Addressing Climate Change in the Health Care Setting

OPPORTUNITIES FOR ACTION

Health Care Without Harm

PRACTICE Greenhealth

The health care industry has a critical role to play in climate change mitigation. Energy usage in medical facilities is highly intensive. In fact, hospitals expend about twice as much total energy per square foot as traditional office space.

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and the United Nations Environment Program to assess scientific, technical and socioeconomic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation. The reports by its three Working Groups (http://www.ipcc.ch/index.htm) provide a comprehensive and up-to-date assessment of the current state of knowledge on climate change. The IPCC's 2007 report concludes that "warming of the climate is unequivocal," and that human activity has "very likely" been the driving force in that change over the last 50 years. This report not only reflects the mounting evidence that the release of carbon dioxide (CO_2) and other heat-trapping gases has already played a role in raising the average surface temperature of the earth; it has "added new momentum to a debate that now seems centered less over whether humans are warming the planet, but instead over what to do about it."[1]

Unless emissions of these greenhouse gases are reduced, the global temperature will continue to increase, impacting the Earth's physical and biological systems and our public and environmental health. Extreme weather events, increase in infectious disease, decrease in fresh water supplies and health-related issues due to an increase in air pollution are all projected impacts of climate change. Mitigating climate change will require action at many levels. As individuals, we all need to do our part to reduce emissions and conserve energy, at home and in the workplace.

Many health care facilities occupy aging, energy inefficient buildings; many also operate around the clock, 365 days a year. In total, health care spends $5.3 billion on energy every year.[2] Medical facilities consume large amounts of other resources as well—for example, one medical center in the San Francisco Bay Area generates an average of six tons of waste every day. Considering that health care is already responsible for 1/7th of the U.S. economy, and that construction adds more than 100 million square feet of medical building space every year, reducing health care's greenhouse gas emissions is a task of national importance. The health care sector's commitment to health can be demonstrated through development and implementation of climate change action plans.

Health care's response to climate change requires a multi-faceted, practical approach. This document provides several kinds of resources to help; including tips on getting started, potential mitigation programs in different sectors, and an outline of some of the many resources, model programs and guidelines available to help move the process forward. The good news in climate change mitigation is that what's good for the environment and public health also often supports the bottom line. In addition, climate change work can reinforce a facility's broader environmental stewardship goals and programs.

Getting Started

Combating climate change is not a finite goal but an ongoing effort. Whether focusing on fleet management, local sourcing, energy and water conservation strategies, or green energy, climate change response is a continuous process. The important thing is to get started. Initiate the conversation internally, get others excited about contributing, and tap into local expertise on climate change. Carve out 20 minutes a day just to research, read and reach out. Together, we all can help reduce our carbon footprints in health care to ensure a more sustainable, healthier environment for patients, workers and our surrounding communities. Here are a few ideas to help you begin the process:

☐ **Assess Your Resources:**
Identify initiatives, public/municipal policies and legislation that are in place in your area to help support climate change mitigation at your facility, and identify stakeholders within your organization and the surrounding community for potential collaboration. Make the connection between climate change and human health through policy development, written commitment statements, and discussion in bioethics committee. For example, see http://www.bioethicsforum.org/climate-change-health-care-bioethics.asp.

☐ **Create An Infrastructure for Action:**
Before embarking on climate change prescriptions at your facility or organization, create an infrastructure for action. This infrastructure can support and report on a variety of environmental initiatives from climate change and sustainable foods procurement to toxicity/waste volume reduction and green building. It's not as important in *which* committee these activities reside, but rather that they have the critical components to success: senior level support, committee diversity, a method for gathering, tracking and reporting data and clear communications.

☐ **Preach What You Practice:**
For teaching institutions: make environmental health, climate change and health care's role in reducing greenhouse gas emissions and facilitating adaptation part of required learning. Work with schools of nursing, medicine, public health and other ancillary programs to exchange information and resources so that practitioners can be better prepared to address climate change-related health issues.

☐ **Identify Actions:**
Using the list of suggestions outlined in this document, assess the activities your facility is already undertaking to reduce greenhouse gas emissions and conserve energy. Identify what departments are already participating in this work and which departments could use initiative and improvement. Celebrate success to help maintain momentum.

☐ **Measure Baseline:**
Create an emissions baseline, and prioritize areas for immediate attention and long-term strategies. The baseline, developed using facility energy use and other information, is critical for performance tracking and environmental cost accounting and reporting. When the in-house expertise is not available to take on an emissions/energy assessment, partnering with outside consultants is an option.

