



Why Sustainable Practices Matter

By JEFF RICH

Health care as an industry is a big polluter. That is a tough statement to come to grips with, but it is true. It also is ironic — focused as we are on providing compassionate care, we in the health care industry often do not think of ourselves as a source of pollution or a contributor to human health problems. But the truth is, health care services use and produce large quantities of supplies that not only cause harm to the environment, but have been connected with disease.

Consider the chemicals, pharmaceuticals, plastics, food, facilities, electronics, water and energy needed to deliver care for patients. Each of these resources has an impact on health and the environment through their production, transportation, use and disposal. However, we have choices in how we source the resources to deliver care. We have the ability to minimize the negative effects.

ENVISION

Gundersen Health System is an integrated delivery system spanning 19 counties in Wisconsin, Minnesota and Iowa. The health system employs nearly 7,000 people and delivers a full spectrum of services in more than 50 facilities, every year admitting more than 13,000 inpatients and seeing more than 1.2 million outpatients.

In 2008, Gundersen began Envision, an envi-

ronmental program built on four pillars: energy management, waste management, recycling and sustainable design. Envision is tied to the Gundersen mission to “provide health and well-being to the communities we serve,” a definition that extends beyond facility walls to include population health, education, prevention of disease and even the economic health of the region. That expanded concept requires a health care provider to consider environmental implications of processes, services and materials and their possible effects on population health and the local economy.

ENERGY MANAGEMENT

A health system consumes a lot of energy in delivering services to patients. Facilities must be heated, cooled, ventilated and illuminated around the clock in order to provide a safe and comfortable environment for patients and staff. Instruments need to be sterilized, computers are required for numerous applications, imaging equipment and automation are fundamental to modern medicine. What’s more, most of the energy used in North American commercial buildings is generated from fossil fuel combustion, a process that emits pollutants such as par-

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ticulate matter, mercury, carbon dioxide, sulfur dioxide, nitrogen oxides and other toxins known to have harmful effects on human health.

Because health care has long been recognized as one of the nation's most energy-intensive building sectors, the U.S. Department of Energy in 2008 launched the EnergySmart Hospitals initiative to help hospitals save energy costs and reduce carbon dioxide emissions.¹

ENERGY CONSERVATION

The average commercial building in the U.S. wastes 30 percent of the energy it consumes, says Energy Star, the U.S. Environmental Protection Agency's voluntary program to improve energy efficiency.² Making it an energy management priority to not only cut back on consumption but to reduce energy waste generally pays off in significant and immediate results and usually is more cost-effective than seeking out and implementing alternative energy sources.

The Envision team started by measuring and benchmarking Gundersen's energy performance across the system. Measuring is a straightforward process — collect a year's worth of energy bills and add up the electricity, natural gas or other fuels used to heat and power the facility.

A building's energy performance typically is measured in British thermal units per square foot of space — the Energy Utilization Index (EUI), sometimes referred to as Energy Intensity. Often, for purposes of scale, the number is noted in thousands of BTUs or "kilo-BTUs." A median hospital in the Upper Midwest climate typically will have an EUI of 250-260 kBtus per square foot.

The U.S. Department of Energy, EPA, Energy Star and the American Society of Heating, Refrigeration and Air Conditioning Engineers (now called ASHRAE) are some of the sources of benchmark information. Gundersen's initial system-wide benchmarking revealed its buildings were at median performance levels for hospitals in the Upper Midwest climate. We concluded we could set a reasonable initial target of about 25 percent in energy savings; since then, the Envision team has learned through experience that most health care facilities in the median EUI range have the opportunity for 20 percent to 30 percent in energy savings with good financial returns.

The next step was to perform an energy audit on some of the largest Gundersen buildings with the worst energy performance. An energy audit is not a benchmarking effort. There are various forms and levels of energy audits, but they all

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For energy audits, Gundersen's team assembles a cross-functional group of employees and external experts such as professional engineers, suppliers and contractors to identify energy conservation measures. The group breaks into teams with check sheets and instruments for a "blitz" of the facility to identify energy waste, quantify and set priorities for energy conservation measures and develop action plans for improvement projects.

