. The data also helped to compare each facility’s energy use to one another as well as to develop a score or label for each building.

11 individual buildings and 6 campuses located throughout the state were analyzed during the study, comprising a typical sample of the State of Illinois’ portfolio of owner occupied buildings. These included three building types (A-C) and three campus types (D-F):

¹ Description of stakeholders is found in Section 5.0 of this report.

- | | |
|--------------------------------------|-------------------------------------|
| A. Mid-size / Large Office Buildings | D. Correctional Facilities |
| B. State Police Headquarters | E. Mental Health Centers |
| C. Maintenance Garages | F. Veterans Administration Campuses |

With these selected buildings, this study highlights the potential and limitations of the carefully chosen tools. This study also utilizes the existing procedures currently applied to manage energy consumption of state-owned buildings. Some benefits that became apparent during the collection and analysis of the building energy data, as well as during the performance labeling calculations, include:

- A state owned facility which had already received an EPA ENERGY STAR Label, awarded to the top 25% most efficient buildings, was found to maintain its better than average energy use. Another previously unanalyzed building was found to qualify for an ENERGY STAR Label as well.
- **Benchmarking and labeling a building is a relatively efficient process. It takes three to four hours to gather the necessary utility data, manually input and process this information using the benchmarking tool, as well as acquire an energy label for each building.**
- During the study, errant utility data and issues with meter readings were also uncovered that will both benefit the state in immediate energy and monetary savings, as well as assist the state to monitor energy use in a more effective way.
- Understanding and disclosing energy consumption data to building managers and tenants leads to positive behavior modifications. **In fact, energy reduction most likely occurs when building user education, consumption data analysis, and implementation of retrofit or equipment upgrade projects occur in unison.**

Energy tracking, assessment, and ratings are especially useful in the commercial and governmental sectors where facilities managers control energy use of a portfolio or large group of buildings. With all state agencies participating, an accurate energy picture can be developed of all buildings with conditioned spaces (both heated and cooled) throughout the state. By creating a broad, overarching data set of all state-owned buildings, planners and decision makers will be able to more precisely implement, measure, and verify the outcome of any completed energy-saving building improvement programs and/or projects. Similar participation of privately owned buildings could also yield comparable benefits. If such data was available, comparison of energy use during a building's time of sale could facilitate more accurate investment information for financing building upgrades and stimulate improvement to the overall building stock.

1.0 Introduction

Building energy use accounts for almost 41% of U.S. primary energy use². Benchmarking tracks the energy consumption of a single, existing building or a group of existing buildings over time and compares the findings against a set of similarly functioned and sized buildings. Benchmarking information is accumulated through the collection and analysis of actual energy used, which is typically obtained from data derived in utility energy bills.

Measuring the energy consumed is the basis for determining how efficiently a building or a group of existing buildings uses energy. Typically, three main evaluation techniques are utilized in comparing total building energy use relative to a baseline or standard. These include:

1. Assessing a single building against itself over time – for example, comparing the energy consumed during the year 2006 versus in 2012.
2. Analyzing similar buildings in a portfolio – as an illustration, one state patrol headquarters can be compared to another patrol headquarters within the same climate zone³ or region.
3. Evaluating against a modeled baseline – such as the energy used in an average building within a portfolio in the year 2009. Another method is to measure the data against a building energy code, such as equal to or above the 2012 International Energy Conservation Code (2012 IECC).

Further conclusions can be derived when the benchmarking data is processed by an energy rating or labeling tool. With these tools, the actual energy consumed is compared against a baseline of similar buildings, such as the database of existing buildings found in the Commercial Buildings Energy Consumption Survey (CBECS)⁴. The result of this comparison is a scaled energy performance “rating” or “label.” The produced label ranks the consumption of the chosen building against similar buildings in a comparable climate zone or region. An analogy is often made between a car’s miles-per-gallon (MPG) rating and a building’s energy performance rating – both suggesting the efficiency of the systems that run the machine for its intended purpose. A rating or labeling tool’s scalable metrics (typically a 1-to-100 or A-to-F scale), allow for accurate comparison between similar types and sizes of facilities. By summarizing the energy use into a single number, buildings across a portfolio can be compared in a more useful manner.

Benchmarking and assessing the energy consumption of buildings can assist building owners and operators to accomplish three main goals:

1. Facilitate energy data collection
2. Evaluate opportunities for improvement
3. Quantify and verify energy savings

With this assembled data, a building owner can make educated decisions regarding a host of operational activities. They can more accurately predict annual energy and operation budgets. In addition, these performance indicators show whether an investment grade energy audit or a more detailed analysis is required to understand which specific building components or equipment are inefficient performers. This data can also be utilized by new construction projects to predict the energy consumption of

² NREL Technical Report, Energy Sector Market Analysis, TP-620-40541, October 2006.

³ Climate zone refers to a geographic area with a similar climate as measured in heating or cooling degree days (a measure of how hot or cold a climate is)

⁴ CBECS is a national survey conducted every few years by the Department of Energy of the energy use of existing buildings. It provides the best statistically valid data set of energy use by existing buildings currently available.

similarly designed buildings or as a baseline to design more efficient structures. Potential renters can use these actual performance metrics to understand their prospective lease arrangements.

Simultaneously, this work can increase energy awareness of building users or occupants, stimulate the local economy with informed investment strategies, as well as build public trust and confidence that buildings are operating in an efficient manner - all while saving taxpayer dollars. Without an awareness of the energy consumed, investment in energy-reducing strategies is difficult to determine or verify.

Who Benefits from the Information Derived From Benchmarking?

Energy performance information is valuable for **property owners and facilities operators** who are attempting to maximize the efficiency of their existing buildings. These energy statistics also help **building designers** predict energy consumption of new buildings or assess energy savings from potential energy conservation measures in existing buildings. Typically, the predicted energy use for new buildings is derived from the actual performance of similar existing buildings. Unfortunately, the current lack of accessible data on existing building operations makes it difficult to formulate assumptions and accurately predict potential energy usage for new buildings.

On a large portfolio scale, **utilities** may also be interested in energy performance information or labels. With these statistics, utilities would be able to target groups of buildings in neighborhoods or campuses for equipment upgrade incentive programs. In general, each of these stakeholders is currently uninformed of the energy use status of their buildings; incorporating benchmarking into everyday practice for public and private building owners would address this situation.

Stakeholders Involved in Project

Following the objectives outlined in Public Act 096-0896 and Governor Pat Quinn's Executive Order 11 (2009), a stakeholder group was formed to complete a study on benchmarking and building energy labeling. The group was led by the Illinois Capital Development Board and the Department of Central Management Services (CMS). Also participating in this study was the Midwest Energy Efficiency Alliance (MEEA) which was requested to develop the methodology of the study, process the data, and complete the analysis. The Energy Resource Center at the University of Illinois – Chicago (UIC) worked with CMS to refine the utility billing information for each facility. UIC had already established this process with CMS before the study began, but was instrumental in gathering the necessary utility data for this study. The stakeholder group also included the Illinois Department of Commerce and Economic Opportunity and American Institute of Architects - Illinois Chapter. Both of these organizations gave insightful opinions on the legislative language, the tool selection process, and possible outcomes of the study once implemented on a broader scale.