☐ **Reorganize for Sustainability—Using the GGHC:**
Use the Green Guide for Health Care (GGHC) to fold ongoing action on climate change and other environmental quality issues into the structure of your organization. The GGHC provides a self-certifying toolkit to steer facilities through greening efforts; it includes credits to help measure environmental improvement. It is separated into two sections, Construction and Operations, to assist health care facilities at various stages: new facility construction, building renovation/upgrade, and operational activity. For more information on linking your climate change programs to the GGHC, see GGHC credit numbers listed throughout this document. Credit goals, samples of action-oriented steps, and additional tools and resources are provided for free at www.GGHC.org.

Opportunities for Action

The following list proposes a multi-pronged approach for facilities operation: transportation, energy/operations, energy/built environment, waste and food service. It provides case studies to demonstrate real-life approaches and identifies organizational assistance opportunities (see resources).

Transportation

Transportation is responsible for 27% of U.S. greenhouse gas emissions, making it the country's second largest source of emissions. It is also the most rapidly growing emissions sector.[3] Burning gasoline and diesel fuels to power motor vehicles produces large amounts of CO_2, and traces of methane (CH_4) and nitrous oxide (N_2O), even more potent greenhouse gases. Health care facilities rely heavily on transportation systems to move patients, workers, supplies, and waste, and so careful analysis and redesign of hospital transportation can have significant climate change mitigation benefits. Transportation sector emissions reduction strategies focus on reducing total travel or making travel less emissions intensive (i.e., by using higher efficiency or alternate fuel vehicles). Reducing transportation greenhouse emissions can also lower other vehicle emissions with known health impacts: nitrogen oxides (a precursor to smog); benzene (a carcinogen); particulate matter (a trigger of respiratory illness and symptoms); volatile organic compounds (some of which are potentially hazardous and a precursor to smog) and carbon monoxide (a probable human carcinogen).

☐ **Reduce Fleet Emissions:**
Reorganize hospital fleets to include high-fuel efficiency, hybrid, and/or alternate fuel ambulances, shuttle vans, and supply transportation vehicles. Fueling stations might be provided onsite or contracted out. Alternative fuels with minimal ecological impact should be considered.
[GGHC Environmentally Preferable Purchasing **(EP) Credit 8** – Low Emitting & Fuel Efficient Fleet Vehicles]

☐ **Help Commuters Reduce Emissions:**
Support mass transit, carpooling, carshare, and telecommuting initiatives among hospital employees. Specific programs might include equal commuting subsidies, shuttle links to public transit drop-off points, carpool organization, and preferred parking or parking cash-out schemes (the latter offers a financial subsidy to alternate transportation users equivalent to the cost of subsidizing on-site parking), among others. See the EPA's Best Workplaces for Commuters program. [GGHC Transportation Options **(TO) Credits 1.1-1.5** – Commuting]

☐ **Choose Suppliers with Efficiency/Alternate Fuel Standards:**
Favor hospital suppliers—including all suppliers of goods as well as contractors who have their own fleets (e.g., waste collection contractors, laboratory sample transporters)—who commit to specific fuel efficiency or alternative fuel standards for their own fleets and/or for their suppliers. An important resource is the EPA's SmartWay Transport Partnership.
[GGHC Environmentally Preferable Purchasing **(EP) Credit 8** – Low Emitting & Fuel Efficient Fleet Vehicles]

☐ **Prefer Local Suppliers:**
Prioritize local manufacturers when choosing suppliers to reduce transportation and shipping distance. Discuss backhauling of delivery trucks to avoid empty transportation vehicles on return trips.

☐ **Purchase for Energy Efficient Shipping:**
Institute a purchasing preference for products that weigh less, use less packaging, or are more compact for shipping where products are equivalent. Also, ask suppliers to make packaging of items like electronic devices as small and light as feasible (using environmentally sustainable materials) and to ship these items via energy efficient modes of transport.