During its first two years, the Envision program focused heavily on reducing energy waste. Gundersen invested nearly \$2 million — including local and state incentives — into energy improvements, resulting in more than 20 percent gains in energy efficiency. Dozens of implemented measures helped achieve these results, such as adjustments to building automation systems to reduce energy consumption during times when spaces were unoccupied; replacing lighting, motors, pumps, steam traps and other equipment with higher efficiency models; and insulating pipes and equipment.

In hospitals, heat recovery generally offers a prime opportunity for using energy more efficiently. Hospital buildings use heat and steam around the clock to support sterilizers, cafeteria services, dehumidification systems, domestic hot water and occupant comfort. By making improvements ranging from installing boiler exhaust heat recovery units and heat recovery chillers



to control existing equipment more efficiently, it is possible to recover wasted heat from equipment, then recycle and use it instead of firing boilers. Between 2008 and 2015, Gundersen facilities became 54 percent more efficient in their fossil fuel use, saving more than \$2.7 million annually in energy costs and creating an enormous benefit in reduced emissions impact.

CLEAN ENERGY GENERATION

Energy efficiency is the first place an organization should begin its energy management program, and the gains can be significant — but energy consumption never drops to zero. Health care facilities need energy to provide a safe and effective environment to deliver care for patients. Therefore, the next step in negating the harmful effects of fossil fuel generation is to look for cleaner sources of energy.

Gundersen's Envision program evaluated a variety of potential alternative energy projects for capital cost, return on investment, emissions ben-

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efit, complexity, risk and local economic impact. Between 2009 and 2014, Gundersen installed a number of renewable energy projects in its region, including renewable dairy manure biogas, landfill biogas, biomass, geothermal, wind and solar projects.

In 2015, Gundersen's portfolio of energy efficiency and renewable energy projects offset 90 percent of its 2008 emissions levels, despite having added 26 percent more facility space in the same time frame. In 2015, the health system achieved 72 days of energy independence during which it produced more energy than it consumed from utility sources and offset 64 percent of its total energy needs for the year. Off-site renewable energy projects (i.e. dairy digesters, landfill gas, wind projects) generate new revenue for the health system and surrounding communities. Gundersen purchases renewable biomass wood chips from local hardwood mills to provide the

majority of heat for the La Crosse medical center, and it also buys renewable landfill gas from the county landfill. Those two projects alone account for more than \$800,000 spent annually, in our region, for renewable fuels that replace fossil fuels previously sourced from other states or nations. Those dollars now stay in the communities that we serve.

WASTE MANAGEMENT

Energy is not the only resource that can have a negative impact on the environment and health. Patient care requires all kinds of supplies — pharmaceuticals, cleaning chemicals, plastics, garments, linens, instruments, packaging, food and utensils, to name a few — and all of them have to be manufactured, transported and disposed of. To make a balanced choice among alternative options and products, an organization must factor in the environmental footprint they create while being produced. Plastics and paper, for instance, require large amounts of fossil fuels to produce, and some are petroleum-based or may have harmful chemicals utilized in the production process, if not in the material itself. The distance a supply item needs to be shipped also can have a significant effect on fossil fuel consumption.

Finally comes disposal. Most items end up in landfills, except for regulated medical waste — contaminated with blood or infectious material, for example — that may need to be transported to a specialized processing center or incinerator. Disposing of so-called red-bag waste, discarded in specially marked red plastic bags, has environmental and health impacts, increased risk associated with its handling and added disposal cost. Each should be considered when weighing options. Procedures and value analysis review teams can be helpful in ensuring balanced decisions to meet the goals of the organization and deal with competing needs. A good place to begin is by conducting a trash audit to see what is going where and which materials offer the biggest opportunities for reducing waste and costs.

One example is food waste. Gundersen started a project in 2010 to address pre-consumer food waste in system cafeterias. Strict codes to maintain food freshness and health standards require food to be removed from the cafeteria serving

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line after a prescribed amount of time. Gundersen was throwing away 25 tons of food a year at an annual cost of nearly \$30,000, most of which was passed on to patients and visitors. To address this source of waste, Gundersen bought a modestly priced software program, and cafeteria employees were trained to weigh pans of food and record the type of food and the time it was removed from the serving line. The software program charted the data, revealing patterns the nutrition services staff used to adjust recipes, schedules and amounts of food that were prepared. Within six months, Gundersen saw a 60 percent improvement, and today, pre-consumer food waste has been reduced by more than 80 percent over the 2010 baseline.

