HOSPITALS FOR A HEALTHY ENVIRONMENT (H2E) CIRCUIT RIDER

COMPANY BACKGROUND

H2E (now part of Practice Green Health) was originally founded as a joint venture of the American Hospital Association, Environmental Protection Agency (EPA), Health Care Without Harm, and the American Nurses Association. H2E aims to create sustainable healthcare facilities by reducing the quantity and toxicity of waste; virtually eliminating mercury; minimizing the use of persistent, bioaccumulative, and toxic (PBT) chemicals; and reducing the environmental footprint through source reduction and recycling.

STATEWIDE

BRETT EDWARDS
MECHANICAL ENGINEERING
IOWA STATE UNIVERSITY

PROJECT BACKGROUND

The circuit rider internship is provided by the Pollution Prevention Intern Program and is funded through a grant from the EPA Region VII. The EPA grant covers the costs of an intern working with hospitals in Iowa and Nebraska to identify mercury and ways to reduce energy consumption. A similar program offered through the Kansas State University Pollution Prevention Institute provides the same services to hospitals throughout Kansas and Missouri.

INCENTIVES TO CHANGE

Healthcare is the fourth largest source of mercury emissions to the environment. In some communities, hospitals are a source of 4 percent to 5 percent of the total mercury-contaminated wastewater. Making hospitals virtually mercury free will help reduce negative environmental impacts and prevent future mercury-related occurrences.

Healthcare facilities spend a considerable amount of money on utilities. The EPA reports that each dollar a healthcare facility saves from spending on energy is the equivalent of twenty dollars in additional revenue. Energy reductions provide both financial and environmental incentives for the hospitals.

RESULTS

Mercury Reduction: A mercury audit was performed at nine hospitals throughout Iowa and Nebraska. The assessment revealed a total of 55.97 pounds of mercury remained in these facilities in patient care areas and the physical plants.

Mercury was identified in a wide array of places in the patient care areas. Items identified include thermometers used for patients and equipment, sphygmomanometers, bougie tubes (dilators), and a barometer.

In the physical plant, the most common items that contained mercury were tilt switches on the boilers. Also, some facilities had in-line mercury thermometers on the chilled water lines. There was a considerable amount of bulk mercury identified at two of the facilities. All of the facilities were lit by fluorescent lights, which also contain a small amount of mercury.

Energy Projects: Energy reduction opportunities were researched at eight of the facilities. The areas studied at each facility included Energy Star appliances, lighting, steam and condensate line insulation, therapy pool covers, computer sleep and standby modes, and Vending Misers for vending machines.

A considerable amount of energy may be saved through the use of Energy Star certified appliances. To earn the Energy Star label, an appliance must use a certain percentage less energy than a conventional unit. Due to the large quantity of televisions, ice machines, and refrigerators found in hospitals, switching to Energy Star products can yield sizable energy cost reductions.

Lighting improvements that were studied included: switching from magnetic T12 ballasts to electric T8 ballasts, replacing 32W bulbs with 25W T8 lamps, replacing fluorescent or incandescent exit signs with light emitting diode (LED) exit signs, using compact fluorescent lights (CFL) in place of incandescent lights, and using occupancy sensors and natural lighting.

Insulation/Pool Cover: Insulating steam and condensate return lines and placing a cover over a therapy pool yield two benefits: less energy is required to maintain the temperature of the fluid and less energy is required to cool the space to which the heat escapes. The heat loss from steam and condensate lines is so substantial that it is economically feasible to insulate any pipe over 120°F. Cooling requirements are reduced by over 30 kWh for each therm saved through insulation.

Installing Vending Misers would save energy used by the vending machines. A Vending Miser is a machine that uses a motion detector to turn off a beverage vending machine when no one is in the area. The Miser allows the machine to cycle on intermittently, resulting in energy reductions without any effect on the temperature of the contents.

Air Pollutants Diverted in Tons

	Total for all sectors
SO2	4.231
CO	0.463
NOX	2.019
VOC	0.123
PM	0.106

Green House Gases Diverted in Tons (CO2 Equivalent)

	Total for all sectors
CO2	785.555
CH4	42.110
N2O	0.403
CFCS	9.658

PROJECT	ANNUAL COST SAVINGS	ENVIRONMENTAL RESULTS	STATUS
MERCURY REDUCTION	—	55.97 POUNDS IDENTIFIED	RECOMMENDED
MISCELLANEOUS ENERGY PROJECTS	$44,769	902,798 KWH	RECOMMENDED
INSULATION/POOL COVER	$23,111	253,445 KWH 9,605 THERMS	IN PROGRESS
ENERGY STAR REPLACEMENTS	$11,167	169,439 KWH 86,974 GAL OF WATER	RECOMMENDED
HAND DRYERS	$5,872	1.6 TONS WASTE DIVERTED	RECOMMENDED