Case Study
Community Strategic Energy Management

Credit: City of Eugene

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OVERVIEW

Location: Eugene, Oregon

City Size: 40.5 Square Miles

City Population: 166,575 (2016)

Median Income: $42,715

Average High Temp: 63.3 F

Average Low Temp: 41.7 F

Number of City Facilities: 60

EUGENE, OREGON

The City of Eugene has a long-standing commitment to city-wide energy management and sustainability. In 1995 Eugene began tracking and evaluating their public building energy data. The city saw the value of energy management from both a financial and environmental perspective.

Eugene's Sustainability Commission is a policy advisory body that played a key role in the development of the city's climate action plan and carbon goals. In September 2010, Eugene City Council approved the City Manager's recommendation to implement actions in support of the Community Climate and Energy Action Plan goals and objectives, including:

- Reduction of community-wide fossil fuel consumption 50 percent by 2030
- Reduction of community-wide greenhouse gas emissions 10 percent below 1990 levels by 2020
- Reduction of greenhouse gas emissions so that all city facilities are carbon neutral by 2020

The City of Eugene understands the importance of leadership-by-example in their community. The triple-bottom-line concept is a very important driver for the City of Eugene. Staff responsible for city energy management work closely with the Eugene Water and Electric Board (EWEB, the local municipal utility) to make these processes as streamlined as possible. However, Eugene was in need of a deeper dive into their municipal benchmarking strategies. They wanted to know how to use this data to identify inefficient buildings, prioritize upgrades, update operational strategies, and guide policy. They also wanted to know how their approaches compared to other cities of the same size.

Community Strategic Energy Management (SEM) is a long-term approach to energy efficiency in public building portfolios. It brings SEM principals to the unique needs of public building decision makers and market actors, providing them with the information they need to turn broader performance and leadership goals into measurable energy savings outcomes in public buildings and schools.

Community Strategic Energy Management

With help from the Northwest Energy Efficiency Alliance (NEEA), the City of Eugene undertook a comprehensive and strategic approach to evaluating energy performance across the city's municipal facilities. A team including New Buildings Institute (NBI), EcoEdge, and Maalka worked with city staff to develop priorities for portfolio management and performance upgrades. This process engaged multiple city departments, the electric, gas, and water utilities, policymakers, and other stakeholders in meaningful discussions of broader city energy goals.

Over a series of facilitated meetings, the energy team created a plan to address operational strategies, develop quantitative metrics for energy efficiency improvements, and consolidate approaches into one working document to guide the team to success. The aim of the effort was to streamline the benchmarking process, create a replicable template, and use this information in decision-making for future building upgrades. A parallel goal was to standardize performance reporting and improve communication between departments and between key staff and policymakers.

The NEEA team worked with city staff to analyze data that Eugene was already tracking. The resulting Community SEM plan established clear performance targets for both high-performance buildings, using Energy Use Intensity (EUI) targets commensurate with Zero Energy performance levels, and lower-performance buildings, using a percent-beyond-code rubric. These were made actionable by setting trigger retro-commissioning activity based on achievements against targets. The SEM plan tracking metrics and targets for particular building types and established routine ways to communicate key metrics and results to stakeholders. Part of this process was to assist the city in consolidating data, information, and goals into a clear and time-bound action plan. This support has helped Eugene staff communicate and reinforce policies, plans, and results in ways that resonate with key decision makers and staff.

Benchmarking and Remote Diagnostics

One key aspect of Community SEM is the use of remote diagnostics to inexpensively diagnose performance issues and establish priorities for improvement. The team migrated collected data into the Energy Star Portfolio Manager® tool to benchmark performance. Benchmarking is the practice of tracking, measuring and comparing the performance of buildings. Eugene's building inventory of 60 facilities included police and fire stations, offices, various airport buildings, community & recreational facilities, public service, warehouses, shops, and other buildings.
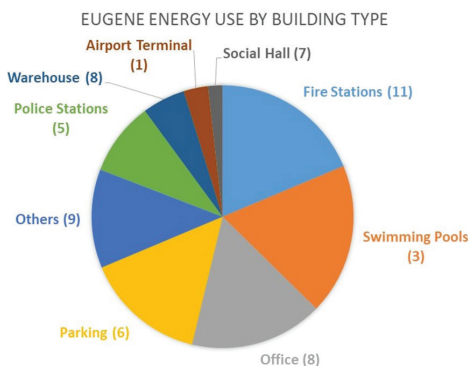
The team selected a subset of 54 buildings for deeper analysis and investigation. Among these buildings, the analysis found that the Airport Terminal uses around one-sixth (14%) of energy and will likely present cost-effective opportunities for savings. The bubble chart on the following page provides a visual breakdown of energy use in 54 of the 60 facilities, with the top energy users highlighted. The size of the circle corresponds to total energy use. Swimming pools (not included in this graphic) were also very high energy users overall and consume about 24% of the city's total energy use.