Pitt County Memorial Hospital in North Carolina is the first hospital in the U.S. to install an on-site biodiesel fueling station. The 35 diesel vehicles in the hospital's fleet—including ambulances, buses, and service trucks—now run on B20 fuel (a blended fuel containing 20% biodiesel). Hospital administrators anticipate reducing both greenhouse gas emissions and other harmful pollutants, since biodiesel exhaust is non-toxic and non-carcinogenic.[4]

Children's Hospital and Regional Medical Center in Seattle has consistently been recognized for its strong workplace trip reduction program. The hospital actively promotes bike commuting among its employees and provides institutional support including new locker and shower facilities, deals on bike maintenance, and information about bike commuting basics. The hospital also runs a Flexpass program and operates numerous vanpools.[5]

Energy–Operations

Energy used in facility operations is a significant source of greenhouse gas emissions. Burning fossil fuels to heat, cool, and power buildings produces large amounts of CO_2, and traces of CH_4, N_2O, and sulfur hexafluoride (SF_6), the most potent greenhouse gas. Water heating accounts for 28% of the energy used in U.S. health care buildings, space heating 23%, lighting 16%, and office equipment 6%. Other energy needs like air conditioning, cooking, and refrigeration together make up the remaining 27%.[6] By conserving energy, making operations more energy efficient, and purchasing renewable energy or installing renewable energy infrastructure, facilities can simultaneously reduce greenhouse gas emissions and save money. Reducing energy use also improves outdoor air quality, benefiting human health by lowering particulate and toxic chemical emissions produced in fossil fuel combustion and electric power generation.

New York-Presbyterian Hospital has worked with the EPA's Energy Star program since 2003, comprehensively retrofitting its HVAC system, lighting, building control system, and central plant, and educating staff about energy conservation strategies. It has pursued Leadership in Energy and Environmental Design (LEED) certification for several buildings. By 2005, the hospital had reduced building energy use by 11% systemwide; managers project that projects implemented to date save the hospital $1.77 million every year.[7]

☐ **Make Building Operations More Energy Efficient:**
Dedicate personnel and programs to energy conservation, establish baseline energy consumption, install retrofits and institute operational changes, and track progress. Projects may range from minor improvements to capital projects that target a facility's major energy-using systems. Hospitals may bring in an energy use reduction consultant, while Group Purchasing Organizations (GPOs) may make available a contract for energy use reduction consulting. Sample strategies:

○ Switch incandescent light bulbs for compact fluorescents* and LEDs; install solar parking lot lighting.

○ Install occupancy sensor switches in offices and other intermittent use areas.

○ Upgrade at least one major piece of mechanical infrastructure equipment (e.g., boiler, chiller, hot water heater) with the most energy efficient available technology.

○ Turn down thermostats slightly (a small lowering, one to two degrees, of temperature can have a big impact).

Important resources include the EPA's Energy Star for Healthcare program and the Energy Efficiency Commitment (E^2C) program, among many others.
[GGHC Facility Management **(FM) Prerequisites 1-2** – Energy Efficiency Best Management Practices: Planning, Documentation & Opportunity Assessment and Minimum Building Energy Efficiency Performance; **FM Credit 1** – Optimize Energy Efficiency Performance; **FM Credits 3.1-3.3** – Existing Building Commissioning: Investigation & Analysis, Implementation, and Ongoing Commissioning; **FM Credits 5.1-5.2** – Performance Measurement: System-Level Energy Metering]

*Note: Some compact fluorescent lights produce radio frequency radiation (this is non-ionizing radiation) that may be associated with adverse health effects. Exposures drop off quickly with distance from the bulb so that at more than 2-3 feet, exposures are much less intense. Where exposures to this electromagnetic radiation are a concern, LEDs are an alternative. Although LEDs are more expensive, their useful life is also considerably longer.

Install On-Site Renewable Energy Capability:

Solar photovoltaic panels can generate a portion of your facility's required electricity or power a solar thermal hot water heating system. Installing a combined heat and power (CHP) facility onsite can also reduce greenhouse gas emissions and reduce spending on energy. CHP systems generate power and heat from a single fuel source, significantly increasing energy efficiency. See the EPA's Combined Heat and Power Partnership. [GGHC Facilities Management **(FM) Credit 7** – On-Site and Off-Site Renewable Energy]

Purchase Energy Efficient Products:

Where Energy Star-qualified or Federal Energy Management Program-designated products are available, hospitals should buy only these products. GPOs should make these products available on contract. See http://www.eere.energy.gov/femp/pdfs/eep_productfactsheet.pdf for a list of eligible products. [GGHC Environmentally Preferable Purchasing **(EP) Credit 7.1** – Energy Efficient Equipment: Office & Commercial Equipment and **EP Credit 7.2** – Energy Efficient Equipment: Medical & Process Equipment]

Reduce "Standby" Energy Use:

Computers and other electronic equipment use energy even when they are turned off or on standby. It is estimated that standby power consumption is responsible for 1% of the world's CO_2 emissions.[10] When possible, plug a computer and related devices into a power strip, then turn off the strip when the equipment is not in use—power strips do not draw power. Another energy-saving tool is a software system that manages the power usage of networked systems.

