



ENERGY TO CARE *SUCCESS STORY*

CAROLINAS HEALTHCARE SYSTEM PINEVILLE

Pineville cuts energy usage by 26 percent in 18 months, empowering the organization to use energy wisely

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CAROLINAS HEALTHCARE SYSTEM PINEVILLE

A non-profit hospital network

Location: Charlotte, North Carolina | **Square Footage:** 479,288 | **Licensed Beds:** 206

- One of the top ten largest health care systems in the country (and growing)
- Operates over 40 hospitals and serves patients at more than 900 care locations
- More than 60,000 full-time and part-time employees
- 10 million+ patient encounters annually
- Headquartered in Charlotte; Operates in North Carolina and South Carolina
- Facilities Management Group (FMG) is responsible for facilities across the system; Infrastructure Support Team was formed to focus on capital infrastructure, aesthetics and energy.

Team:

- Larry Bost, Assistant Vice President for Facilities Management and Energy
- Christina Vernon, Assistant Vice President for a Healthy Environment
- Tom Kaufman, Energy Specialist
- Michael Roberts, Senior Energy Specialist, Plant Operations and Maintenance
- Jimmy Peebles, Senior Infrastructure Specialist, Plant Operations and Maintenance
- Joseph (Joe) Ross, Manager, Plant Operations and Maintenance, Pineville

Overview

At the outset of 2014, Carolinas HealthCare System Pineville ranked as the worst energy performer in the Carolinas Healthcare System (CHS) 40-hospital portfolio. For Pineville, which routinely leads the portfolio in quality and service metrics, this realization was a call to action that led to impressive results.

As of July 2015, **Pineville had reduced its energy consumption by more than 26 percent in 18 months.** Its performance surpassed two other hospitals in the portfolio and is closing in on two more.

Pineville is living its mantra of success in progress and has received well-deserved recognition for its efforts. In July 2015, the American Society for Healthcare Engineering (**ASHE**) **recognized 23 medical facilities nationwide for significantly cutting energy consumption.** Pineville was one of four Carolinas HealthCare System hospitals to receive this notable recognition. Each hospital received an ASHE Energy to Care Award for its work to slash energy use, which reduced operational costs and made more resources available for patient care.

How, in less than two years, did this Charlotte, North Carolina hospital go from one of the lowest ENERGY STAR scores to being nationally recognized for cutting energy consumption?

Action and successes happened at both the system level as well as at the local hospital facilities management team. At the system level, Carolinas HealthCare System prioritized energy consumption as a major initiative. At the facility level, the Pineville facility management team brought on a leader who offered a fresh perspective, a collaborative game plan, and an innate desire for efficiency. He was not afraid to question status quo, to experiment and learn quickly, to lead by example, and to empower his team to equally participate.



Objectives

In 2012, Carolinas HealthCare System Facilities Management Group (FMG) set an audacious enterprise goal to reduce energy use intensity (EUI), which is defined as energy use per square foot per year, at 12 key facilities by 20 percent over a five-year period, starting December 2012 and ending December 2017. This goal encompasses Pineville, seven other acute care facilities, two nursing homes, and two rehabilitation facilities. As of this publication in late 2015, Pineville has met and exceeded its 20 percent EUI reduction goal without breaking the bank.

Solutions

CORPORATE SUPPORT FIRST

To put its goals within reach, Carolinas HealthCare System FMG invested in both physical improvements at facilities in the portfolio as well as infrastructure to drive change. In 2013, the System invested in a first flight of projects to reduce energy consumption including energy-savings equipment at various sites within the System as part of the capital construction and renovation program. Additional subject matter expertise resources were allocated to create an Infrastructure Support Department, including energy specialists. A system-level sustainability leader was added to FMG to lead the newly created Office for a Healthy Environment.

