

# Case Study Public Buildings Portfolio Management

Credit: Montana NonProfit Association



Credit: Jets Like Taxis

## OVERVIEW

- Location:** Missoula, Montana  
**City Size:** 29 Square Miles  
**City Population:** 72,364 (2016)  
**Median Income:** \$41,968  
**Average High Temp:** 58.1 °F  
**Average Low Temp:** 33.7 °F  
**Number of City Facilities:** 57



## MISSOULA, MONTANA

Shortly after the City's 2009 Greenhouse Gas Emissions Inventory, Mayor John Engen moved from research to action and convened the Conservation & Climate Action Plan Task Force. The volunteer Task Force, a group of citizen experts made up of small business owners, City staff, conservation professionals, and University of Montana representatives, was charged with creating emissions reduction goals for municipal operations and developing a path to achieve those goals while maintaining and improving the City's high level of service to citizens.

The City of Missoula Conservation & Climate Action Plan (CCAP) is the culmination of a long history of energy conservation and climate action, and serves as the road map to maintain progress in the City's commitment to reducing energy and fuel consumption, reducing greenhouse gas emissions, practicing fiscal responsibility, and being good stewards of natural resources, environment, economy, quality of life and community. The City's emissions goals include:

- Carbon Neutral by 2025
- 10% Carbon reduction from 2008 baseline by 2015
- 30% Carbon reduction by 2017
- 50% Carbon reduction by 2020

The City realized that more carefully managing their own building portfolio would be the way to demonstrate leadership by example in their community. They have identified key strategies to accomplish their carbon goals. A full-time staff is responsible for establishing a data monitoring and reporting system and developing a budget and financing strategy. However, Missoula was still lacking a mechanism to identify inefficient buildings, prioritize upgrades and guide policy.

**Public Buildings Portfolio Management** provides public building decision makers and market actors with key information and an actionable framework to turn broader performance and leadership goals into measurable energy savings outcomes in public buildings and schools.

## Public Buildings Portfolio Management

With help from the Northwest Energy Efficiency Alliance (NEEA), the City of Missoula took their commitment to energy efficiency to a new level. The NEEA project team partnered with the city to undertake a comprehensive approach to efficiency in the city's municipal portfolio. The team, including New Buildings Institute (NBI), EcoEdge, and Maalka, worked with City staff to benchmark their municipal buildings and develop priorities for portfolio management and performance upgrades. This process engaged multiple departments, policymakers, and other stakeholders, forming the basis for meaningful discussions of broader city energy goals, and leading to a more comprehensive approach to building management for the city.

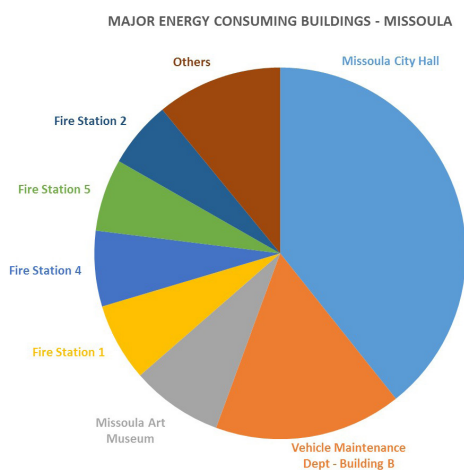
Over a series of facilitated meetings, the project team created a plan that established an energy team, developed quantitative metrics for energy efficiency improvements, and consolidated the approaches into one working document to guide the team to success. The aim for the effort was to streamline the benchmarking process, create a replicable template for the process and use the information in decision-making.

The project team worked with the dedicated staff to conduct an in depth analysis, ensuring that energy meters were appropriately tracking energy use of the city's facilities. Using this analysis, the management plan established clear Energy Use Intensity (EUI) tracking metrics and established routine ways to communicate key metrics and results to stakeholders. They also needed help in translating a robust set of carbon goals which were already in place into specific energy reduction targets for particular facilities. This support helped Missoula staff communicate plans and results in ways that would resonate with key city decision makers.

## Benchmarking and Remote Diagnostics

One key aspect of Public Buildings Portfolio Management is the use of remote diagnostics to better understand building performance issues and establish priorities for improvement. The team used the Energy Star Portfolio Manager tool to benchmark performance. Benchmarking is the practice of tracking, measuring and comparing the performance of buildings. While the initial building inventory included 65 city facilities for further analysis, the team benchmarked 33 of these buildings in Portfolio Manager and focused more detailed analysis on a subset of 19 buildings. These 19 buildings included five fire stations, four offices, five public service buildings, one museum, and four other buildings of various types. To focus the results of the analyses, non-traditional buildings (e.g. wastewater and aquatics) are omitted from the majority of the report.

With only utility bills and basic building inputs (building location, type and size), the team used NBI's FirstView® software tool to remotely diagnose energy performance. Among the 19 buildings, the analysis found that the Missoula City Hall uses over one third (39%) of energy and will likely present cost-effective opportunities for savings. The pie chart provides a visual breakdown of energy use in these 19 facilities. The top five buildings consume 77% of total energy use and make up about 64% of the total square footage for the city.



“One of the important reasons for this work is to lead by example.”