After an introduction to the basic process of benchmarking and building energy labeling in Section 3.0, Section 4.0 describes benchmarking activities in other Midwest states. The body of this report is formatted in a similar fashion to the Workplan developed by the stakeholder group. Section 5.0 summarizes the study's process, while Section 6.0 includes an analysis of findings generated by the select group of buildings comprising this study. Section 7.0 outlines recommendations for future building labeling initiatives.

Coordination between state agencies and departments was critical to gain an overall picture of current building energy consumption. By integrating benchmarking and labeling as everyday facilities management practices, energy management of private and public buildings will continue to produce

energy savings, reduce ongoing maintenance costs, and create higher performing buildings within the state of Illinois.

2.0 Related Illinois Public Policy Directives

The following section outlines the statutory basis for conducting this pilot study.

2.1 Overview of Public Act 096-0896

The State of Illinois General Assembly enacted Public Act 096-0896 with the goal of “identifying a simple and easily understood label for a building or facility that indicates its energy use.” This Act was created to implement a pilot benchmarking and building energy labeling program for public and privately owned facilities. Specifically, this Act’s language included the following:

Be it enacted by the People of the State of Illinois, represented in the General Assembly:
Section 5. The Capital Development Board Act is amended by adding Section 18 as follows:
(20 ILCS 3105/18 new)

Sec. 18. Study; building energy labels.

(a) On and after the effective date of this amendatory Act of the 96th General Assembly, the Board, in consultation with the Department of Commerce and Economic Opportunity, shall initiate a study of building energy performance measures for the purposes of identifying a simple and easily understood label for a building or facility that indicates its energy use.

(b) The Board shall identify no less than 10 buildings to serve as case studies for measuring, reporting, and comparing the energy consumption using widely recognized and accepted indicators such as British Thermal Units per square foot. Consideration shall be given for a variety of representative building types in different geographic regions of the State to provide additional information and data. The Board shall use existing reports and data from the Illinois Energy Efficiency Committee created by Executive Order 2009-07, the Commercial Buildings Energy Consumption Survey, the Residential Energy Consumption Survey, and other available sources.

(c) The Board shall report its findings and recommendations to the General Assembly by July 1, 2012.

2.2 Executive Order Number 11 (2009)

Governor Pat Quinn issued Executive Order 11 in 2009 to coincide with goals to reduce energy consumption in state-owned, public facilities. A portion of this Executive Order uses a baseline year of 2008, similar to benchmarking tools and comparisons. In addition, it accurately suggests how benchmarking and labeling of buildings can enable actual information to be disclosed to decision makers on energy budgets, which buildings to target for energy reduction measures, and better facilities management operations (including behavior modification). This study is one of the initiatives to be completed toward the stated goals of this Executive Order. The specific language which relates to this study includes the following:

Executive Order: To Reduce the Environmental Impact of Illinois State Government Operations

II. Energy Efficiency and Conservation

- a. To the extent possible, agencies shall implement energy efficiency practices with respect to the operation and maintenance of all State-owned and State-leased buildings. Such practices shall include, but not be limited to, the following:
 - i. Turning off lighting in unoccupied areas;
 - ii. Turning off office equipment and electronics when they are not in use;
 - iii. Adjusting the setting of space temperatures; and
 - iv. Properly and regularly maintaining, inspecting, and re-commissioning or re-tuning heating, air conditioning and ventilation equipment to ensure optimal performance.
- b. In pursuit of the goal of meeting State greenhouse gas reduction targets, agencies shall cooperate in employing cost-effective efficiency measures to reduce electricity consumption and natural gas consumption at State-owned facilities by 25 percent each by July 1, 2025 as compared to fiscal year 2008 levels. These measures shall include, but not be limited to, the prioritization of capital upgrades and the implementation of operating policies and strategies that will deliver appropriate comfort levels while minimizing energy usage.

3.0 The Process of Analyzing Existing Building Energy Consumption

This section outlines the basis for this study, offering a three step process any organization can follow to collect, analyze, and interpret their energy use data. This information can be utilized by a variety of stakeholders – both in the private and public sectors.

3.1 Collecting and Processing Energy Data

For existing buildings, data is collected from the Building Owner’s utility energy bills or from the utility company’s records. Obtaining energy consumption data can assist in determining if the levels are consistent throughout a year or if peaks and valleys occur due to abnormal events.

From the energy consumption data, calculations can determine a building’s Energy Utilization Index or Energy Use Intensity (EUI), representing the total energy consumed by a building relative to its size. The EUI offers an initial building energy performance assessment and is utilized to demonstrate the actual energy use in existing buildings. Typically, this scaled measure uses a metric of “kBtu” (combining electric (kilowatts) and natural gas (Btu’s) of energy use) on a square foot basis per year, i.e. kBtu/sqft/year. Energy use intensity can also represent the predicted energy use for a building during the design process; sometimes this is referred to as the “PEUI.”

3.2 Using an Energy Rating or Label to Compare Energy Use

After compiling energy use data, existing buildings can be assigned a numeric rating or score according to a predetermined scale of energy use – such as 1 to 100 or A-to-F. This type of rating functions as a “miles per gallon” rating for buildings and allows for equivalent evaluation among different buildings with similar sizes or functions. A building rating uses the same information compiled in a benchmarking tool while combining additional aspects of the building’s characteristics. Comparing buildings of similar types and with similar usage patterns can allow for evaluations between individual buildings, but can also assist in normalizing weather or facilities management practices.

Buildings with a rating or label can be compared across climate zones and use/types to determine best performers or those which are in need of equipment upgrades, renovations, or additional education of operators. For example, by comparing the rating of two separate State Police Headquarters, each with a

similar number of users, operational hours, location/climate, etc., one can determine the efficiencies of the HVAC equipment or whether the building envelope is the determining factor in energy consumption amounts. A building energy label can also provide a simple indication of how well a building facility manager or owner is administering the energy use compared with peer and neighboring buildings. By expanding this second step, energy use in a group or portfolio of buildings, with similar equipment and composition, can be compared.

3.3 Disclosing the Information

The final step is disclosing the energy use information to decision makers. By compiling building energy use data and assessing the information in a rating or label, the information is more accessible to each partner in the building management chain – from the local Facilities Manager up to the Department Administrator or Portfolio Advisor. Providing the accessed data to the building management team presents the facts necessary to make educated decisions on how to manage energy use within building(s). By providing the information to all the building users, including the tenants or occupants, the decisions made by the management team will be reinforced and more easily adopted.

In addition to immediate energy management use, these tools can also be used to verify the impact of energy equipment upgrades or renovation work. The data compiled during benchmarking and energy use rating processes provide valuable information which can be used to determine if certain buildings are candidate(s) for a more in-depth energy analysis. This information can assist in shaping facilities management budgets and creating energy use requirements for new construction of similarly sized structures.

In the future, the process established and information gathered during this pilot can be replicated to include all state-owned facilities in Illinois. With such information collected and analyzed, the State of Illinois can follow what other Midwest state governments, such as Iowa, Wisconsin, and Minnesota have already implemented. Following a similar approach, Illinois will have the means to reduce their energy use in public buildings, which may also apply to privately owned and operated facilities, as well as non-profit building incentive programs.