Buy Green Power:

Offset 50% or 100% of your power use by purchasing electricity generated renewably. [GGHC Facilities Management **(FM) Credit 7** – On-Site and Off-Site Renewable Energy]

Oregon Health & Science University in Portland is installing solar electric panels and a solar thermal water heating system as part of the LEED Platinum design for its new Health and Healing Center. The panels will have an annual output of 66,000 kWh. The Center projects $660,000 per year in electricity savings and a 12% reduction in CO_2 emissions.[8]

Providence Health & Services, a regional healthcare system serving the Pacific Northwest and California, purchases only Energy Star-qualified computers. This policy forms one component of a highly organized, systemwide, energy efficiency program projected to save the system more than $3.4 million annually.[9]

York Hospital in Maine currently purchases 90% green power, drawing from in-state renewable energy sources. The hospital's green power purchases have qualified it for the EPA's Green Power Partnership and helped it reduce its carbon emissions by 24% between 2000 and 2006; the hospital's green programs save more than $100,000 in operating expenses annually.[11]

Energy–The Built Environment

Incorporating sustainability into the design and construction of hospitals' built (and planted) environment can significantly reduce their energy use and greenhouse gas emissions. Building and landscape design features can reduce the energy required to operate health care facilities. Siting decisions that adhere to integrated land use and development planning, help to contain urban sprawl, thus reducing auto-dependence and transportation-related emissions. The extraction of raw materials used for building construction can cause ecological disruption, threatening natural carbon sinks. Therefore, careful material selection and furnishing choices can mitigate climate change by protecting this natural sequestration, as well as reducing fossil fuel energy required for material manufacture and transport.

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When building a LEED Gold-certified Duluth Clinic campus extension for St. Mary's Hospital in Minnesota, managers purchased 77% of the wood used in its construction from forests with FSC certification.[13]

☐ **Incorporate Green Building Principles:**
Utilize design components such as day lighting, natural ventilation, and green roofs to reduce your facility's energy needs. Use long-life, loose fit principles. Right-size the building; plan for flexibility for future growth and change. Zone the built environment for 24 hour/non-24 hour use, with system selection/operation appropriate to each. See the LEED program for guidance. [GGHC Site Selection Management **(SSM) Credits 4.1-2** – Heat Island Reduction]

☐ **Consider Overall Transportation Impacts of Facility Siting:**
Avoid developing on Greenfield sites. Where possible, preserve open space and habitat by increasing development density in previously developed areas. Reconsider centralized versus decentralized facility locations. Review public transportation infrastructure in proposed building locations. Advocate for extending public transportation systems to better serve health care facilities.

☐ **Use Native Vegetation and Plant Trees on Site:**
Large- and small-scale studies have demonstrated the power of trees to mitigate the heat-island effect. Vegetation lowers ground level temperatures near buildings, reducing the buildings' cooling load, energy requirements, and greenhouse gas emissions. City-scale studies have shown a nine-degree difference between less-vegetated urban centers and leafy suburban neighborhoods. Mitigating the heat island effect also improves health by reducing conditions favorable for ground-level ozone (smog) formation; smog can lead to respiratory symptoms and illness. Native vegetation requires less water and attract beneficial insects, thus eliminating pesticide use. [GGHC Site Selection Management **(SSM) Credit 4.1** – Heat Island Reduction: Non-Roof and **SSM Credit 1.2** – Control & Landscape Management Plan]

☐ **Use Local and Regional Building Materials:**
Reduce energy required to transport materials to the building site. You may set goals for material transportation based on weight. The Living Building Challenge provides resources.

☐ **Offset Emissions from Building Construction:**
Account for the embodied greenhouse gas emissions footprint of facility construction through a one-time carbon offset tied to the building's square footage and general construction type. See the Living Building Challenge.