To identify the most effective path toward achieving its goal, FMG partnered with a national energy-consulting firm to perform energy audits at Pineville and other facilities. Reviewing the results from each facility, the FMG team identified and secured funding for a project called Enterprise Energy Management Phase 1 (EEMp1), a series of energy projects with capital investments that could be quickly offset through savings and applied consistently across the portfolio. These projects included: retrocommissioning, installation of occupied/ unoccupied setback controls in specialized ventilation rooms, upgrading chilled water systems, and retrofitting VAV air terminals from pneumatic control to direct digital control (DDC) in order to implement energy-optimizing control sequences. Work at Pineville as a part of EEMp1 began in mid-2015. While these capital projects are an important part of the story, the energy performance improvements at Pineville began well before the capital projects. The operational improvements, with quick implementation, have been at least as important, if not more, in impacting Pineville's energy efficiency.

EMPOWERING OPERATIONAL EFFICIENCY

Joe Ross joined Carolinas HealthCare System in January 2014 as Plant Operations and Maintenance Manager at Pineville. His first task: to lead the energy reduction effort at this struggling location.

Ross was new to health care facility management, coming from an industrial setting in which he notes, “operational efficiency is a way of life.” He brought a fresh perspective and challenged his staff to do the same. “What would you change if you were ‘king’ for a day?” Ross asked his team. He regularly went to his team for ideas and helped implement them, ensuring the impact was measurable so they could assess degrees of effectiveness. “Every accomplishment can’t be huge,” noted Ross, “...but pennies add up to dollars.” Even replacing incandescent light bulbs with LED would reflect the facility’s mantra of success in progress. Ross empowered his staff to see things differently, share their observations, and make change.

Solutions: Energy Measures

LIGHTING

When focusing on lighting, Ross and his team discovered and quickly resolved multiple “low-hanging fruit” lighting opportunities. A sophisticated lighting control system installed in the kitchen and dining areas had never been programmed; incandescent light bulbs used in bedside lamps had not yet been replaced with LEDs. Both situations were quickly resolved upon discovery.

OCCUPANCY SENSORS

A perception that installing occupancy sensors was costly and complex prevented some facilities (FMG) team members from readily embracing and looking for opportunities to deploy the technology. To overcome this, Ross empowered an electrician to tackle this challenge and found success in easy to install battery-operated sensors. Facilities created a pilot project to install a 10-year-life battery powered occupancy sensor in a small area that proved successful. Ross used his operating budget to install additional sensors, including one in his own office, as an example to other leaders outside of the facility department.

KITCHEN COLLABORATION

Partnering with the food service department, Ross’ team determined that kitchen equipment was another energy-saving opportunity worth pursuing. They began by identifying systems and equipment routinely left powered ‘on’ during periods of inactivity. More importantly, this effort prompted cross-departmental collaboration and building rapport among staff working together toward cutting energy use. Simple, yet effective strategies included turning off or powered down equipment based on actual kitchen staff needs. To drive consistent energy-smart behaviors, activities recommended by the group (facilities and kitchen staff) were documented and entered into a new dietary equipment checklist for daily use by the food service team.

WATER HEATER

Domestic hot water was another area of opportunity. The team questioned why they were heating water for an entire hospital wing to 140 degrees for the sole purpose of serving a dishwasher in the kitchen. All other uses, which constitute the majority of hot water consumption, are ideally served at 115 degrees. Heating water to 140 degrees wasted energy as it was blended with cold water to reduce the temperature back down to 115 degrees. The facility team quickly resolved this inefficiency by installing a point-of-use booster heater at the dishwasher, allowing the building water heater to be set at 115 degrees while still providing the 140-degree water to the dishwasher.

HVAC HEATING AND COOLING

The largest energy impact resulted from adjusting the HVAC occupancy schedules and reducing simultaneous heating and cooling. Air-handling units were typically set to a constant supply air temperature (typically 55 degrees) only to be reheated at the zone level. Ross’ team began gradually increasing the supply air temperature (based on zone demand) until there



was less need for zone reheat. They also synchronized heating measures based on the weather, so that warm temperatures outside, afforded less energy-intensive warming inside. These tactics saved considerable energy without affecting patient or staff comfort.

DATA TRACKING

To support the level of transparency necessary to generate a true culture of change, new and existing tools and talent were deployed. The Energy to Care program provided a complimentary energy dashboard that helped

Carolinas HealthCare System corporate facilities management group (FMG) track energy consumption and savings system-wide—as well as allowing each facility to track its individual progress.

