

Kalispell Regional Medical Center – Achieving Operational Excellence and Energy Efficiency

Kalispell Regional Medical Center (KRMC), in Kalispell, Montana, is a community hospital and a regional referral center offering the most advanced health services and medical technology in the area. In 2005, KRMC began exploring energy efficiency and leveraging a Strategic Energy Management Plan (SEMP) when few healthcare organizations embraced comprehensive energy efficiency as a cost-effective operations solution. At the time, there was no SEMP example to follow and little knowledge in the healthcare sector related to Strategic Energy Management (SEM). Moreover, the healthcare sector is risk averse and methodical when considering systemic change, and decision-makers often perceive energy management as not aligned with traditional organizational goals such as better patient care or honing top-tier medical capabilities. In fact, projects with perceived alignment with traditional goals, such as funding for an advanced MRI machine to improve patient care, directly compete with SEM projects for budget and resource allocation.

In this environment, a diverse team of dedicated employees, non-profits, energy consultants, architects, design engineers, and utilities that actively seeks energy management solutions proved to be critical in launching the SEM project. Through this team, KRMC implemented over 100 energy-saving measures over the last 10 years, resulting in an average 35 percent drop in energy use per square foot. But the benefits did not stop there: through low-cost, no-cost SEM activities, the facility also reduced water and chemical treatment costs, lowered labor and maintenance hours, and decreased equipment repair frequency, resulting in a 25 percent reduction in facility maintenance operating costs. KRMC could not have achieved these extraordinary results through a series of isolated, ad-hoc energy projects – instead they required a holistic change in approach to energy management, including benchmarking, planning, commitment and collaboration between facility managers and senior leadership.

Finding Common Goals

When a major energy user, such as a hospital, expands their facility footprint, they inform local utilities in order to plan for additional resource requirements. With plans to expand their campus, KRMC contacted Flathead Electric Co-Op, along with a major regional hydroelectric power supplier, Bonneville Power Administration (BPA), to collaborate on the expansion. Simultaneously, Flathead and BPA were actively seeking opportunities to better manage energy capacity growth, preferring to help KRMC and other entities reduce energy needs rather than investing capital in additional infrastructure capacity. During this time, the Northwest Energy Efficiency Alliance (NEEA) was expanding their Healthcare and Hospitals (HHI) initiative and worked with Flathead, BPA and regional utilities to implement an SEMP approach for healthcare systems across the Northwest. Together, the utilities and NEEA identified the capacity expansion engagement as an opportunity to discuss energy management with KRMC. While seemingly straightforward, these discussions are often difficult—the hospital and utility would need to align perspectives on energy and organizational goals.

Market Challenges: Finding a Path Forward

The timing was right for engagement, but first the utilities, NEEA and KRMC would need to agree on a course of action. NEEA and Flathead approached KRMC with an SEMP scoping report, detailing a comprehensive approach to energy management that included recommendations primarily focused on retrocommissioning and operations and maintenance (O&M) projects, along with some capital improvements.

With opportunities for capital improvements identified in the scoping report and Flathead Electric financial incentives available to facilitate these activities, KRMC's facilities director launched a plan to complete a comprehensive set of capital energy projects. However, this occurred in 2008, near the time of a major economic downturn that affected many industries, including the healthcare sector. This economic strain meant KRMC staff would be forced to delay their capital retrofits, since these projects come with significant financial investments and—though compelling—a relatively lengthy payback period. Even with the incentives offered, KRMC could not move forward with the plan.

Still, KRMC senior leadership and key personnel were interested in energy management, and KRMC's SEMP was intact. Instead of pursuing the capital projects, KRMC decided to pursue the SEMP's low-cost, no-cost operations and maintenance recommendations.

A Strategic Energy Management Plan Is Launched

To address the previous efforts, along with KRMC's interest in energy-saving measures, Flathead, BPA, NEEA and KRMC revisited the SEMP proposal. An SEMP is a living management tool that communicates the organization's vision and mission for all stakeholders. In 2006, NEEA proposed a detailed plan to develop KRMC's SEMP. KRMC was intrigued by the new plan and decided to perform a self-assessment using new energy tools and concepts offered through the two utilities. Flathead supplied energy experts to provide guidance on energy projects, identify opportunities to improve business systems and achieve sustainable energy savings, and incentives to help fund energy conservation measures. The

“Utilities and businesses have a variety of interests that are not always in clear alignment. A critical component for success in the KRMC project was to define common interests and work together to achieve these goals.”

– Don Newton, Key Accounts Representative, Flathead Electric Co-Op.

review was conducted over a six-month period and revealed that KRMC could meet their goals by conducting energy conservation awareness activities, incorporating energy cost reductions in budgetary targets, regularly reviewing energy efficiency trends, and assessing opportunities for peak electric demand control. After completing the examination, Flathead and NEEA approached KRMC about the next step.

