

## Issue Stories

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### Going Green

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by Verina Palmer Martin

**Today's providers are looking for ways to increase their bottom line by cutting operational expenses. Although the initial investment in green technologies may seem costly, experts say the long-term savings can be substantial.**



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—Mark Tecca, *Business Alliance program manager, Hospitals for a Healthy Environment*

CT systems. Quit fuming because the MRI bulbs keep burning out and take so long to replace. Medical imaging is "going green," and several new energy-saving technologies are good for your business, your patients, and the environment.

Hospitals for a Healthy Environment (H2E) is an independent not-for-profit organization that promotes environmental sustainability in the health care sector. It began in 1998 with an agreement among four organizations (US Environmental Protection Agency, American Hospital Association, American Nurses Association, and Health Care Without Harm) to create a program that would virtually eliminate mercury, minimize chemical waste, and reduce the health care sector's total waste volume. The organization strives to help hospitals reduce their total environmental footprint, including reducing the use of toxic materials, such as carpet glues and polyvinyl chloride (PVC), and improving medical recycling efforts, including the disposal of old computers and electronics.

"More and more hospitals are taking a closer look at materials to understand the potential health impact," said Mark Tecca, H2E's Business Alliance program manager. "Of course, hospitals don't want to be making people sick. Our overall goal is to help hospitals do the work of becoming a more sustainable, healthier place."

Tecca said reducing toxicity and waste also results in reducing costs. "It just makes sense from an environmental standpoint to reduce the environmental footprint," he said. "Paying attention to the resources we are throwing away is one of the best cost-saving measures hospitals can adopt."

In medical economics, Tecca said the hard part may be the "greening" of the chief financial officer who has to balance the initial cost of change with long-term savings.

"Hospitals are so intently focused on the bottom line, and a long-standing misperception of new environmental programs is that they are going to cost more money," he said. "While we need to be good stewards of health

care dollars, savings are realized from waste reduction, longer life cycles of products, and water and energy reduction." In addition, there's an added benefit of enhanced public perception of an environmentally sensitive health care provider.

"They can save money, but it may sometimes involve spending money to do that," Tecca said.

H2E encourages all medical providers and manufacturers to use greener products, build greener facilities, and reduce their energy loads. Its web site, [www.h2e.org](http://www.h2e.org), offers ideas, guidelines, and information about state and local regulations and resources.

H2E has 1,600 hospital partners, and it also partners with the "Green Guide to Healthcare," [www.gghc.org](http://www.gghc.org), a sustainable design toolkit for integrating environmental and health principles and practices into health care. This guide uses a credit system similar to The Leadership in Energy and Environmental Design (LEED) Green Building Rating System, developed by the US Green Building Council, for environmentally sustainable construction.

"Not only do we want to help hospitals operate a healthy facility, we want to help them build it, too," Tecca said.

Medical imaging providers are starting to build environmentally friendly medical facilities or using new technologies to remove toxic substances such as lead from existing radiology suites. More companies are reusing, recycling, and finding alternatives to hazardous materials. They are seeking out manufacturers who have joined the global "greening" initiative to conserve energy and reduce environmental waste, such as Green Shielding Solutions, Siemens Medical, and Everbrite Lighting Technologies (ELT).

Green Shielding Solutions, a maker of radiology shielding products, is one manufacturer who is already on board. The company has partnered with imaging machine component makers, Vulcan Global Manufacturing Solutions and Thogus Products, to develop tungsten-filled polymer shielding products and parts for medical imaging equipment. Tungsten is a brittle metal with the highest melting point and the same thickness and specific gravity as lead, but without the toxicity.

These products are compliant with the European Union RoHS Directive, which restricts the use of certain hazardous substances in electronic equipment. Similar legislation is being discussed in the United States, which has prompted manufacturers such as Green Shielding Solutions to develop lead replacements in anticipation of a complete ban by 2010.

"We feel part of the reason they haven't come out and banned lead is they didn't know there was a substitute," said Russ Wolff, sales engineer for Green Shielding Solutions. "We have a substitute."

Wolff said the US Department of Energy has acknowledged that tungsten-filled polymer is decommissionable, and energy officials are examining the product's potential not only for medical equipment but for munitions, power plants, and other radiation facilities. Green Shielding Solutions also is working with equipment manufacturers such as Siemens Medical Solutions, Philips Medical Systems, and GE Healthcare to replace lead in their existing products with injection molding. Although there are no current restrictions on medical devices, these manufacturers know that day is coming.