FMG provided Ross with a wealth of energy consumption data as well as training on where to find the most up-to-date information. Ross managed data locally with dynamic spreadsheets, calculating unadjusted power and gas consumption to see data changes daily, monthly and yearly. The measurement and analysis process also extended to fan speeds, air and water pressures and temperatures on large systems. In some cases, the team was able to see changes almost immediately, particularly for pressure and temperature settings to ensure systems were running as optimally as possible. The FMG Infrastructure Team validated energy data and information, including data in ENERGY STAR, to ensure baseline data was correct. NOTE: One of the Systems' top priorities in energy management is accurate and reliable energy data.

At Pineville, Ross used the data to regularly demonstrate the results of the staff's actions. The data helped them see whether they were focusing on the right priorities to achieve success or needed to change course. As staff ideas were successfully being implemented and celebrated, more ideas emerged. A culture of efficiency experimentation quickly emerged, and was infectious.

FUNDING

The cost of energy efficiency improvements is often a road block. But most of the solutions implemented at Pineville were focused on low cost, high return investments. Since Pineville is a relatively new building, adding occupancy sensors and reprogramming the building automation system allowed Ross' team to have some immediate wins without much funding, providing a strong financial return. This naturally reduced the need for additional funding, by simply working with available resources and within existing systems and infrastructure.

With the support of Carolinas HealthCare System FMG, the team was empowered to look for opportunities to implement change. The technology was in place; it just wasn't being used to its full capacity. Where expense was incurred, Pineville first started small, spreading expenses out as much as possible, so that expenses could be paid from the routine replacement or operational budget.

Pineville's second phase of work, launched in March 2015, entailed larger, capital-intensive improvements sponsored by Carolinas HealthCare System Corporate as a part of the Enterprise Energy Management Phase 1 project. In less than five months, Pineville has decreased its EUI by an additional 10 percent over the 16 percent gains made through active local management. This additional 10 percent reduction was the direct result of formal retrocommissioning performed as specified in the ASHE Health Facility Commissioning Guidelines and Handbook. And, as a result of retrocommissioning, Ross and his team have daily energy use report cards that further enhance their ability to address consumption almost in real time.

Results

Carolinas HealthCare System Pineville is living its mantra of success in progress. In less than 18 months, Ross' team, with the support of Corporate, reduced its EUI by 26.1 percent, improving its ENERGY STAR score from 1 to 19. The strategy of combining facility-based operational and system-level capital improvements with quick and low-cost implementation has made Pineville's continued success possible. Partnered with the full support of FMG, Ross' innovative local leadership and empowerment of staff cultivated a culture of continuous efficiency improvement, dramatically reducing EUI.

The Energy to Care Award further validates the efforts of both FMG and Pineville. Since receiving the award, Ross' team is further motivated to maintain steam and "beat" other Carolinas HealthCare System facilities in the race to reduce energy.

Celebrating the award via internal announcements and social media was an opportunity for Carolinas HealthCare System to share this energy conservation journey with internal stakeholders. With so much of the work occurring behind the scenes, almost invisible to many staff members and patients, gaining outside recognition sheds light on the hard work and results being done by the facility team. This kind of external validation on work well done and money well spent helps facility management staff compete for funding on future energy efficiency measures.

The success of Pineville and other Carolinas HealthCare System facilities aids Corporate in navigating through this time of uncertainty and financial burden in the industry. Now is as important as ever for health care facilities to cut operational costs and build greater resiliency. Every dollar a nonprofit health care organization saves on energy generates the same impact on the operating margin as increasing revenues by \$20 (assuming an operating margin of 5 percent). Carolinas HealthCare System is pioneering how to build greater resiliency through energy savings.

What's next for Pineville? The facility will continue completing the capital investments and evaluate other opportunities for infrastructure and controls improvements. Most importantly they will keep asking "What can we do to continually improve?"

**The Energy to Care program, sponsored by Johnson Controls, encourages hospitals across the country to reduce their energy consumption by 10 percent or more over their baseline energy consumption. Since 2009, hospitals participating in the Energy to Care program have tracked more than \$67 million in energy savings. The free program includes a robust energy-benchmarking tool in addition to the awards. ASHE congratulates these hospitals for their leadership in reducing energy consumption.*



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