

## **25 Steps to a More Sustainable Hospital**

Old drives, short circuits, and steam leaks represent a few of the little things that can bring down your green efforts. Elevate your level of service by attacking them, evaluating options like desiccants and economizers, and incorporating processes like sustainability audits and even recommissioning when needed.

America's focus on healthy, sustainable environments is here to stay. Health care organizations that embrace sustainability for their facility and operations will undoubtedly reap similar benefits that are being seen by other owners throughout the country. These benefits will include reduced costs, cleaner operations, improved patient outcomes, enhanced goodwill, and a standout reputation within the community. Providing reliable patient care, infection control measures, 24-hr operations, and disaster preparedness are a few critical issues unique to hospital owners. These issues must be considered when applying sustainable solutions.

Each of the steps below outlines a proven method for existing hospitals without large building programs to embrace sustainability — now — while still keeping an eye on the issues critically important to their environment of care.

### **1. INVESTIGATE SOLAR WATER HEATING**

Solar water heating has become one of the most cost-effective means of utilizing the sun's energy. Initial installation costs for these systems are dropping as more manufacturers offer greater choices and installers are becoming more experienced. Furthermore, with recent increases in fuel costs, the payback on these systems is becoming shorter. Hospitals may typically incorporate this free heat most easily into a domestic hot water system. It is easy to begin small with this technology, and increase system size once proven.

### **2. REDUCE YOUR WATER CONSUMPTION**

Low-flow fixtures and infrared faucets are common ideas that are widely implemented. Make sure your persistent water leaks are stopped first! Rainwater harvesting systems for irrigation may make sense in your facility. Don't forget the heavy water users in a hospital other than toilet room fixtures, though. Medical processes, kitchen/dining, and HVAC may represent a larger water consumption load than all other sanitary system contributors. Water seal vacuum pumps or medical air compressors may need replacement. Conservation of water may not result in a huge cost savings or quick payback, but it is at the core of sustainability.

### **3. PERFORM A RECOMMISSIONING OF LABORATORY AIR SYSTEMS**

One of the most prominent origins of indoor air pollution in a hospital is the main hospital laboratory. Many laboratory supply or exhaust air systems bypass the scrutiny that other air systems serving patient care areas receive. Perhaps the supply or exhaust air volumes, locations of fan equipment, and/or discharge points for the contaminated air are allowing the laboratory pollutants to aggravate staff health or patient outcomes. Even if pressure relationships are routinely tested and lab hoods regularly certified, the air system flows may be allowing contaminants to collect in other areas of the hospital.

### **4. INVESTIGATE FUEL CELLS AND MICROTURBINES**

These technologies have developed significantly in the last five years. New generation cell stacks, especially, have longer service lives and are providing better power and heat outputs than

those of the past. These technologies provide both heat and electricity, needed by most hospitals throughout the year. The two different technologies will fit your electrical/thermal load profile differently, so they need to be thoroughly analyzed for proper application. These devices offer energy cost savings through more efficient fuel utilization.

#### 5. START A RECOMMISSIONING PLAN

This is a well-tested method of ensuring your infrastructure systems are continuing to operate at peak efficiency. While it may be difficult to estimate a payback on this item, recommissioning improves the indoor environment and verifies comfort and safety. The IAQ of your hospital is a key element of its sustainability.

#### 6. PUT VFDS ON ALL MOTORS 3 HP AND HIGHER

The reduced cost of drives and the increased distribution and power of most hospital DDC systems make installation of VFDs feasible on even smaller motors. A new drive may be controlled in two modes: it may be controlled to modulate flow based on a variable sensor input, or it may be controlled to balance a constant speed system after the triple duty valves are opened fully to reduce system head loss. In either mode, VFDs have the potential to save energy even on smaller motors.

#### 7. START A SUSTAINABILITY PROGRAM

Remember those energy management programs that were so popular 10 to 20 years ago? The time has arrived to execute a similar sustainability program. This program should begin with a thorough review of your facilities and operations. Focus on the “low-hanging fruit” initially to get things going. After the easiest elements are implemented, your focus can widen to plan strategy for implementing the more intensive elements.

