



ENERGY TO CARE *SUCCESS STORY*

RUSSELL REGIONAL HOSPITAL

Russell Regional Hospital Employs an ESCO to Build Enthusiasm and Achieve ENERGY STAR® 100.

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RUSSELL REGIONAL HOSPITAL

Critical Access Hospital

Location: Russell, Kansas | **Square Footage:** 98,000 sq. ft. | **Acute Staffed Beds:** 25 | **Long-term Care Beds:** 22

Team:

- Steve Adams, director of plant operations, environmental services, laundry
- Chris Harders, maintenance technician
- Scott Newachek, maintenance technician
- Clarence Larson, maintenance technician
- Tim Howard, maintenance technician

2013 source EUI (energy use intensity) of 308; 2015 source EUI of 150
100 percent DDC system (Siemens Apogee)

Overview

When it comes to hospital energy efficiency, the people of Russell, Kansas, and the surrounding region can be proud to say, “there’s no place like home!” Russell Regional Hospital was already a leader in hospital energy performance when they embarked on a journey to make even more improvements. Now they are ENERGY STAR® 100—better than all of their peers. So how did they do it?

Shockingly, Russell Regional went from good to great in hospital energy efficiency by focusing beyond energy and taking advantage of its situation. The hospital had a motivated maintenance team, equipment nearing the end of its useful life, a new director of plant operations, and a CEO who had experience with using energy projects to drive overall hospital priorities. Russell Regional aligned these forces to achieve unrivaled energy performance.

The new director of plant operations, Steve Adams, noticed the enthusiasm of his facility maintenance team of Chris Harders, Scott Newachek, Clarence Larson, and Tim Howard. This team was taking advantage of small opportunities to decrease operations costs. They were also building trust. These small projects demonstrated the team was serious about finding opportunities, and administration knew the team had a foundation worthy of investment.

This story illustrates the incredible results possible when you couple a motivated maintenance staff and organizational emphasis on energy reduction. Enthusiasm and support can lead to huge opportunities.

Objectives

The facility's goal was to make strategic investments to reduce operating expenses while increasing system reliability. Or, as Adams put it, "let's get our operating expenses down so we can put more money toward our primary mission."

The Game Plan

Russell Regional's game plan to save operating expense was simple:

- Make small improvements to start
- Earn trust by managing with energy in mind
- Invest in opportunities to reduce energy and improve the facility
- Sustain the gains

Solutions

The maintenance team started by implementing some strategies to reduce energy in-house.

Behavioral Changes

Adams and his team did the small things first because they knew it would free up funds for larger initiatives. For example, they started checking lights to make sure lights were not unnecessarily kept on. They also started dialing back steam pressure when it didn't need to be high and dialing back temperatures where possible.

Occupancy sensors

When light switches needed to be replaced, the team replaced them with occupancy sensor light switches instead. The switches were replaced slowly, a switch or two per month. This strategy fit easily into the budget and the savings added up.

Lighting upgrades

The team also started upgrading T12 to T8 bulbs. Following the same pattern as the occupancy sensors they upgraded a few each month so that the funds came out of the operational budget.

Maintenance

Russell Regional has an energy policy. When they received complaints about temperature the maintenance team investigated and found equipment that was not functioning properly. The team took steps to understand the design intent and make the equipment function properly. According to Adams, this helped eliminate space heaters from the building and sent a signal that the maintenance team was serious both about energy efficiency and occupant comfort.

Sharing info

Adams shares info with the entire hospital through an in-house newsletter. The idea of sustainability inherent in energy reduction spread through the newsletter to the cafeteria where they now encourage using reusable cups instead of Styrofoam®.

Energy services company project

Russell Regional administration entered a contract with an energy services company (ESCO). An ESCO can also be thought of as a design-build contractor that focuses on energy and cost reduction. The projects can often be self-funded through the energy savings and utility incentives without requiring capital from the facility.

An ESCO can structure financing for energy projects in several ways. (See <https://betterbuildingssolutioncenter.energy.gov/financing-navigator> for an overview of how to finance energy efficiency projects.)