4.0 Building Energy Tracking in Other Midwest States

Rating and labeling tools have been created and implemented for many building types including public, commercial, and residential buildings. Energy tracking and assessments are especially useful in the commercial and governmental sectors where facilities managers control energy use of a portfolio or large group of buildings. Nearly all state governments in the Midwest currently track the energy consumption of their public buildings. The following three examples briefly demonstrate how benchmarking projects have been implemented and how the results translate to informed decisions on how and where to invest their fuel and capital improvement budgets. In addition to the states below, the state governments of Michigan, Ohio, and Missouri have implemented similar programs.

Iowa

In 2010, the Iowa Office of Energy Independence entered into an agreement with Iowa State University to have the Iowa Energy Center begin a pilot project creating an energy benchmarking database. This pilot was intended to demonstrate the potential energy savings that can be incurred from increased energy awareness and informed decision-making. For their pilot, the Iowa Energy Center defined public building sectors to include city, county, K-12, community colleges, and state-owned facilities. The Iowa

Energy Center managed this pilot project, which created an initial energy benchmarking database for 1,200+ public buildings (about 23% of the total). **From their 2012 report results, the Iowa Energy Center estimated that about 37% of their surveyed sites have potential for inclusion of energy efficiency measures and the possibility to save an estimated 300,000 MMBtu (million BTU's) per year – an equivalent of \$3.9 million per year in energy consumption savings.**

Wisconsin

The Wisconsin Department of Administration began a benchmarking program to track the energy use of their public buildings in 1996 in order to establish a set of goals for building energy reduction. In 2010, they invested \$80 million under guaranteed cost savings performance contracting to save the state over \$9 million per year in measured energy expenditures, as compared to a baseline of FY2005 use. The Department of Administration projects to continue investment in energy reduction projects to meet a yearly goal of 10% reduced energy consumption. Projects shall be selected individually by each of the eleven state agencies. The database of on-going, collected data was used to assess the progress completed towards the stated goals and continues to inform their energy managers as to which major facilities to target for the next round of energy upgrades.

Minnesota

Energy performance benchmarking for existing buildings and energy design guidelines for new buildings were established by a 2001 law in the State of Minnesota, known as the Buildings Benchmarking and Beyond program. By incorporating state, county, and municipal buildings into one database, energy use comparisons can be made between different regions of the state, as well as among building types not always included in all benchmarking and labeling programs. The Minnesota Department of Administration will continue to track the energy performance results of over 7,000 structures and incorporate these results into their government procurement policies and incentive programs. Minnesota's benchmarking process enables each associated governmental organization to prioritize their energy conservation activities, so that the poorest performing buildings will be addressed first. By utilizing a continually updated database of building energy use, each state agency will be able to implement their maintenance and improvement budgets in the most cost-effective manner.

5.0 Project Development

The Capital Development Board (CDB), along with the Department of Central Management Services (CMS), convened a stakeholder group in April, 2012. This group incorporated members of the Illinois Energy Efficiency Committee, the Department of Commerce and Economic Opportunity (DCEO), American Institute of Architects Illinois, and the Midwest Energy Efficiency Alliance (MEEA), in order to create a methodology to complete this study on building energy ratings.

The group formulated a Workplan to determine the process for the benchmarking and building labeling pilot program to follow. The following methodology was utilized to complete this study:

1. Select tool(s) to use for benchmarking and labeling
2. Identify buildings and campuses to include in study
3. Gather necessary data
4. Input data into the selected tool(s)
5. Analyze data and determine energy label
6. Compare results to confirm accuracy
7. Complete report describing results and conclusions

5.1 Benchmarking and Labeling Tool Selection

The stakeholder group reviewed a variety of available tools to act as a central repository and database for the benchmarking information. The U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA), along with a variety of private developers, offer online tracking software packages and tools to assist in the tracking, assessment, and rating of building energy use. Each tool utilizes data gathered in the Commercial Buildings Energy Consumption Survey (CBECS) as a baseline comparison for energy use. Selecting the right tool depends upon a number of variables including cost, project timeline, and desired outcomes.

Many state and city governments, as well as private building owners and portfolio managers, use EPA ENERGY STAR Portfolio Manager (ES PM) as their tool of choice for commercial and public buildings as it has no upfront fees or ongoing costs associated with its use (see Appendix 'A' for more information on all tools mentioned in this report). As with most benchmarking tools, ENERGY STAR Portfolio Manager uses a web based interface through which the user inputs or uploads information. Although the ES PM tool covers a limited number of building types and uses national comparisons of energy use, it remains an industry standard. As an example, the cities of New York, NY; Austin, TX; and San Francisco, CA each track their own buildings with this tool. These cities also use ES PM as a verification tool to confirm the impact of energy equipment upgrades within their large residential and commercial building programs.

Both the State of Iowa and State of Minnesota utilized the B3 Tool (see Appendix 'A' for further information), customized for their state's climate zones. B3 also expands the number of available building types beyond Portfolio Manager's current pool of fifteen and incorporates building types more akin to public entities, such as public safety buildings, maintenance garages, and libraries. A variety of additional features are available within other privately developed benchmarking tools including additional building types and customizable features. As an example, the combined city-county government of Lexington, KY uses a privately developed program called EnergyCAP (more information can be found in Appendix A). This benchmarking program completes three tasks at once - tracking interdepartmental utility bills, creating automatic billing and payment cycles, and benchmarking their building energy use.

There is also an assortment of labeling programs available, either in conjunction with a particular benchmarking tool or as a stand-alone product. Most benchmarking tools connect with EPA ENERGY STAR Energy for Buildings Performance Label (ES Label) and indicate which buildings are eligible for an award – once the facility performs better than at least 75% of similar buildings nationwide (i.e. receives at least a 75 out of 100 score) See Figure A on the next page for an example of this labeling report. Other tools generate a different scale of comparison, such as an 'A to F' grading system (ASHRAE EQ)⁵ or 'one to five stars' (See B3 tool in Appendix A). Compatibility between different ratings is sometimes difficult to determine, so it is often recommended to maintain a consistent type of rating, as was performed during this study.

An additional tool considered during the study was the Commercial Energy Asset Score (see Appendix A for more information). As part of a national building energy program created by the U.S. Department of Energy, this tool can be used to score or label commercial buildings. Currently in pilot phase, this web based interface allows users to benchmark their building's energy use while automatically creating a simulation energy model to compare the total energy use with a code equivalent building. For

⁵ For more information on the ASHRAE EQ label, see <http://buildingenergyquotient.org>

comparison purposes, this is a two-in- one tool which can be used to both benchmark energy use and generate a building label. As the name implies, the DOE Commercial Energy Asset Score generates a building performance score and, just as important, also identifies possible energy upgrade opportunities or equipment retrofits for building owners to consider. The stakeholder group identified this tool as a good possibility for implementation, but noted the tool offered only a limited number of building types during the current pilot phase, which did not incorporate the diversity required to complete this study.