#### 8. START A SUSTAINABILITY EDUCATION PROGRAM

Similar to those education programs that complemented the energy management programs, it's time to start educating people about your plan for sustainability. What are the goals of the sustainability program, and how can each staff member and each patient get involved? These are designed to sell your sustainability program so posters and contests are all a part. You'll know you've reached the first milestone when you overhear staff talking about the gallon of water they saved this morning.

#### 9. INVESTIGATE DESICCANTS

Are you one of the many hospitals in America that has a warm and humid surgical suite? The continued increase in the demands on surgical staff has driven the temperature and relative humidity requirements lower and lower. This dropping of the indoor environmental limits has over-burdened many hospitals' mechanical equipment. The application of desiccants to this area of the hospital has become a proven technique in the last few years. Desiccants can provide a cooler and dryer environment at a lower energy cost.

#### 10. INVESTIGATE YOUR HVAC ECONOMIZERS

There has been a little controversy bubbling over the years about whether waterside or airside economizers are better. The truth is that it depends on your location and your plant equipment. Have an engineering firm review your economizers to ensure you are saving the maximum energy possible.

#### 11. FIND THOSE CHILLED WATER SHORT CIRCUITS

Many hospitals in the U.S. share similar problems with their secondary chilled water system. The area furthest from the plant never seems to be cool enough. The chilled water temperature difference never seems to be high enough. While there could be several explanations for these scenarios, short circuits in the piping system are a widespread occurrence. These short circuits allow supply water to enter directly into the return water piping. They could be at coils or at building connections. With secondary pumping motors in the 50- to 100- hp range, these short circuits are robbing your energy efficiency.

#### 12. SEAL THOSE STEAM LEAKS

Whether large or small, these steam leaks result in lower energy efficiency. They are easy to see or hear, and should be stopped.

#### 13. GET RID OF YOUR OLD REFRIGERANTS

Many hospitals have eliminated CFC refrigerants. However, some still are holding onto an aging, dedicated chiller that serves a small area of their campus. Use of these refrigerants is contributing to greenhouse gases in the atmosphere, and the chiller should be replaced or converted.

#### 14. MAKE SURE YOUR ROOFS REPEL WATER

If you have roof leaks, moisture is entering your building envelope. Even if this water isn't visible to patients or staff, it is likely degrading the indoor environment and increasing your energy costs. Water will often start the growth of mold in a building. Once started mold can be difficult to completely eliminate. The presence of mold may contribute to health problems, and compromises the healing indoor environment that you've worked hard to create. Furthermore water infiltration damages the thermal properties of insulation and other materials, increasing the energy costs to heat and cool your facilities.

#### 15. COMPLETE A SUSTAINABILITY AUDIT

Even if you've completed an energy audit or an infrastructure assessment, it's time to look at your facility through the lens of sustainability. A sustainability audit can be designed to do just this. Your audit should focus on the core areas of sustainability, including your institution's site, water conservation, energy consumption and impact on the environment, materials used within the hospital, IAQ, and ongoing operational practices. The audit should present many opportunities so that the core strategies important to an organization can be identified. These core strategies will form the outline for the individualized roadmap to sustainability.

An audit can include updates of previous energy audits and infrastructure assessments, but it should focus first on how sustainability can be improved. A firm experienced in applying sustainable solutions, and experienced with hospital facilities and operations best completes this audit. A hospital green team may already be in existence at an institution. This team will provide invaluable assistance to the firm in understanding the work that has already been done at an institution.

#### 16. INSTALL SECURE BICYCLE PARKING AREAS AND SHOWERS

It's not just during bike-to-work week that employees would happily leave their car at home in favor of their bicycle. Employees' automobiles increase roadway congestion, emissions, and parking requirements. Shower facilities and safe storage areas will present the catalyst needed for some staff to willingly participate in the sustainable efforts of the hospital. This is typically an inexpensive step to implement, and it results in greater staff satisfaction as well as a positive influence on the environment.

## 17. REVIEW YOUR LIGHT POLLUTION

Pick an evening to walk around your campus when all your exterior lighting is illuminated. Note areas where the light spills outward onto neighbor's properties. Note areas that light spills inward onto patient room windows. In both these situations, this light pollution is likely unwanted as well as unbeneficial to your overall lighting strategy. It may also become obvious that selected exterior fixtures can actually be eliminated, reducing energy consumption as well as potential light pollution.