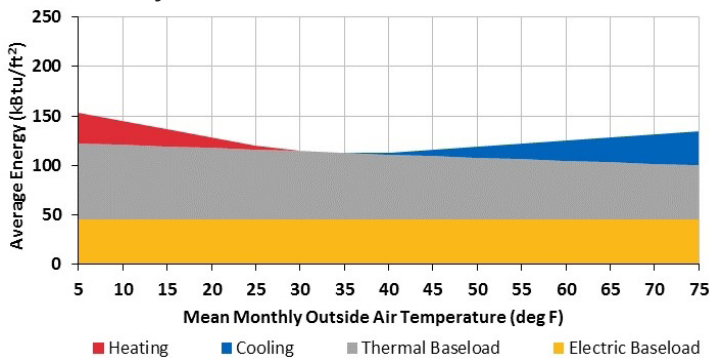
Chase Jones, Energy Conservation Coordinator for the City of Missoula

Based on the analysis, these three buildings demonstrated the most need for further investigation.

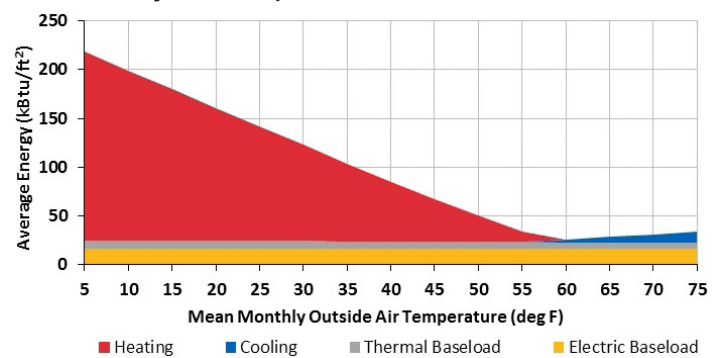
Building	Building Type	Size, ft <sup>2</sup>	EUI, kBtu/ft <sup>2</sup> -yr
Missoula City Hall	Office	56,500	121
Vehicle Maintenance Dept.-Building B	Public Service	41,000	65
Missoula Art Museum	Museum	14,700	95

The FirstView software tool allowed the team to dive deeper into energy performance in these high priority buildings before on-site assessments. Remote diagnostics on benchmarking data showed that in City Hall (left), thermal baseloads and plug loads are the major concern, as seen by the height of the electric baseload (yellow) in the energy signature. The signature for the Cemetery Office/Apartment (right) clearly diagnoses a heating problem as demonstrated by the dominance of the heating (red) in the energy signature.

Missoula City Hall



Cemetery Office/Apartment



### Outcomes

The Public Buildings Portfolio Management plan has given the city the impetus for a cultural and organizational change. The formation of an energy team with a full time employee is an important aspect of driving the energy efficiency goals forward. Department heads, policymakers and the Mayor are now more open to making improvements in City buildings. They also have a better understanding of the important of energy performance in the City’s portfolio. This cultural acceptance has given the Energy Conservation Coordinator, Chase Jones, the approval to begin the engagement of an Energy Services Company to conduct assessments of high priority buildings and implement projects. The NEEA team was invited to present alongside staff to city council which helped to validate the importance of energy efficiency and the list of prioritize projects that save energy and money. One council member noted that this was the best presentation of the year.

“One city council member mentioned that this (energy measurement presentation) was his favorite presentation of the year.”

Chase Jones, Energy Conservation Coordinator for the City of Missoula

This process also allowed the City to focus its resources on the best opportunities for performance improvement, even before they did expensive site assessments. By identifying significant energy users and buildings with performance that was out of line with comparable facilities, the City was able to prioritize analysis and upgrade resources on the subset of buildings that represented the most significant opportunity for performance improvement. The team identified the need for deep retrofits to City Hall and that Council Chambers presented a unique opportunity for upgrades to zero energy. The team was even approached by Missoula



Credit: Martin Kidston/Missoula Current

Missoula Energy Team

“As an outside third party, the NEEA team was able to make this data look nice. As the person responsible for banging the drum on energy, I can tell you that it’s good to have that professionals come in for support.”

Chase Jones, Energy Conservation Coordinator for the City of Missoula

Art Museum after they reviewed the analysis to see about making facility and operational improvements in this leased space which is separately managed.

Interdepartmental communications were also helpful to compare results of like building types (community stations, fire stations, police stations, libraries and office buildings). Discussions like these also highlighted opportunities like taking a programmatic approach to bring all fire stations to zero energy.

Based on the management process, the city is now including money for the continuation of the energy team and a full time employee to focus on energy data and efficiency in the upcoming yearly budget. City Council members noted that there is a lot of appetite for this work in the community. Even the media has engaged and shared progress with the community.

In additional, Missoula has used this process as a reason to begin in-depth conversations with the utility provider, Northwestern Energy, about improving the efficiency and transfer of data down the road. The data request for this project was a large one, but the utility was very receptive to the needs of the City and willing to discuss improvements to the data acquisition process.

## Lessons Learned

- Tracking meters to buildings in Energy Star Portfolio Manager can be time consuming. After the initial data cleaning, the data needs to be updated regularly. An Americorps volunteer has been helpful in collecting energy data and keeping it up to date.
- Having a third party present their tools and metrics to City staff and department heads in an easy to understand format validated the importance of energy efficiency in Missoula’s buildings.
- Analyzing the city portfolio, both overall and for particular departments, is helpful in planning and priority setting. This helps the city uncover the most promising financial investments across the city, but lays the groundwork and inspiration for department-specific plans necessary for successful implementation.
- Transparency and media presence around energy efficiency can be effective for engaging the community and creating that appetite and support for these projects equally at the City and at the residential and commercial level.
- Energy performance targets at the building level, usually defined in terms EUI can bridge the gap between broad climate goals and day-to-day building management. Missoula now understands the relationship between their carbon emissions goals and the role this plays in facility management. As they work to finalize their strategic energy management plans they will be able to correlate EUI and carbon reduction to achieve the energy efficiency outcomes desired.