The stakeholder group selected the EPA ENERGY STAR Portfolio Manager (ES PM) tool as a means to track the energy use of State buildings and campuses for this study, along with the ENERGY STAR Label to score and disclose the total building energy consumption. Each of these tools use the industry standard of measurement – thousands of Btu’s per square foot per year basis (kBtu/sqft/year). Using this metric of comparison, the total energy use of electricity, natural gas, propane, or any other fuel consumption can be converted and combined into one number. ES PM, as well as most benchmarking and scoring tools, can also incorporate energy producing equipment (solar PV, wind turbines, etc.) into the sum of energy consumed.

The total energy metric of kBtu/sqft/year is not only used by most benchmarking and labeling tools, it is also the means of comparison by the U.S. Department of Energy’s Energy Information Agency (EIA) when it collects national energy use data across the country using their Commercial Buildings Energy Consumption Survey (CBECS). By inputting similar information held within the CBECS database into the chosen benchmarking and labeling tools, this study was able to compare yearly energy consumption of similar buildings.

For building types that were not in the CBECS database, the stakeholder group confirmed that no database of regional or state buildings is currently in existence; therefore comparisons for these types would have to be made between similar buildings on a nationwide scale or by buildings within the study. Further expansion of benchmarking work for State Owned buildings and campuses in Illinois could create a more robust, internal comparison of building energy use or allow evaluation between other organizations on a regional /state-by-state scale. The stakeholder group decided to use a select group of Illinois owned and operated facilities as a case study to determine the accuracy and applicability of the selected tools.



STATEMENT OF ENERGY PERFORMANCE
Any Supply Company

Facility 123 Main Street Berkeley, CA 94765	Facility Owner Any Supply Company	Primary Contact for this Facility Stuart Fishman SFishman@ClearPathSus.com
Year Built:		1979
Gross Floor Area (ft2):		11,500
Energy Performance Rating (1-100)		89
For 12-month Period Ending:		December 31, 2009
Date SEP Generated:		June 10, 2010
Site Energy Use Summary		
Electricity - Grid Purchase(kBtu)		88,645
Natural Gas (kBtu)		4 57,718
Total Energy (kBtu)		146,363
Energy Intensity		
Site (kBtu/ft2/yr)		26
Source (kBtu/ft2/yr)		64
Emissions (based on site energy use)		
Greenhouse Gas Emissions (MtCO2e/year)		12
Electric Distribution Utility		Pacific Gas & Electric Co
National Average Comparison		
National Average Site EUI		46
National Average Source EUI		113
% Difference from National Average Source EUI		-43%
Building Type		Office

Figure “A” - an ENERGY STAR Performance Label

Ultimately, both of the chosen tools (ES PM and the ES Label) had already been utilized in 2010 by the Illinois Department of Central Management Services (CMS) to obtain a building energy rating for the Bilandic Building in Chicago, IL. Therefore, some of the procedures of data acquisition were already established or understood.

5.2 Methods of Data Collection

The first goal of the data collection process was to determine a general number of buildings to include, as well as the specific building types to compare in the study. The stakeholder group proposed to obtain a diverse pool of structures, minimum of 2-3 buildings of similar type and size, to compare energy use within this study. By including at least two buildings per type, similarities and contrasts of data collection, energy use, and labeling results in each building type would be better understood. Using these guidelines and CBECS definitions, a significant quantity of individual buildings was able to be incorporated within this quick study. They included:

- Office Buildings, separated into
 - Mid-size Office Buildings and Large Office Buildings with combined space types
- Public Order and Safety Buildings (such as State Police District Headquarters)
- Vehicle Service Buildings (containing Maintenance Garages)

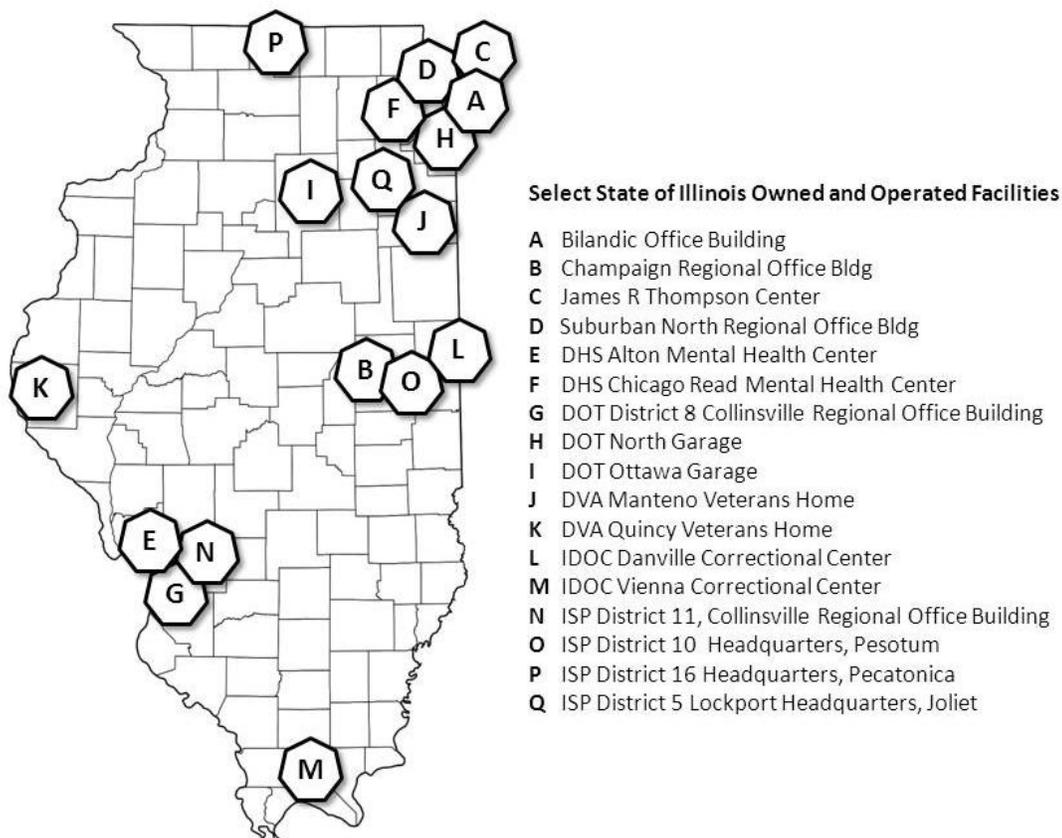


Figure “B” - Location of Buildings included in this Study

Collection and verification of utility bills in benchmarking projects often requires some synchronization with utilities and can be challenging due to inter-departmental coordination, such as account management, division of data between multiple building users, billing record keeping, etc. Some utilities offer an automated benchmarking service (ABS) which uploads the yearly energy use of a building directly to a benchmarking tool. Energy Star Portfolio Manager (ES PM) accepts this type of data transfer and also has a list of such utilities which perform this service. Currently, Commonwealth Edison is the only utility in Illinois which makes this direct transfer of electronic files available to its customers.

Time Required To Complete Study

Fortunately, the Illinois Department of Central Management Services (CMS) had already begun a process with the Energy Resource Center at the University of Illinois at Chicago to confirm utility billing information and amount of fuel use (primarily electricity and natural gas) for buildings throughout the state and from differing utilities. **Approximately one hour per building/campus was allocated to secure this utility data information and process it for use in the study. Some additional time was required to review the data sets for gaps or completeness - on an average of one hour per building/campus, bringing the total hours of this task to two.** The common billing dates with sufficient utility data were from June 1, 2010 through May 31, 2012. As the UIC Energy Resource Center continues to process this data for CMS, the workload for other users of this data will be reduced. Nonetheless, future benchmarking initiatives will need to allocate a portion of their hourly budget to refine the utility data sets.