EUGENE ENERGY USE BY BUILDING TYPE

Airport Terminal (1)
Social Hall (7)
Warehouse (8)
Police Stations (5)
Others (9)
Parking (6)
Office (8)
Fire Stations (11)
Swimming Pools (3)

Major Energy Consuming Buildings in Eugene

The top five buildings consume about 40% of total energy use among the 54 buildings selected for in-depth analysis. The Hult Center is a performing arts space. The Overpark building is a parking garage with leased restaurant and retail spaces on the ground floor.
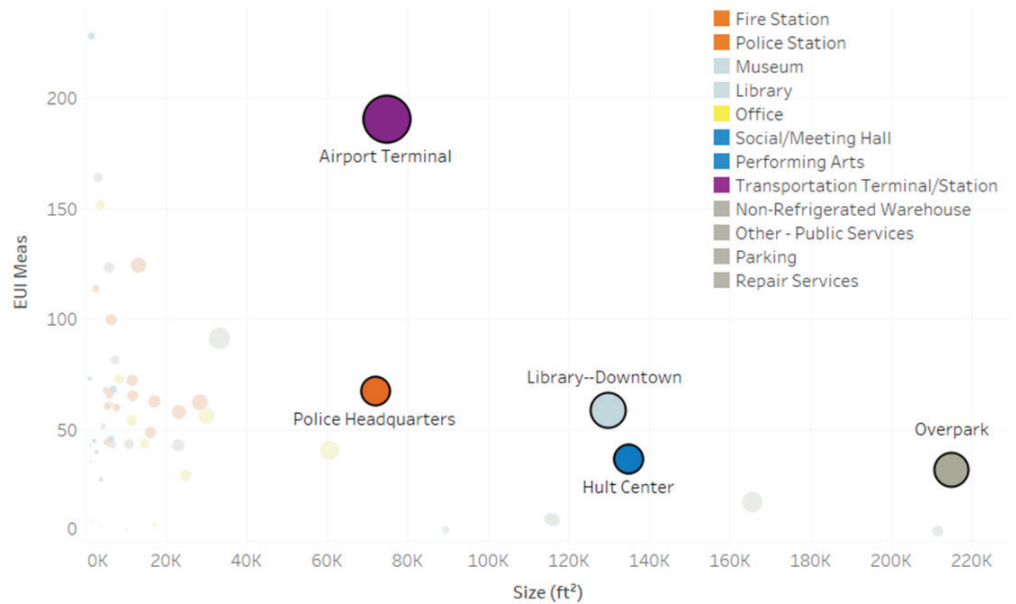

Using only monthly utility bills and basic building inputs (building location, type, and size), the team used NBI's FirstView® software tool to remotely diagnose energy performance. This tool enabled the team to recommend specific buildings to the city as candidates for deeper investigation and to identify specific areas of concern. For instance, in the Airport Admin Building, electric baseloads (lighting and/or plug loads, shown in yellow) are responsible for most of the energy use in the building. The signature for the historic Shelton-McMurphey House shows clearly that space heating (red) is the predominant end use. This analysis can help prioritize building upgrade candidates and improve both the cost-effectiveness and the overall impact of energy audits by enabling the auditor to focus attention and time on the most important building systems and components.

Airport Admin Building
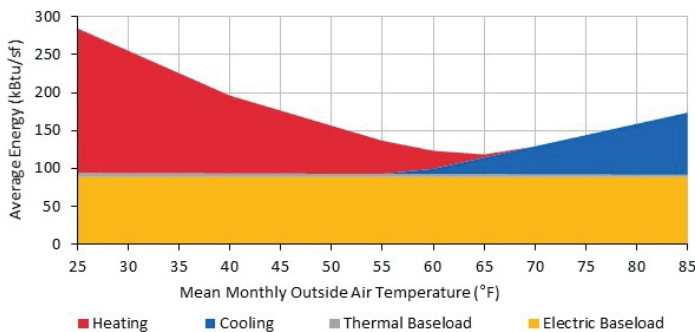
Historic Shelton-McMurphey House
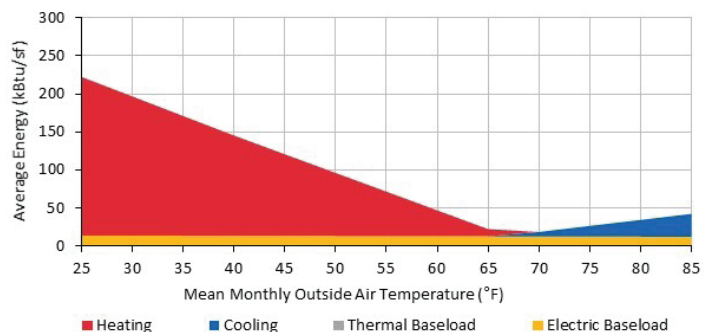
The results of FirstView analysis were folded into a broader analysis effort. Other data sources including in-depth building analysis conducted by Solarc, a local engineering firm, were included in the effort to help Eugene strategically prioritize facility improvements. In conversations with Eugene stakeholders, factors such as deferred maintenance, capital planning, anticipated renovations, and other non-energy considerations were taken into account in drafting the SEM plan.