☐ **Purchase only Forest Stewardship Council (FSC) Certified Lumber Products:**
Protect natural carbon sinks by buying lumber from well-managed forests. Sustainable forest management practices help maintain a viable, diverse plant life, increasing air filtration and carbon sequestration. The FSC has established a LEED-consistent forest certification standard.

Waste

Waste disposal produces greenhouse gas emissions in several ways. Transporting waste from facilities to disposal site requires energy and produces greenhouse gas emissions. Waste disposal practices themselves also produce greenhouse emissions, along with other environmental pollutants. Anaerobic decomposition of organic matter in landfills produces CH_4 (although landfills are also carbon sinks), and waste incineration emits N_2O and CO_2. Food and organics are the second largest constituent of the health care waste stream, comprising close to 20% of the solid waste volume in medical facilities with food service operations. A comprehensive approach to facility waste management includes diversion of construction and demolition debris, material recycling, composting of food waste, reuse, and donation reduces these emissions. It also lowers facilities' demand for virgin resources, thus mitigating emissions produced in resource extraction, manufacturing, and product transportation.

☐ **Recycle and Buy Recycled Products:**
Recycle all eligible materials, including electronics. Buy recycled products to help support the recycling market. See the EPA's WasteWise program and WARM model for guidance. [GGHC Waste Management **(WM) Credits**; food waste recycling and composting in Food Services **(FS) Credits**]

☐ **Collect and Recycle Nitrous Oxide Anesthetic Gases:**
Most anesthetic gases—including N_2O and halogenated inhalation gases—employed in hospital operating rooms are permitted to escape to the atmosphere during use, a serious problem considering that these gases are extremely potent greenhouse gases (especially the halogenated gases; some have a global warming potential up to 1,900 times that of CO_2). Capturing and recycling these gases reduces these emissions. [GGHC Chemical Management **(CM) Prerequisite** – Chemical Management Policy and Audit]

☐ **Dispose of Waste Locally:**
Stipulate that waste be disposed of as close as possible to the source of generation, reducing energy and greenhouse gas emissions produced in transporting waste between the facility and disposal site.

☐ **Prevent Waste:**
Through reduced material manufacturing, lowered waste transport, and decreased use of virgin material, hospitals can reduce energy use. Reducing or eliminating packaging (and/or ensuring that the packaging is recyclable or compostable) may also lessen hospital waste production.

☐ **Divert 90% or More of Construction Waste:**
Divert, reuse, and recycle waste produced in construction and demolition. This waste is often needlessly disposed of, contributing to waste greenhouse gas emissions and requiring heightened use of virgin materials, thus producing still more emissions from extraction, manufacturing, and transport. [GGHC Waste Management **(WM) Credit 1.4** – Solid Waste and Material Management: Recycling and Reuse of Facility Alterations & Additions]

The Children's Hospital of Eastern Ontario, in collaboration with Blue-Zone Ltd., has installed innovative anesthetic gas capture technology in all of its operating rooms. After capturing, reclaiming, and purifying the gases, the hospital may reuse them. This procedure extends the gases' lifecycle by ten to twenty times, saving money and reducing greenhouse gas emissions.[14]

Food Service

Major shifts in the U.S. food system in the last century are having negative impacts on human and ecological health. While total farm acreage has declined, farm size has increased and is more focused on the intensive production of a single crop or animal. This industrialized system relies on massive inputs of petroleum-based resources in the form of fertilizers, pesticides, herbicides and fuel for farm operations, processing and transportation—leading the food system to account for more greenhouse gas emissions globally than our transportation sector. The UN Food and Agriculture Organization reports that the livestock sector generates an estimated 18% of global greenhouse gas emissions.[15] Food transportation's role in driving energy-related emissions is becoming more and more widely recognized. In the U.S., the typical food item now travels from 1,500 to 2,400 miles from farm to plate, and agriculture and food account for up to 30% of the goods transported on our roads. Hospitals can influence the climate change impacts of our food system through the power of their purchasing dollar by selecting foods that minimize greenhouse gas emissions.

Loma Linda University Medical Center[16] and other hospitals in the Adventist Health System, which includes 37 hospitals in ten states, actively promote a completely vegetarian diet and menu.

☐ **Reduce the Amount of Meat Protein on the Menus:**
Reducing meat served in hospitals not only reduces greenhouse gas emissions associated with livestock ranching and slaughter, it poses health benefits. According to Center for a Livable Future studies, the regular consumption of meat and high-fat dairy products increases the risk of chronic diseases, especially heart disease, stroke and some cancers, the leading causes of death in the United States. Numerous hospitals taking a disease prevention perspective have already endorsed a voluntary one-day a week meatless menu.