## 18. INVESTIGATE WIND TURBINES

These devices seem to have become common for organizations that want to offer a very public display of their commitment to renewable energy and sustainability. While it likely won't make sense for a hospital organization to install a large field of 200-ft turbines, a compact turbine could fit snugly into a campus where the wind resource is available. It may make sense at your hospital to augment exterior parking lighting with small, compact wind turbines hanging from fixture poles.

## 19. INVESTIGATE ALTERNATIVE PAVEMENTS

Large paved parking lots can represent a significant erosion problem if storm water is not managed properly. This can especially be true for areas of parking that were hastily installed with improper grading or drainage. Permeable surfaces that allow a certain amount of storm water to pass through into the ground may provide a more sustainable surface for water run-off. These surfaces do not make sense for all locations. Winter maintenance may breakdown some surfaces, and patient safety should remain a top concern. However, when patient safety and maintenance are properly considered, these pavement alternatives may improve your site sustainability.

## 20. REDUCE VEHICLE IDLING AROUND YOUR FACILITY

While it may not be possible to ask the ambulance drivers to completely eliminate idling on cold winter days, there are plenty of trucks, buses, construction vehicles, and cars that idle for long periods when attending to business at your hospital. Idling increases the opportunity for vehicle pollutants to enter ventilation air intakes, but it also sends thousands of pounds of particulate matter into the local environment. Programs have been implemented in which lighthearted "ticketing of violators" or "rewarding those who comply" have raised awareness successfully. Construction vehicles are a prime target for this type of awareness program.

## 21. INVESTIGATE DIESEL OXIDATION CATALYSTS (DOCS) FOR VEHICLES

DOCs are devices installed on large vehicle exhaust outlets in order to reduce emissions of particulate matter by 20% or more. They are easy to install and do not significantly reduce hp. Some very successful programs have been instituted at hospitals around the country where these devices were required on construction vehicles operating in support of the institution's construction projects. Similar to idling reduction, DOCs reduce the chance for vehicle pollutants to enter hospital ventilation, but also reduce particulate matter released into the local environment.

## 22. REMOVE OLD DEVELOPMENT LAB PIPING — ALL OF IT

When you renovated that old radiology lab, did all of the old drainage piping get removed? If not, then you likely still have piping that is contaminated with mercury. One of the core efforts of sustainability is to identify and eliminate all harmful chemicals and pollutants in a facility.

Piping may have been “cut, capped, and abandoned” but it shouldn’t be forgotten. Start a removal program on any remaining piping immediately.

### 23. RECYCLE YOUR CARDBOARD

This seems like a common sense step, but there are still hospitals that are not recycling their cardboard waste. In many cases, this waste could be generating tens of thousands of dollars of income annually. This money may be able to be funneled to pay for some of the sustainability program!

### 24. RECYCLE YOUR FLUORESCENT LAMPS

Fluorescent lamps offer great energy savings for hospitals. However, these lamps may contain mercury or other elements. If these bulbs are broken, they could release these materials into the air, water, or soil. The first step is to complete an assessment of what types of lamps are in your facility and the means of lamp disposal. Then begin discussions with lamp recycling companies.

### 25. REVIEW YOUR CLEANING AGENTS

Infection control in a hospital is a most serious issue. The role of environmental services in a hospital is extremely important both to the infection control program and to the environment. There are hospitals in the U.S. that have incorporated more environmentally sound cleaners into their list of standard products, and they have not seen an increase in infection rates as a result of this transition. It may be appropriate to review your list of cleaners to ensure they are as green as possible while still protecting patients and staff against infection.

## PUTTING IT TOGETHER

I remember sitting with a hospital facility manager several years ago while he explained to me that his department was a net cost to the hospital. His facility management department supported clinical functions very well, but it didn’t develop a positive cash flow for the institution. We talked about the energy reduction measures they had implemented. We talked about the positive aspects of a clean, well-lit facility that was comfortable and welcoming to patients, but he repeated his initial assertion that they were still a department that spent money without generating income.

Sustainability represents a huge opportunity for hospital facility managers. No hospital can be sustainable simply by greening new construction. Sustainable operations are foundational for greening hospitals overall. Sustainability can empower facility management to improve patient outcomes, elevate staff confidence and retention rates, reduce energy consumption, and lower the overall impact a hospital organization has on the environment.

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