RECYCLING

Health care tends to be a throwaway culture due to its penchant for efficiency and convenience, its reliance on the economics of bulk purchasing and the need to maintain sterility. One environmental goal is to minimize the amount of items discarded, but cost and quality standards prevent some from being easily or cost-effectively reused or recycled once they have served their purpose. However, with careful attention to purchasing and use, health care systems can find some things that can be reused or recycled, thus reducing the need for additional production, transportation and disposal. A number of health systems already have had success with reusing or recycling linens, garments, paper, plastics and similar items. Even some clinical items can be “reprocessed” for use, such as sharps containers, thermometers, implants and oxygen sensors. More opportunities are becoming available as health care organizations seek alternatives to disposables.

SUSTAINABLE DESIGN

A good time for a thorough environmental assessment is during the purchase of a new piece of equipment or the design of a new or renovated facility. As a rule of thumb, 75 percent of life-cycle costs are committed during the design phase, leaving smaller opportunities for improvement once the die is cast. Goal setting is key at this point to minimize material waste in construction, optimize energy performance, ensure safe materials are utilized, reduce harmful chemicals, etc.

In Gundersen’s experience, many new facilities prove to be among the worst energy performers when benchmarked. This is surprising, given that so much effort and resources are committed in a large project such as a new hospital or clinic. Yet, often there are no stated, measurable, environmental goals. Validation to measurable goals is important but usually not included by owners in the design phase, bidding or construction process. Commissioning of a new facility (the process of validating that the building functions as designed) often is skipped as a cost-saving measure, only to result in inefficiency for decades afterward. When drafting contracts, it is important to pay careful attention to desired outcomes and measures in order to achieve a balanced result — and making the investment up front is the best approach.

In January 2014, Gundersen Health System opened the doors to its newest hospital, the Legacy Building in La Crosse. The facility has more than 450,000 square feet of inpatient space, including surgery suites and critical care services. During the design and construction, great efforts were made to set measurable energy performance goals for the Legacy Building based on benchmarks for

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the top 1 percent of hospitals in its climate. As a result, the new hospital is currently functioning with less than half of the energy consumption as that of a median facility of the same size in its climate, saving many tons of emissions from fossil fuels each year and more than \$600,000 in annual energy costs.



More than 90 percent of the materials and waste from construction were able to be recycled for other uses. Interior furnishings and equipment were selected with life-cycle economics in mind — that is, making purchase decisions based on not just the sticker price, but also taking into consideration costs associated with operating and maintaining a piece of equipment and decommissioning or disposing of it when its intended use is completed. Similarly, environmental attributes of products are evaluated with their entire life-cycle in mind and not just the intended customer use — where are the materials sourced? How much fuel is used in their transport? What chemicals and processes are used in manufacturing? Can they be reused? Will they have a negative environmental or health impact when disposed of?

SUMMARY

Sustainable thinking provides an opportunity to create new value to the mission of health care, rather than settling for less. Success stories and case studies exist, which if replicated can have an enormous positive effect. The future holds promise. Many health care organizations are signing up with efforts such as the Healthier Hospitals initiative,³ a program of the Practice Greenhealth⁴

membership organization for sustainable health care, to set new standards and learn more about methods to reduce the environmental footprint and negative health effects from the delivery of care to their communities.

Providing safe and affordable care to patients and their families must remain paramount in the decisions that are made, but good environmental stewardship can be achieved. Setting organizational goals holds the key to finding the optimal balance.

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NOTES

1. U.S. Department of Energy, “DOE Launches EnergySmart Hospitals to Promote Improved Energy Efficiency in Healthcare” July 23, 2008, energy.gov/articles/doe-launches-energysmart-hospitals-promote-improved-energy-efficiency-healthcare.
2. Energy Star web site, www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy.
3. Healthier Hospitals web site, healthierhospitals.org.
4. Practice Greenhealth web site, healthierhospitals.org.

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