☐ **Buy Local and Seasonal Food:**
Reduce long-distance transport of foods by procuring local food, setting seasonal menus, and calculating food miles. Food miles measure the distance a food travels from field to plate. They also take into account the form of transport, as food transport by air has a much higher energy and climate change burden than other forms of transport such as train, ship, or truck. Seasonal foods are those foods that are locally in season. [GGHC Food Services (FS) Credits 3.1-3.3 – Local, Sustainably Produced Food Purchasing and FS Credit 5 - Hospital Supported Agriculture: Food and Farm Linkages]

☐ **Procure Organic Food When Possible:**
Climate benefits accrue from buying food raised under a less industrial model of agriculture. This translates into meat from animals raised on grass instead of grains, and produce grown using fewer fossil fuel-derived pesticides and fertilizers (e.g., Certified Organic, Food Alliance Certified, others).

☐ **Prevent Waste in Food Services:**
Assess use of disposables and identify opportunities to switch to reusables for patients, staff and visitors. Donate food, where possible. [GGHC Food Services (FS) Credits 4.1-4.3 – Reusable & Non-Reusable Products and FS Credit 6 – Food Donation and Waste Reduction]

Holy Redeemer Medical Center in suburban Philadelphia has implemented composting programs, including one for fryer grease. Composted food waste from the hospital supplies two local farms, nourishing the soil. Those farms then supply the hospital kitchen with fresh, local produce, thereby, the food recycling effort operates full circle.[17]

☐ **Compost Food Waste:**
Composting diverts organic matter from landfills, reducing landfill methane emissions. Therefore, composting food/plant waste from food service and grounds is an important waste management component. Composting simultaneously creates a recycled product that can be used in place of inorganic fertilizer. By reducing the need for inorganic fertilizer, composting reduces industrial greenhouse gas emissions. Inorganic fertilizer production is energy intensive, and the chemical process itself releases greenhouse gases. [GGHC Food Services **(FS) FS Credit 6** – Food Donation and Waste Reduction]

☐ **Eliminate Bottled Water:**
Several U.S. cities and prominent employers have stopped providing bottled water at their facilities, urging tap water as a more energy efficient and generally less wasteful option. Hospitals might incorporate bottled water reduction or elimination decisions into their food-related climate change programs.

RESOURCES
Partnering for Climate Change Action in Health Care

Health Care Without Harm (www.noharm.org) is an international coalition that guides the health care sector to make environmentally preferred purchasing, practices, and policies, without compromising patient care or safety, so that it is ecologically sustainable and no longer a source of harm to public health and the environment. HCWH provides technical assistance, product research, support, advocacy, and education. Its goals include safer products, materials and chemicals; alternatives to incineration; green building and operations; sustainable foods and food systems; and safe and healthy places for workers and patients, so that the health care sector can become a true healing environment.

Practice Greenhealth (formerly Hospitals for a Healthy Environment) (www.practicegreenhealth.org) formed out of Hospitals for a Healthy Environment, the Healthcare Clean Energy Exchange (HCEE) and the Green Guide for Health Care to provide tools, education and recognition on environmental sustainability in the health care sector, EIC and resource tool web based open source. HCEE has developed the *Energy Impact Calculator (EIC)* for measurement of the health impacts and costs of a hospital's energy use, and to enable energy purchasers to make business decisions on energy efficiency projects and renewable energy purchases based on a fuller understanding of energy's true costs. HCEE also operates a healthcare focused, web-based clean energy and environmental commodities reverse auction platform to help healthcare facilities contain or reduce their energy costs, lock in more stable pricing, and be good environmental stewards.

Physicians for Social Responsibility (PSR) (www.psr.org), with chapters around the country, provides technical assistance and organizing support for health systems engaging in climate change reduction strategies as well as a speaker's bureau of clinical professionals who can deliver presentations about the health impacts of climate change, environmental health, and much more.

California Climate Action Registry (http://www.climateregistry.org/), a private non-profit organization, serves as a voluntary greenhouse gas registry to protect and promote early actions to reduce greenhouse gas emissions by organizations.