"At some point in time, lead is going to have to be removed. They don't want to be surprised and have to scramble to replace it," Wolff said. "Lead is toxic. After so many exposures to radiation, it becomes radioactive. In lower dosages, it can be reclaimed and recycled, but that's expensive."

As health care costs escalate, providers are looking for ways to increase their bottom line by cutting operational expenses. Although the initial investment in green technologies may seem costly, manufacturers say the long-term savings can be substantial for both the customer and the environment.



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tungsten costs \$35 to \$100 per pound. During part production, however, lead has to be formed, drilled, tapped, faced, and transferred, which escalates the cost with every step. Part production is less complicated with tungsten, which reduces labor time as well as the final cost by 30%.

"We can injection mold it as one part. There's less labor, less handling, less machining, and the cost differential starts to shrink," Hlavin explained. He said Green Shielding Solutions is working with 243 manufacturers and already has converted 56 machine parts from lead to plastic. Another 150 products will be developed within the next 2 years, including CT radioisotope containment units, prototypes, and lining systems that include tiles and tapes to seal radiology suites.

In addition, the company is developing a proprietary product and working with architects to build green rooms with these lead-free materials. The product will replace the lead-backed gypsum board currently used to block radiation.

"We started a joint venture with a lead company. There's a reason for that," Hlavin said. "These companies have a customer base that will have to get rid of lead sometime, and they want to supply that customer base."

Another illuminating idea in green technology is the use of light-emitting diode (LED) systems for MRI suites. Everbrite Lighting Technologies offers energy-efficient LED lighting that lasts longer than traditional bulbs, which reduces costly MRI downtime. Although these lights can be more expensive than incandescent bulbs, they are more energy efficient and have a lifespan of 10 years or 100,000 hours of continuous use. Incandescent bulbs have a lifespan of only 700 to 3,000 hours due to the high magnetic field of MRI.

According to ELT product manager Jeff Gatzow, LED lights are MR safe because they do not use filaments that can react with magnetic fields, nor do they emit radio frequencies. He said lighting in MRI suites is challenging because of the short life of incandescent bulbs. Fluorescent lights can't be used either because they generate noise artifacts on patient scans. Gatzow said some imaging facilities experience weekly outages, which shut down the MRI suite for maintenance.

"They are replacing entire light systems [with LED] because they can't handle the frequency at which the bulbs have to be replaced," Gatzow said. He added that bulb replacement also poses a safety issue because of the potential for service-related accidents associated with the powerful magnet.

ELT has been replacing neon and fluorescent signs with LED technology for years, and Gatzow said it was natural for the company to shift into health care lighting. "We want to gravitate from MRI to other areas within the health care facility as the cost comes down and the technology continues to improve," he said. "We can

eliminate the fluorescent lamp in a lot of cases, which eliminates the mercury from entering the landfills and the environment."

Gatzow said LED systems are more cost-effective because they are more efficient at converting electrical energy to light energy. Incandescent bulbs convert electrical energy to heat energy, which raises the temperature in MRI suites, which then have to be cooled. The air conditioner then cycles more often to compensate for the heat thrown off by the bulbs, he said.

LED lights also consume less energy than incandescent while emitting the same amount of light. "We're not consuming 75 watts of energy to make 75 watts of light energy. We are consuming only 42 watts of energy to produce the equivalency of 75 watts of light," Gatzow explained. "The next generation will have a 150-watt equivalency while using only 39 watts."

He said LED systems will become even more efficient as the technology advances, which means the product cost will level out and eventually come down. Already the MedLux XLS lighting system with a dimmer is comparable in price to incandescent lighting, he noted.

More customers are expressing interest in ELT products as architects and lighting designers become more educated about green technologies as they design greener medical facilities. "There's a lot of genuine interest. A lot of people already recognize the benefits," Gatzow said. "Since we've released the XLS down light, we've seen our sales double this year, and we fully expect them to double again next year."

ELT also creates backlit mural systems for MRI suites. These high-resolution graphics on walls and ceilings are designed to relax and calm patients. Although LED color temperature previously was a problem in medical contexts because of its cool blue color, Gatzow said other color temperatures are available. "Now we can give customers a color temperature that's best suited for their applications," he said.