Building Types Included in Study That Do Not Qualify for the Energy Star Label

As the study progressed, some buildings were removed from the dataset due to their incomplete energy profiles or other limiting factors. Maintenance Garages were included in the study but do not qualify for an ES Label, and therefore were compared only on a building-to-building basis. Rented facilities were excluded from the study due to the lack of energy information available. In addition, some rental agreements are for only a floor or small portion of a facility and do not conform to the requirements of this study which compares whole building energy use.

The study proceeded further than individual building types to capture potential comparison methodologies beyond those applicable to the EPA ENERGY STAR Portfolio Manager and Buildings Performance Label. Due to the large number of 24/7 operational campuses managed by the State of Illinois, comparisons among these groups of facilities were made on an internal, campus-wide basis. Even though a campus wide approach of data collection does not qualify for an ENERGY STAR Label, yearly energy use on a total square foot basis can be compared, although it is more difficult to do this for a campus than for individual buildings. If the campus buildings could be separated with individual utility meters, they could be compared using a national average, such as the CBECS database and within ES PM, possibly gaining an ES Label. However, tracking the energy consumed by these groups of buildings is also needed to gain an overall picture of the energy utilized by the State. The types of campuses included in this study contain the following:

- Correctional Facilities (Lodging per CBECS Database)
- Mental Health Centers (Lodging per CBECS Database)
- Senior Care Facilities (Veterans Administration Home/Hospitals)

The last major pieces of information required to complete the benchmarking pilot were the operational aspects of each building including: weekly operational hours, number/type of equipment, and number of occupants. Both CMS and the IL Capital Development Board utilized established lines of communication, developed prior to the study, with their facilities managers to compile this information quickly. In addition, the existing State of Illinois VFA Facilities Assessment Database included a wealth of data regarding basic facility statistics and sizing – crucial to scaling energy use information to building types.

Due to the small number of structures per building type, all building information was manually entered into ES PM, no matter the energy supplier or the location. The tool's data fields comprised of each building/campus's general information, operating characteristics, as well as energy meter amounts for both electricity and natural gas. An average of two hours was required to input this data - bringing the total amount of time required to obtain and enter the information to about 4 hours per building. If a comprehensive assessment of all state owned and operated buildings was developed, automated types of data input could be established with utility companies that would potentially reduce the time spent to complete this information.

Collection and processing of the data into the ENERGY STAR Portfolio Manager and scoring a Building Performance Label averaged 1 hour of training per person and 4 hours data entry per building. The results were achieved in a very short time period and with very little overhead.

5.3 Training of Stakeholders and Potential Users

Training is a necessary component to make sure that building operators and other individuals who need to use benchmarking tools use them properly.

The EPA conducts free, monthly trainings on the ENERGY STAR Portfolio Manager which simultaneously incorporate their Building Energy Labeling tool. EPA offers both an introductory and an advanced or "Beyond the Basics" course. As was mentioned earlier, CMS Building Managers received training on the Portfolio Manager and became familiar with both of these tools during the 2010 benchmarking and labeling work for the Bilandic Building in Chicago. During the course of this study, many of the stakeholder group members received their first training, refreshed their skills in an additional course, and/or utilized the selected tools to become familiar with the recording process and resulting methodologies. Customized classes are available from the EPA for larger groups of learners at no cost. As future considerations are made for benchmarking additional state-owned or leased buildings, the education of the Facilities Managers, Benchmarking Data Entry Managers, or others involved in the process should be included within any plans.

6.0 Conclusions Derived from the Data and Analysis Performed

EPA ENERGY STAR Portfolio Manager (ES PM) automatically compares total energy use per year of the subject building to national averages of similar building types. This benchmarking tool has embedded algorithms which find buildings of similar type and operating characteristics to use for comparison. It can also be used to track energy in groups of buildings, such as mental health center or veteran home campuses, although the total energy use cannot be compared to facilities outside of those added. These features generated interesting relationships and comparisons.

6.1 Confirming Whether a Building Qualifies for an EPA ENERGY STAR Label

The EPA ENERGY STAR Label was selected as a means to measure the energy performance of the buildings within this study. This rating tool is based on source energy, accounts for the impact of weather variations, as well as changes in key physical and operating characteristics of each building that may occur over time. The ES PM data collection tool can indicate which buildings are preliminary candidates to receive an ENERGY STAR Label. Buildings that receive an energy performance rating of 75 or greater qualify for the ES label.

A total of eleven buildings and six campuses were entered into the ES PM tool to create a database of existing, state owned buildings. Only five buildings were eligible to receive an ENERGY STAR Label due to their building type. These two building types – medium/large office and Senior Housing Buildings – were specifically included in this study to demonstrate the tool and because they are abundant within the State of Illinois portfolio. Senior care facilities are eligible for an ES Label, but their utility bills are currently managed at a campus level, and therefore cannot qualify. The building energy performance of building types not covered under ES PM, which cannot qualify for an ES Label, can still be compared with the national averages for their building types (Illinois State Police Headquarters can be compared with other Police Headquarters in different locations). In addition, these buildings can be compared between themselves, (the total campus energy use between two facility sites). Therefore, even the facilities who cannot qualify to receive an ES Label were included in the study to compare their energy use internally – i.e. between each campus facility. Their energy use is calculated using a combined energy usage, based on the total gross floor area or square feet.

Facility Name	Total Floor Space (Sq. Ft.)	Current Source Energy Intensity (kBtu/Sq. Ft.)	Change from Baseline: Adjusted Energy Use Intensity (kBtu/Sq. Ft.)	Change from Baseline: Adjusted Energy Use (%)	Current Rating ENERGY STAR Rating (1-100)
CMS - Bilandic Office Building	445,145	157.9	-8.8	-5.1	83
CMS - Champaign Regional Office Bldg	55,005	401.5	-31.5	-7	8
CMS - James R Thompson Center	1,200,000	262	N/A	-0.2	59
CMS - Suburban North Regional Office Bldg	443,865	122	-0.6	-0.5	92
DHS - Alton Mental Health Center Campus	337,186	243.2	8.8	3.8	N/A
DHS - Chicago Read Mental Health Center Campus	331,890	244.6	-25.8	-9.2	N/A
DOT - Collinsville Regional Office Bldg Distric 8	78,600	319	N/A	-3.4	45
DOT - Northside Garage	9,932	N/A	207	N/A	N/A
DOT - Ottawa Garage	16,450	89.6	-0.6	-0.6	N/A
DVA - Manteno Veterans Home Campus	315,361	285.5	-6.7	-2.2	6
DVA - Quincy Veterans Home Campus	574,459	138.5	6.1	4.4	73
IDOC - Danville Correctional Center Campus	405,177	308	31.1	5.6	N/A
IDOC - Vienna Correctional Center Campus	576,572	307.6	13.5	4.6	N/A
ISP - Collinsville Regional Office Building	38,600	395.9	-40.5	-12.2	N/A
ISP - Headquarters District 10 Pesotum	6,032	439.8	-3.7	-0.8	N/A
ISP - Headquarters District 16 Pecatonica	6,462	379.8	N/A	8.4	N/A
ISP - Headquarters Joliet - District 5 Lockport	10,289	268.9	N/A	-4.3	N/A
Group Total	4,851,025				