Intergovernmental Panel on Climate Change (IPCC) (http://www.ipcc.ch/) is the premier scientific body reporting information on climate change. See the IPCC's "Mitigation of Climate Change" document at http://www.ipcc.ch/ipccreports/ar4-wg3.htm

EPA Energy Star for Healthcare (http://www.energystar.gov/index.cfm?c=healthcare.bus_healthcare) provides tools for measuring hospital energy use and calculating the financial benefits of improved energy efficiency. Also see the **Energy Star Portfolio Manager** - http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

Center for Health Design (www.healthdesign.org) has as its mission to transform healthcare settings—including hospitals, clinics, physician offices, and nursing homes—into healing environments that contribute to health and improve outcomes through the creative use of evidence-based design.

Environmental Health News (http://www.environmentalhealthnews.org/) published research and studies on environmental health issues.

CleanMed (www.cleanmed.org), conferences for Greening Health Care, addresses green building, environmentally preferable purchasing, and waste reduction. The conferences attract key decision makers from across the health care supply chain.

EPA Best Workplaces for Commuters (http://www.bwc.gov/) is a national resource for workplace trip reduction. Requires participating workplaces to offer programs such as free or low cost bus passes, strong telework programs, carpool matching and vanpool subsidies.

EPA Greenhouse Gas Equivalencies (http://www.epa.gov/cleanenergy/energy-resources/calculator.html)

EPA SmartWay Transport Partnership (http://www.noharm.org/details.cfm?ID=968&type=document) commits freight carriers, shippers, and logistics companies who participate in this program to specific fuel efficiency/alternative fuel standards for their own fleets and for a certain percentage of their suppliers.

Energy Efficiency Commitment (E²C) (http://www.ashe.org/ashe/facilities/e2c/), sponsored by Energy Star and the American Society for Healthcare Engineering (ASHE), encourages facilities to reduce 10% of their energy demand in the next 12 months.

EPA Combined Heat and Power Partnership (http://www.epa.gov/chp/) offers resources to CHP-interested facilities.

U.S. Green Building Council (http://www.usgbc.org/LEED/) provides guidance and certification to facilities interested in building green via its Leadership in Energy and Environmental Design (LEED) rating system.

The Living Building Challenge (http://www.cascadiagbc.org/lbc/Lb-challenge-v1-2) provides green building information, including guidance for setting goals for material transportation based on weight (http://www.cascadiagbc.org/lbc).

Forest Stewardship Council (FSC) (http://www.fscus.org/), a non-profit organization, provides information and certification to support sustainable forest management.

EPA WasteWise (http://www.epa.gov/epaoswer/non-hw/reduce/wstewise/index.htm) provides organizations technical support in reducing municipal solid waste and selected industrial waste.

EPA Waste Reduction Model (WARM) (http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html), a waste calculator that helps facilities assess their greenhouse gas emissions from alternate waste disposal strategies: source reduction, recycling, and composting, as well as more conventional strategies like landfill disposal and incineration.

ENDNOTES

1. The New York Times (2007): http://topics.nytimes.com/top/news/science/topics/globalwarming/index.html.

2. http://www.eere.energy.gov/buildings/info/health/.

3. http://www.epa.gov/climatechange/emissions/usinventoryreport.html.

4. http://www.engr.ncsu.edu/ncsc/transportation/success_stories/Pitt_Co_Memorial/AFI_Pitt_County_Memorial_Hospital.html

5. http://www.commuterchallenge.org/cc/profiles06/awards06_profiles.html#childrens.

6. http://www.eere.energy.gov/buildings/info/health/.

7. http://www.energystar.gov/index.cfm?c=healthcare.bus_healthcare_ny_presb_hospital.

8. http://www.nrdc.org/buildinggreen/casestudies/ohsu.pdf.

9. http://www.energystar.gov/index.cfm?c=healthcare.bus_healthcare_providence_health.

10. http://www.iea.org/textbase/nppdf/free/2000/blipinthenight01.pdf.

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13. http://www.nextstep.state.mn.us/res_detail.cfm?id=3973.

14. http://www.ec.gc.ca/default.asp?lang=En&n=714D9AAE-1&news=A1080D7B-5B3A-4028-BDF5-B576AA17FAAA.

15. http://www.fao.org/newsroom/en/news/2006/1000448/.

16. https://lomalindahealth.org/for-patients-and-visitors/hospital-stay.html.

17. http://yosemite.epa.gov/opa/admpress.nsf/d0cf6618525a9efb85257359003fb69d/f50ca7ebf03a235b852573770065890c!OpenDocument.

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