In Russell Regional's case, the ESCO performed the following steps to develop the overall projects:

1. Identified a list of energy efficiency and cost reduction measures based on the hospital's goals and allocated capital
2. Provided project pre- and post- measurement and verification that would serve as the baseline for energy savings
3. Constructed and implemented the identified energy efficiency and cost reduction measures that the hospital decided to pursue
4. Provided a 10-year savings guarantee

Through the ESCO the following projects were performed:

- **Lighting improvements (new lamps, ballasts, fixtures)**
New energy efficient lamps, ballasts, and fixtures were installed throughout the building. T12s and older T8 florescent lighting were replaced with energy efficient T8 lamps and ballasts. Incandescent, fluorescent, and in some cases even compact fluorescent lights were upgraded to more efficient varieties.
- **Water efficiency**
While not an energy project, the water efficiency project included components such as new water-saving toilets, showerheads, and faucet aerators.
- **Energy management system (building management system) upgrades**
The project included improvements to the building management system. These included occupancy schedules, set point modifications, optimizing startup and shutdown, and providing additional helpful graphics including the ability to easily run override reports. Training on how to use the energy management system more effectively was also provided.
- **Water-side economizer**
The facility made changes in how it operated to take advantage of free cooling whenever possible, for example, cooling in the winter without running the chillers. To accomplish this, a heat exchanger was installed to allow cold condenser water from the cooling towers to cool the primary chilled water loop without running the chillers.
- **Boiler replacement: convert steam to hot water**
The facility had inefficient steam boilers. The steam boilers were replaced with two new condensing hot water boilers. Associated equipment was converted to operate off of hot water instead of steam.
- **Chiller replacement – water cooled**
The previous chiller was unreliable at the end of its useful life. This chiller was replaced with a new water-cooled chiller.

- Multi-zone to variable-air volume conversion**
 The multi-zone HVAC system was converted to a variable-air volume (VAV) system.
- Variable speed pumping**
 Variable speed pumping was provided for the hot water, chilled water, and domestic water system.
- Floating head pressure control**
 Floating head pressure control was installed for the refrigeration equipment so that the pressure in the refrigerant circuit could vary. On cold days, the refrigerator compressor energy consumption can be reduced while still maintaining refrigeration temperatures.
- Backup emergency generator replacement**
 The facility had some power quality concerns and wanted to replace their generator. The existing generator was replaced with a new one. A smaller second backup generator was also provided. The hospital paid for the generator outside the scope of the other projects

Project Details

Table 1 shows anticipated energy, operations, and maintenance savings; project cost; and simple payback for some of the above identified projects.

Table 1 Select energy conservation measures annual savings, project cost, and simple pay-back.

Energy Conservation Method	Total Annual Savings (Energy + O&M)	Project Cost	Simple Payback (years)
Lighting improvements	\$21,146	\$95,528	4.5
Water efficiency improvements	\$1,889	\$16,739	8.9
Energy management system upgrades	\$24,147	\$264,556	11.0
Boiler replacement (convert to hot water)	\$33,233	\$474,679	14.3
Chiller replacement	\$19,773	\$301,401	15.2
Condensing unit replacement	\$12,611	\$63,222	5.0
Variable speed pumping	\$10,244	\$39,037	3.8
Floating head pressure controls	\$656	\$2,452	3.7

Results: What Happened to Actual Savings

Russell Regional Hospital has an energy score of 100 which means that it performs better than all of its peer facilities. In this sense, the results have been fantastic. The facility reduced energy use by a spectacular 43 percent between 2013 and 2016.

The energy services company measured and verified the savings as part of their work. Russell Regional’s maintenance staff independently verified the savings with ENERGY STAR Portfolio Manager®. So far, the savings predicted have been verified as above the guaranteed savings value. The hospital replaced old equipment, improved patient comfort and safety, and reduced operating expenses.

The energy project made a real difference for the hospital. “That’s the whole Energy to Care idea, right?” suggests Steve. “Reducing some of our operating expenses helps us focus on our primary mission of taking care of patients!”

What’s next?

Russell Regional Hospital will continue to sustain the gains they have made. The plant operations team will continue to look for ways to reduce consumption and make even more strides in energy efficiency.

*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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