Outcomes

The Community SEM plan has given Eugene the impetus for a cultural and organizational reinvigoration regarding advancement toward climate goals. Despite Eugene's long history of energy management, the process had become rather informal. Now, department heads, policymakers and city staff are re-engaged in the work being done by the energy team. This Community SEM process has reminded various departments of the importance of tracking energy performance and communicating success.

The City of Eugene has committed to reaching carbon neutrality in municipal operations by 2020. However, this near-term goal will likely trigger the purchase of carbon offsets. This team used the community SEM process to help the city find the right balance between building upgrades, which present higher up-front costs but represent a long-term investment in publicly owned assets, and carbon offsets, which cost less up front but offer no direct long-term benefits to the city. This team held discussions to help city staff frame their justification for building upgrades in this context. By identifying significant energy users, buildings with abnormal energy usage patterns and trends, and diagnostic recommendations from the FirstView diagnostic analysis, the city was able to prioritize next steps on buildings that presented the most significant opportunity for performance improvement.

The team invited representatives of local utility service providers (Eugene Water and Electric Board (EWEB) and Northwest Natural Gas) to the planning meetings. Both utilities participated in several meetings throughout the Community SEM planning process. During the course of this project, EWEB changed the structure of their incentive programs and eliminated rebates for many energy efficiency measures, including all lighting replacement measures. This major change in the utility rebate structure occurred one day before an SEM planning meeting. The connection enabled by the structure of these meetings enabled the City of Eugene to act fast based on this information and submit lighting upgrade rebate applications across their portfolio.

The team in Eugene noted that energy end-use disaggregation from FirstView was very useful in targeting performance improvement opportunities and did not require expensive sub-metering. The team identified opportunities for deep retrofits to the Airport Terminal, the Downtown Library and the Police Headquarters, which will present very visible examples of the impact of energy upgrades to the community. Additionally, the team identified the Hilyard Community Center, Peterson Park Barn and the Logistics Building as candidates for Zero Energy (ZE) retrofits.

Another key part of the Community SEM process was to evaluate the city's building policies regarding operations, procurement, and green building design and construction. Some of the performance characteristics identified in the analysis of the operational strategies suggested opportunities for improved building operations that did not require capital improvements to the facilities. This helped the city's Sustainable Operations Analyst reinforce existing strategies and garner support for operational settings and equipment policies. The team created a comprehensive description of all of the policies to consolidate and effectively communicate to city staff to institutionalize and regularly update these policies to reflect the city's robust goals.

"Having a strong strategic energy management plan institutionalizes commitment in city operations. With this plan, we are able to able to take our message out into the community and show them how we are walking the walk and talking the talk."

– Lynne Eichner, Sustainable Operations Analyst for the City of Eugene

Lessons Learned

- An automated energy data process established in conjunction with the utility is helpful, but not required, for keeping benchmarking data up to date.

- Having a third party present their tools and metrics to city staff and department heads in an easy-to-understand format reinvigorated the importance of energy efficiency in Eugene's buildings and deepened the knowledge of the energy team. Although energy efficiency has been a part of Eugene's culture for many years, it had become so institutionalized that few were actively engaged in it on a daily basis. Eugene is in the process of setting up a program to increase accountability and develop a plan for revisiting and redefining building performance goals as part of the ongoing process.

- Analyzing the city portfolio, both overall and for particular departments, is helpful in planning and priority setting. This helps Eugene staff uncover the most promising financial investments across the city and lays the groundwork and inspiration for department-specific plans necessary for successful implementation.

- Energy performance targets at the building level, usually defined in terms of Energy Use Intensity (EUI) can help define where to start when deciding which buildings have the greatest needs. Defining climate goals and building-level energy performance targets helped the team pinpoint their efforts and be able to focus on where the specific need was for each building.

- Communicating energy efficiency goals, progress, and actions of particular departments is an effective way to engage all city departments and the broader community while creating accountability and support for these efforts.

- Using benchmarking, Eugene was able to communicate the progress and plans for their community energy management as a whole and compare it to other communities. Eugene found that this was an effective way to influence stakeholders regarding energy efficiency. Community members expect the municipality to be a leader in energy efficiency. By creating and implementing the Community SEM plan Eugene is leading by example and encouraging others to follow suit.

> "As an outreach tool, benchmarking is effective to communicate energy efficiency both internally and externally."
>
> – Lynne Eichner, Sustainable Operations Analyst for the City of Eugene