A work group consisting of KRMC Facilities personnel, and representatives from Flathead Electric, BPA, and NEEA drafted the plan, identifying five goals to help facilitate energy management:

- Obtain organizational approval of the SEMP and a commitment of resources.
- Implement financial practices and decision-making processes and establish funding resources.
- Implement procurement/purchasing procedures and specifications for capital investments.
- Implement enhanced design and construction (D&C) practices.
- Implement enhanced facility-operating performance.

With the SEMP in place, stakeholders from KRMC, Flathead, BPA and NEEA worked hard to identify and implement process improvements. The team recognized that improvements to existing facility performance and equipment often have fewer upfront costs, which reduced the financial barrier and presented an attractive approach for KRMC during the economic slow down. In order to achieve these enhancements, KRMC needed an energy specialist to bring energy awareness to an operational level. Consequently, the group identified the role of a Resource Conservation Manager (RCM) as an important next step: an RCM brings energy efficiency awareness, as well as the measurement, monitoring, and reporting of energy usage, into day-to-day operations. KRMC worked with NEEA, who agreed to help fund the RCM position with KRMC's commitment to fully fund the position within three years. KRMC hired an RCM who put new operations and maintenance best practices into place, including the "fix what you have first" approach, which encouraged KRMC to find low-cost, no-cost energy projects that yielded significant cost savings. In this budget-constrained environment, the RCM brought clarity to the energy management process, and identified projects that were possible even under the organization's budget constraints.

After the O&M changes were in place, KRMC deemed the previous capital measure efforts less cost-effective. Instead, they invested in an upgrade of their Building Automation System, which provided several more attractive opportunities for operational cost savings. Though initially a challenge, the delayed scoping report and denial of capital projects ultimately allowed for the identification of a path toward achieving traditional healthcare system goals and cost savings. It also uncovered an order of operations, highlighting O&M as a starting point for SEMP projects. By 2009, broad SEM processes evolved to focus first on O&M energy projects due, in part, to results similar to those that KRMC experienced.

Low-Cost, No-Cost O&M Measures Result in High-Impact Savings

Operations and maintenance projects can powerfully demonstrate immediate energy and facility cost savings. Further, since O&M projects are often not dependent on capital dollars, they are less likely to be constrained by budget issues.

Lastly, O&M training has long-term benefits: equipment that is properly operated lasts longer, has more capacity, and requires less maintenance.

Because of these elements, KRMC implemented a number of improvements in both the hospital and their health center from 2010 to 2014 that directly contributed to the goal of enhancing facility O&M performance, including:

- Repair and calibration of HVAC equipment and controls
- Turning off equipment when not required
- Reduction of ventilation spaces unoccupied during nights and weekends
- Sequence chillers and pumps installed in a central chilled water plant
- Repair of leaks in steam, hot water, condensation, compressed air, and cold water systems
- Resetting temperatures of hot water, chilled water, and supply air based on measure demand
- Scheduling air handlers to turn off for the laundry, carpentry shop, welding shop, and general shop during nights and weekends
- Cleaning of airflow sensors to restore accuracy, resulting in slower fan speeds
- Lowering differential pressure setpoints of both hot and chilled water loops for better efficiency
- Programming Variable Air Volume (VAV) boxes to close or go to minimum flow when the areas they serve are unoccupied
- Reworking boiler controls to improve sequencing and improve combustion efficiency

In addition, KRMC updated a capable Building Automation System (BAS) to provide enhanced reliability and control of HVAC systems and energy consumption. The system helped ensure that they were monitoring all aspects of building performance, gaining insight into what was performing well, and identifying areas for potential improvement. Through these measures, KRMC saved 3,328,548 kWh, achieved primarily through low or no-cost improvements that reduced dependence on additional energy resources, enabling the KRMC facility to expand its building footprint to better serve the community.

Making Energy Visible

Another important element implemented by the KRMC project team was the introduction of an energy-consumption tracking tool. Most operations staff never see utility bills and seldom receive timely feedback on their operational efforts to gain energy efficiency. This can result in waning dedication to projects and difficult justifications for lengthier efforts. KRMC project collaborators, including NEEA, Flathead and hospital staff, recognized timely feedback on their energy management efforts as critical in achieving top-level savings, and identified the need to measure energy consumption as critical to process success.

To facilitate this need, NEEA provided incentive money that allowed KRMC to acquire the Energy Expert tool to track energy consumption and, using accumulated hourly utility data, provide a daily score of energy performance. The tool incited the competitive spirit among staff, motivating them to score well and teaching them which operational measures were pivotal to energy savings. This not only established a baseline of energy usage, but also enabled staff to compare energy

You can't improve what isn't measured. – Jim Stelson, Resource Conservation Manager, KRMC

consumption year-over-year, applying weather-normalized corrections. Most importantly, by using the tool, KRMC operations staff saw the immediate effects of adjustments to energy systems, and were equipped to set energy saving targets and select projects to meet those targets.