More companies are realizing being ecologically responsible is also good for business because customers want products that are cost-effective and environmentally friendly.

Rob Friedman, senior director of environmental health and safety for Siemens Medical Solutions in the United States, said products that conserve energy save his customers money. Equipment that emits less radiation during imaging tests is healthier for patients. Eliminating hazardous materials during product manufacturing saves the environment. And designing equipment with fewer or more efficient parts lowers the cost of production for Siemens.

With sustainability and conservation in mind, Siemens is developing a new generation of medical imaging systems that use less energy and fewer materials and reduce hazardous wastes during manufacturing. Because this equipment also has fewer parts, it is easier to recycle when it can't be refurbished for another life cycle.

Friedman said achieving sustainability begins in the design phase. When developing the new Somatom Definition CT, for example, the design team met with internal and external suppliers to understand how these systems impact the environment. He said the end result was a redesigned x-ray tube that cuts energy consumption by 30% and reduces the amount of hazardous lead used by 80%.

Previously, lead was used as a counterweight when the CT was rapidly spinning. "The engineers came up with an innovative concept to use the components themselves as the counterweights," Friedman explained.

Siemens Refurbished Systems Division also rebuilds used CT, MRI, ultrasound, radiation therapy, and radiography systems to extend the life cycle of a product. Friedman said the company considers the cumulative energy demand, or the total energy, needed to create raw materials, make the product, use the product, and then recycle it.

"We have found that the vast majority of energy occurs during the customer use phase, so that is where we can

have the greatest benefit from the standpoint of energy," said Friedman. "I can reuse a system and upgrade it so that it is a useful product. The raw materials and energy required to build it are no longer necessary. If I can't reuse useful parts, then I can recycle it for material and energy content. There's no landfill [use]."

"The entire life cycle is being considered when the product is developed and designed today," added Knut Fenner, vice president and general manager of Proven Excellence Division, which guarantees the quality of refurbished products. "If you don't have a refurbished systems operation, then you don't really have any choice but scrapping systems or reselling them as-is. "

Because landfill use is extremely important in Japan, Fenner said, sales of refurbished systems has increased dramatically in that country. In Germany, high recycling standards demand the use of refurbished products. Although the United States is behind in this initiative, Fenner said it is definitely catching on. He also said it won't cost more to build green products if they are designed from the beginning with fewer, more efficient parts that have a longer life cycle.

Like Green Shielding Solutions, Siemens is preparing for the day medical devices fall within the scope of the European Union RoHS Directive, as well as for future environmental restrictions in the "greening of America."

"We anticipate that medical devices will come into scope in the next several years, and we are planning now to be able to comply. However, we believe that the European Union needs to provide flexibility and exemptions for risk-benefit," Friedman said. "Although technology can support the elimination or reduction of hazardous substances, in some cases that technology isn't here yet."

The danger lies in restrictions that prevent the use of certain materials or medical equipment when an alternative has not yet been developed. "We believe we need them to continue to be able to save lives with our equipment and services," Friedman said.

Other manufacturers are proclaiming green initiatives by changing processes at their production plants in order to be viewed as more environmentally friendly. Last summer, Fujifilm began its effort to cut greenhouse gas emissions in half at its Greenwood, SC, plant by converting methane gas from a nearby landfill into energy. The Greenwood facility produces more than 80% of the company's medical film distributed in the United States. It is budgeted to finish approximately 8,524,000 dozens or 7,807,984 meters squared of x-ray product this fiscal year.



**Has your imaging center or hospital taken steps to become more eco-friendly?** Register your opinion on [our online poll](#).

-generated energy from the landfill annually—the amount of energy used to heat more than 5,000 homes each year. This will significantly lower its energy costs and reduce its dependence on fossil fuels. The company also has implemented eco-sustainability measures globally with the intent to reduce energy consumption 10% and carbon dioxide emissions 20% by 2010.

"This is a situation where we have come up with a solution that is good for our business, good for the community, and very good for the environment—and that is something that's always been inherent in Fujifilm's culture globally," Johnny Udo, director of Environmental, Health & Safety for Fujifilm in South Carolina, announced in a press release.

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**Normal Version**