Figure “C” – ENERGY STAR Portfolio Manager Summary of All Buildings Included in Study

From the results indicated in “Figure C” above, the Bilandic Building, located at 160 N LaSalle St. in Chicago, continues to maintain similar energy consumption levels as recorded in 2010 when it was awarded an ENERGY STAR Label. This result shows the benefit of disclosing consumed energy and how awarding an Energy Star label reinforces positive energy behavior. The Suburban North Regional Office Building, 9511 Harrison St. in Des Plaines, also scored well enough to earn an ES Label, although it had not previously been benchmarked or scored. The lighting retrofit work currently underway, with funding provided under a DCEO Block Grant initiative⁶, at the James R. Thompson Center in Chicago at 100 W

⁶ Department of Commerce and Economic Opportunities administered the Energy Efficiency and Conservation Block Grant (EECBG) which was provided to the State of Illinois through the U.S. Department of Energy under the American Recovery and Reinvestment Act of 2009 (Recovery Act).

Randolph St. was not recognized in the data comparison results as achieving an ES Label due to the ongoing nature of the project. However, once work is complete, and preferably after a full year of utility data is logged, an accurate picture of the savings can be verified and may yield an ES Label for the building.

6.2 Analyzing Energy Use of Building Types Unable to Receive a Label

As noted, not all building types can achieve an ENERGY STAR Label, as is the case for campuses within this study. Since many of the campuses owned and managed by the State of Illinois do not include separate energy meters for each building, they can only be evaluated within their own group. If we separate the six campus facilities into their own study, other comparisons can be drawn which assess the similarities and differences among this group of buildings. “Figure D” below denotes the six campuses included in this study, which range in size from 315,000 to over 575,000 square feet. Although the total amount of building area can play a factor in total energy usage, the benchmarking tool used in this study automatically adjusts for area differences and combines all energy uses (mainly electricity and natural gas) within the kBtu/sqft/year measurement. For comparison purposes, all energy is noted as “source” energy, as EPA has determined that source energy is the most equitable unit of evaluation. Source energy represents the total amount of raw fuel that is required to operate the building. It incorporates all transmission, delivery, and production losses, thereby enabling a complete assessment of energy efficiency in a building. Combined together, these six campuses use an average of 254 kBtu/sqft/year – separated into an average of 228 kBtu/sqft/year for veteran and mental health center campuses, and 308 kBtu/sqft/year for correctional institutions.

Campus Name	Total Square Feet (Sqft)	Current Source Energy Intensity (kBtu/Sq. Ft.)	Change from Baseline: Adjusted Energy Use Intensity (kBtu/Sq. Ft.)	Change from Baseline: Adjusted Energy Use Intensity (%)	Current Rating ENERGY STAR Rating (1-100)
DHS - Alton Mental Health Center	337,186	243.2	9.1	3.8	N/A
DHS - Chicago Read Mental Health Center	331,890	244.6	0	-9.2	N/A
DVA - Manteno Veterans Home	315,361	285.5	0	-2.2	N/A
DVA - Quincy Veterans Home	574,459	138.5	6.1	4.4	N/A
IDOC - Vienna Correctional Center	576,572	307.6	13.7	4.6	N/A
IDOC - Danville Correctional Center	405,177	308.0	17.3	5.6	N/A

Figure “D” - State of Illinois Owned and Managed Campuses in Study

With such a small sample, it is difficult to make direct comparisons between these campuses, other than total energy use. The real outlier here is the Quincy Veterans Home, with a much lower total energy use. Further investigation was made to confirm if the collected data was accurate, including calls to the local Facility Manager. It was confirmed that an on-site, coal burning power plant generates steam used to both heat and cool the campus buildings. Since this production was unmetered, and typically constitutes a majority of the building energy use, verification amounts could not be determined and the Quincy Campus remains an outlier in this study.

The data also points to a potential success story - Chicago Read Mental Health Center (RMHC). Using a baseline year of 2011 and including the energy use data for 2012, the total energy use has dropped over 9%. Further investigation needs to be made to confirm the data and review whether any energy conservation steps have been implemented during the “current energy period.”

The outcome of the benchmarking assessment can be made using two methods. By a single number as is produced by an ES Label, or through the rough evaluation of total energy use when the building configuration does not allow for another means of comparison. Using either method can assist in understanding how the building relates to others in its overall energy use. Comparing the results can assist in determining which buildings to target for further study. Investigation of higher energy users may determine whether a piece of equipment has reached the end of its useful life, if repairs are necessary to maintain the intended efficiency, or if the operation of the equipment varies from the manufacturer's recommendations. Benchmarking tools other than ES PM, such as the DOE Commercial Building Energy Asset Score, can generate estimated or potential savings that can be achieved by replacing a certain piece of equipment. Without tracking the yearly energy use, determining which buildings or equipment to target for improvement is difficult or nearly impossible.

Data from benchmarking and building labeling results can be analyzed to determine best practices in building energy management. These outcomes can be implemented throughout a portfolio to increase efficiency on a larger scale.

7.0 Possible Future Initiatives or Policies

This limited study compared the energy consumption of eleven buildings and six campuses to demonstrate the power of data collection, analysis, and disclosure/comparison. The State of Illinois owns and manages over 8,000 structures within its portfolio of buildings, indicating the significant energy savings potential that exists.

7.1 Complete a Comprehensive Energy Analysis of All State-Owned Buildings

The main conclusion of this study is to strongly recommend that benchmarking and labeling energy use be completed on all State-Owned facilities on a yearly basis. Energy data for all buildings and campuses owned and managed by the State needs to be gathered into one centralized database, such as the DOE Building Performance Database. With all the data contained in a centralized location, comparisons and conclusions may be drawn across the portfolio regarding existing energy use and future energy project reduction measures. Fortunately, the first step - to compile and correct utility billing information for all state owned facilities - has already begun, but the goal of scoring, disclosing and labeling the energy performance of all buildings remains.

7.2 Integrate Energy Data within Capital Improvement Projects

As capital improvement projects are developed, the use of energy data should be incorporated into each step of the process – from the planning stages, into implementation, and finally used as verification. Collected energy data should be analyzed to make informed decisions regarding which facilities to target for additional energy auditing or implementing energy upgrades. Energy consumption data can also be used to produce energy savings goals when developing a project. By collecting energy use data throughout, as well as a year beyond the implementation phase, verification of the projected savings can be confirmed once a project has been completed.

As an example, a lighting retrofit project is currently underway at the Thompson Center in Chicago. The historical energy consumption data collected during this benchmarking and labeling pilot includes over two years of utility information predating the start of the Thompson Center's project. This collected historical information, if combined with the post-retrofit consumption data, will assist in confirming

whether the projected savings meet the actual energy reduction levels targeted. These confirmed results may also determine if the project goals or contractual obligations have been met. By comparing pre-project levels with post-project results, both with real data, an accurate picture of the energy savings can be verified.