Working Together: Strategic Energy Management Collaboration Results In Shared Success

In 2011, nearing the end of the time frame laid out in the first SEMP, KRMC broke ground on a new, state-of-the-art, three-story surgical tower designed to meet KRMC's current and future surgical needs. In keeping with the goal of implementing enhanced design and construction practices, KRMC and its energy partners worked closely together on this new project. Through their efforts on operations and maintenance-based energy projects, the KRMC and utility teams established a close working relationship: KRMC felt comfortable and safe working with Flathead and the architects, designers, and consultants they brought to the table.

All of the energy and design experts came together to participate in design charrettes and explore integrated energy design options. They identified several energy conservation measures (ECMs) for the new tower, including innovative uses of well water for condensers to eliminate dependence on cooling towers, installation of fanwall air handlers to provide efficient air delivery to surgeries, and ventilation reduction designs deployed in unoccupied operating rooms. There was a problem, however: the recommended ECMs drove the cost of the project beyond KRMC's budget. Flathead realized that if KRMC did not implement those ECMs, the utility would have to spend a significant amount of money to increase their capacity; implementing these ECMs would save money for KRMC as well as Flathead. Flathead implemented an innovative solution. They offered KRMC a \$1.2 million, low interest loan to facilitate implementation of the ECMs. Together, this diverse, hardworking team identified potential savings, and overcame significant barriers to implement energy conservation measures. The outcome was a win for KRMC, who will enjoy energy-efficient operations in their new surgical tower, a win for Flathead, who did not have to spend excessively to increase capacity, a win for top-level patient outcomes, and a win for the local community and Northwest region.

Cascading Benefits, Recognition, and Leadership

In summary, energy efficiency projects can help healthcare organizations achieve operational excellence, cost savings, and traditional goals through a willingness to embrace fresh ideas, try new concepts, and change long-time practices and habits related to energy management.

Through its commitment to Strategic Energy Management, KRMC realized significant energy, operations, and water savings achievements, including:

- Reduced facility maintenance operating costs for existing facilities by an average of 25 percent per square foot over five years
- Lowered maintenance operational costs from \$8.71 per sq. ft. in 2006 to \$6.33 per sq. ft. in 2014
- A 35 percent reduction per square foot in energy use
- An improved ENERGYSTAR rating from 42 to 91 from 2007 to 2014
- A 33 percent reduction in water and sewer usage

The benefits extend beyond energy savings. Major pumps, fans, and chillers run fewer hours and at lower speeds, resulting in decreased maintenance and operational costs and manpower hours. Employees and patients in energy-efficient facilities are frequently more comfortable due to proper and consistent heating and cooling. The operations staff is well trained and more capable to deploy important equipment upgrades and repairs, resulting in a reduction of repair-related downtime. The facility uses less salt to soften their water due to a reduction in water usage, thereby reducing impact this process has on the environment. Further, cost savings realized from SEM contribute to a reduction in operations and maintenance costs while also reducing the need for additional plant equipment typically required for expansion. At KRMC, this results in a healthier bottom line, allowing leadership to allocate more funds toward facility upgrades and increased medical capabilities. As a result of these benefits, as well as the energy savings achieved through the SEMP project, KRMC adopted an updated SEMP in 2012 that takes them through 2017.

KRMC has become a leader in energy conservation in the healthcare sector; in 2012, KRMC Facilities Manager Mark Chitwood, won a BetterBricks award. During the award announcement, the judges stated the following:

“Mark’s work is exemplary in that he has developed a thorough approach to guide and manage the people, systems and leadership of his hospital to promote reduction in energy use. Probably the most difficult part of environmental stewardship and the resulting reductions in energy use is to get the human side of the equation to agree and move toward a common goal. Mark has developed a comprehensive method of establishing the mindset in his organization, then moving the ball down the field by very organized goal setting and leadership.”

The work achieved through the KRMC, Flathead, BPA and NEEA partnership set KRMC up for long-term success in resource management: with an entire team of operations staff and executive leadership engaged, KRMC is set up to ensure lasting engagement and operational excellence. They now employ facility managers who are motivated to uphold successful new O&M processes that improve the bottom line, and senior management supports these efforts thanks to the thorough reporting and planning put in place through the SEMP. Yet, perhaps the most important lesson from KRMC’s experience is the example set by the diverse group of hard-working people, who formed a partnership to work toward a common goal. The knowledge, experience, and perspectives, which in many cases can be a barrier to forming close relationships, proved essential to finding innovative solutions that allowed KRMC to implement its energy conservation measures.