7.3 Improve Energy Efficiency Rebate Programs

Government departments can work with local utilities to gain the required billing information to complete their benchmarking work. They can also join with utilities to create incentive and/or loan programs to facilitate upgrades to poor performing buildings. As a similar example, the State of Minnesota launched a technical and financial assistance program called PBEEEP (Public Building Enhanced Energy Efficiency Program) to encourage municipalities and state agencies to lower their building operational costs, reduce emissions, and save energy through energy-related infrastructure improvements. Using their existing benchmarking tool, they were able to develop achievable energy and monetary goals, as well as promote green technology jobs to complete the work within their jurisdictions. As a leader in this area, Minnesota has utilized their energy tracking program to measure and verify the savings incurred by the work completed on those buildings within the program – bringing actualized, reporting data to their programs.

7.4 Consider Benchmarking of Private Sector Buildings

Access to the data provided by ratings or energy labels allows Building Owners, Facilities Managers, Lenders, and Potential Buyers to make informed decisions regarding a building's energy use and the potential costs of building operations. In turn, the implementation of Building Energy Rating (BER) guidelines will also create a more robust database of existing building energy use. If incorporated on a regional scale, this warehouse of data could be utilized to more accurately predict energy use in new buildings during the design process.

As noted in this study, nearly any size building can benefit from an understanding of its energy consumption metrics. All Building Owners or Managers are potential consumers of energy use information - with it, they can make better and more informed decisions. In addition, informing building users and potential leasers (i.e. the real building "consumers") on the amount of energy they use can assist in energy reductions, especially for the difficult-to-quantify plug and process loads. Ideally, BER policies can be enacted on a city, county, or state wide basis to cover existing, private buildings. Data from implementing building energy rating policies would, in turn, encourage private owners to complete renovations or energy upgrades prior to sale of their buildings.

Building energy ratings can also assist policymakers to gauge the achieved energy gains of policies, such as building energy codes for new construction, by confirming the total energy used on a per square foot per year basis. Building energy ratings can also be utilized to measure energy savings or reduction of greenhouse gases as is often targeted in climate action plans of state and local governments. By incorporating privately owned buildings, the amount of data increases dramatically and allows for a much more robust comparison of information of building types, sizes, and uses. Ultimately, these policies will allow for the continued progress of energy use reduction within our existing and future building stock.

7.5 Incorporate Building Component Work in Energy Upgrade Projects

Currently, there are few studies which focus on the metrics or the energy savings from building envelope retrofits or renovations. Most work often analyzes only equipment lifespan, efficiency ratings,

and the potential savings by replacing only that equipment. As building owners strive for continual improvement, they will begin reaching for other energy saving strategies, such as building envelope upgrades.

Building envelope or exterior renovations typically remain in place for twice as long as boiler or other equipment, therefore these types of projects have long lasting benefits. Although these endeavors typically disturb more than just the envelope itself, often involving repair or replacement of adjacent finish materials, the long term potential savings of these projects is much higher than for a light fixture lamp upgrade. If building envelope projects are combined with a more holistic building renovation or restoration, achieved envelope energy savings will increase the total project return on investment, as well as dramatically improve the building's lifespan.

The State of Illinois could become a leader in this field by using their benchmarking data to analyze potential envelope or exterior renovations for energy savings and track such results over time. Coordinating such work in conjunction with studies led by the DOE National Labs could show the large potential energy savings from this strategy, (measuring dollars saved or energy consumption reduced), and potentially serve as a national model for other state governments or private industries with similar, large portfolios.

7.6 Increase Energy Managers Ability to Collect Data

Collection of data for benchmarking and building energy labeling can serve many purposes for Energy Managers, and additional tools may be necessary to complete the acquisition of this information. Inclusion of sub-metering at a building or component level, especially at campuses and multi-tenant buildings, can allow for more accurate measurement of energy use. With a higher level of energy tracking, Facilities Managers have the tools to react to user complaints on an hour-by-hour measure. In addition, benchmarking and labeling energy use of buildings brings greater awareness to tenants and building users, potentially modifying their behavior patterns to curb unproductive or wasteful energy practices.

Benchmarking begins with the collection of information on actual building characteristics and performance data. Through a continuous process of calculated strategies, this measured knowledge can be implemented to meaningfully compare peer group buildings or other target values. Measuring energy use can set performance targets for both new and existing buildings and allow for verification of completed project goals. Ultimately, it can lead to the effective implementation of cost-effective energy improvements that will lower energy use and save money for building owners.

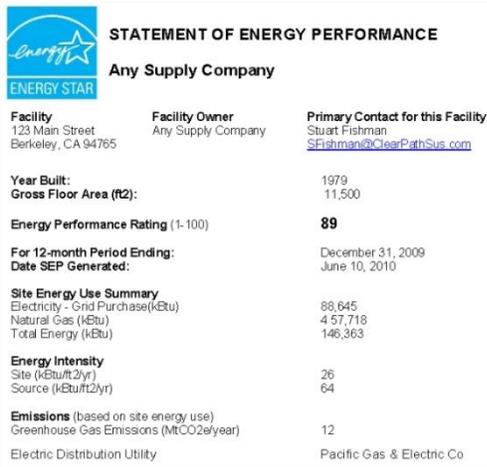
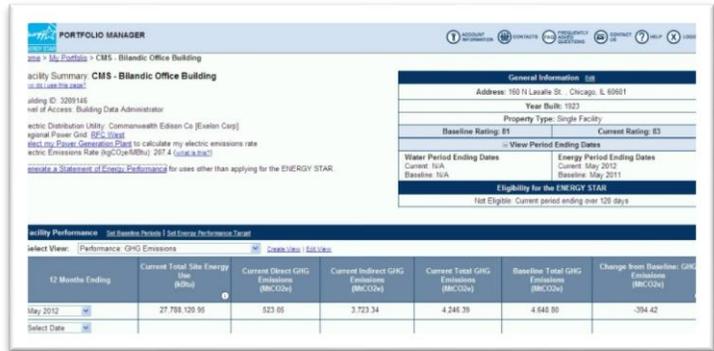
Appendix A - Referenced Tools

With the increase of energy tracking, benchmarking, and labeling of commercial and public buildings, the advent of tools to facilitate these processes has exploded. A number of tools have been referenced throughout this document. Some which have assisted in the collection and analysis during this study and others are used by governmental and private organizations to complete similar work. Both publicly and privately developed tools are presented here for informational purposes - no endorsement is suggested.

EPA ENERGY STAR Portfolio Manager

http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager#manager

ENERGY STAR Performance Rating Tool is a free, web-based tool which has been utilized by many local and state governments to manage their energy data and consumption. Existing buildings over 5,000 square feet that fall into one of 15 building type/use categories can be measured using this tool.



EPA ENERGY STAR Energy for Buildings Performance Label

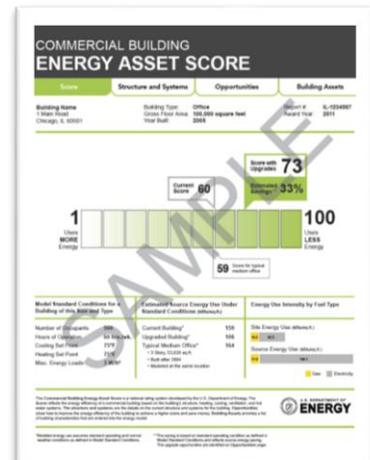
http://www.energystar.gov/index.cfm?c=evaluate_performance.pt_neprs_learn

This scoring tool is another free, web-based tool used by many local and state governments to determine a score or rating for their new or existing buildings. The program calculates a rating of 1 to 100 based on the building source energy use intensity (EUI). This score represents the percentile performance above other comparable buildings. For example, a score of 67 means the building is performing better than 67% of all similar buildings nationwide. A rating of 50 is average, and a score of 75 earns the building an ENERGY STAR Certification Label for that year.

DOE Commercial Building Energy Asset Score

<http://www1.eere.energy.gov/buildings/commercial/assetscore.html>

This web-based scoring tool compares energy use for any size, existing commercial buildings. Based on the energy-modeling tool rooted into the website, this program evaluates the physical characteristics of the building "as built" and its overall energy efficiency independent of its occupancy and operational choices. The 1-to-100 asset scoring system, currently in pilot phase, also identifies potential opportunities for efficiency improvements and notes what impact those opportunities might have on the potential asset score of a building once implemented.





B3 Benchmarking System

<http://twgi.com/benchmarktargetsratingslabels.html>

The B3 tool was developed by The Weidt Group for use in benchmarking, baseline tracking, as well as managing and improving energy use of a portfolio of facilities. This web-based tool incorporates the use of an embedded energy model to compare a baseline energy use to the energy consumption of the buildings included in the database. This tool uses a one-to-five star method to rate the energy consumption of each building within the database. The States of MN and IA have customized this tool for their climate zones and use it to meet their sustainable building initiatives.

EnergyCAP

<http://www.energycap.com/products>

This energy management software is used to benchmark energy use of buildings, while simultaneously it can be used to process utility billing and building improvement project budgeting. As with other benchmarking software, this web based tool can assist in obtaining an EPA ENERGY STAR rating and verify energy savings of completed projects. Unique to this tool is the ability to customize the interface, output graphics, and means of comparison. The City of Lexington, KY has customized their interface to include accounting and payment options directly from this benchmarking tool.



Appendix B - Data Compiled in EPA ENERGY STAR Portfolio Manager

Building Type	Facility Name	Total Floor Space (Sq. Ft.)	Current Source Energy Intensity (kBtu/Sq. Ft.)	Change from Baseline: Energy Use Intensity (kBtu/Sq. Ft.)	Change from Baseline: Adjusted Energy Use Intensity (kBtu/Sq. Ft.)	Change from Baseline: Adjusted Energy Use (%)	Eligible for an ENERGY STAR Rating	Current Rating ENERGY STAR Rating (1-100)	Eligible for an ENERGY STAR Label (Greater than 75 Rating)
	CMS - Bilandic Office Building	445,145	157.9	-11.7	-8.8	-5.1	Y	83	Y
	CMS - Campaign Regional Office Bldg	55,005	401.5	-41.6	-31.5	-7	Y	8	N
Office Building	CMS - James R Thompson Center	1,200,000	262	N/A	N/A	-0.2	Y	59	N
	CMS - Suburban North Regional Office Bldg	443,865	122	-6.4	-0.6	-0.5	Y	92	Y
	DOT - Collinsville Regional Office Bldg District 8	78,600	319	N/A	N/A	-3.4	Y	45	N
	ISP - Collinsville Regional Office Building	38,600	395.9	-20	-40.5	-12.2	N/A	N/A	N/A
Maintenance Garage	DOT - Northside Garage	9,932	N/A	171.9**	207**	N/A	N/A	N/A	N/A
	DOT - Ottawa Garage	16,450	89.6	-6.1	-0.6	-0.6	N/A	N/A	N/A
Safety Building	ISP - Headquarters - District 10 Pesotum	6,032	439.8	-3.1	-3.7	-0.8	N/A	N/A	N/A
	ISP - Headquarters - District 16 Pecatonica	6,462	379.8	N/A	N/A	8.4	N/A	N/A	N/A
	ISP - Headquarters Joliet - District 5 Lockport	10,289	268.9	N/A	N/A	-4.3	N/A	N/A	N/A
	DHS - Alton Mental Health Center Campus	337,186	243.2	3	8.8	3.8	N/A	N/A	N/A
	DHS - Chicago Read Mental Health Center Campus	331,890	244.6	-38.1	-25.8	-9.2	N/A	N/A	N/A
Campus	DVA - Manteno Veterans Home Campus	315,361	285.5	-14.5	-6.7	-2.2	Y	6	N
	DVA - Quincy Veterans Home Campus	574,459	138.5	0.3	6.1	4.4	Y	73	N
	IDOC - Danville Correctional Center Campus	405,177	308	-4.6	31.1	5.6	N/A	N/A	N/A
	IDOC - Vienna Correctional Center Campus	576,572	307.6	2.3	13.5	4.6	N/A	N/A	N/A
	Group Total	4,851,025	4363.8		Average = +11.4	Average = -1.16			

**Outlier - Includes only 1 year of electric and/or natural gas utility data, therefore does not allow for comparisons or denotes any change over time

Average w/o Outlier = -4.89

Study surveyed energy use between June 1, 2010 - May 31, 2012

Additional Resources

Below is a selection of web-based information either referenced in this Study document or which offer additional resources on benchmarking and building energy labeling.

DOE SEE Action Network has created an Energy Benchmarking, Rating, and Disclosure for State Governments Fact Sheet (updated May 2012). It summarizes the basics of benchmarking, gives pertinent examples of state governments who have implemented benchmarking initiatives, and outlines the building professionals who are essential to a successful program.

http://www1.eere.energy.gov/seeaction/pdfs/commercialbuildings_factsheet_benchmarking_statgovt.pdf

Iowa Energy Center Final Technical Report (April 2012) describes the results from the Iowa Energy Center's public building energy benchmarking pilot project. Principal Authors: Dr. Xiaohui Zhou, Iowa Energy Center and Tom McDougall, The Weidt Group.

<http://www.iowaenergycenter.org/news/public-building-energybenchmarking>

The State of Minnesota Department of Commerce has produced a number of energy savings programs, including the Guaranteed Energy Savings Program, for state agencies and local units of government. These technical and financial assistance programs build upon their B3 Public Building Benchmarking Program and support those seeking to implement energy efficiency and/or renewable energy improvement strategies in state facilities using Energy Savings Performance Contracts.

<http://mn.gov/commerce/energy/topics/financial/Energy-Savings-Program/index.jsp>

U.S. Department of Energy's Building Technologies Program has developed tools for tracking energy use in commercial (Commercial Building Energy Asset Score) and residential buildings (Home Energy Score). The Building Performance Database is a means to collect energy information of a wide variety of buildings which have already been energy benchmarked. Within this information warehouse, individual and portfolios of buildings can evaluate their own energy efficiency projects to similar endeavors complete around the country.

<http://www1.eere.energy.gov/buildings/commercial/assetscore.html>

http://www1.eere.energy.gov/buildings/residential/hes_index.html

<http://www1.eere.energy.gov/buildings/commercial/bpd.html>