Energy Saving Improvements in State Facilities and Operations, 2009: State Agencies Leading by Example

A Report to the Commissioner of Environmental Protection
and Secretary of Policy and Management,
prepared by the Climate Change Coordinating Committee
(staff from DEP, DOT, DPUC, DAS, OPM, and CT Clean Energy Fund)
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As the Connecticut General Assembly and state agencies call on Connecticut towns, businesses, and residents to adopt measures to address global climate change, it is important that state agencies reduce their carbon footprints and lead by example. The actions taken by state agencies demonstrate the economic and energy savings benefits associated with various greenhouse gas reduction strategies.

The Connecticut Global Warming Solutions Act (PA 08-98, codified as Section 22a-200a(b) of the General Statutes) requires state agencies that are members of the Governor's Steering Committee on Climate Change to report on or before January 1, 2010, and biannually thereafter, to the Secretary of Policy and Management and the Commissioner of Environmental Protection on "existing and proposed activities and improvements to the facilities of such agencies that are designed to meet state agency energy savings goals established by the Governor" and policies that could be adopted to reduce greenhouse gas emissions at these agencies. This reporting requirement applies to the following state agencies that are members of the Governor's Steering Committee on Climate Change: Department of Environmental Protection (DEP), Department of Transportation (DOT), Department of Administrative Services (DAS), Department of Public Utility Control (DPUC), Connecticut Clean Energy Fund (CCEF), and the Office of Policy and Management (OPM). This report highlights the recent energy saving actions of those agencies and includes energy and greenhouse gas actions taken by other state agencies. While it is intended as an update from the GSC agencies, this information in this report should also be useful to other state agencies, municipalities, and businesses in Connecticut.

State Energy Savings Goals

The energy savings goals established by Governor Rell for state agencies can be found in the Governor's Executive Orders (see Table 1) and the Governor's 2006 energy plan, *CT's Energy Vision* (see Table 2).

State agencies save energy through a number of different programs and have been actively engaged in doing so over the past several years. These efforts show the State's continuing commitment to "leading by example" – demonstrating the economic, energy, and environmental benefits of efficient energy and resource use and reduction of greenhouse gas emissions. The State's programs cover buildings, vehicles, appliances and other purchases, and agency policies. This report discusses these programs and identifies further activities and policies to save energy and reduce greenhouse gas emissions in State agencies.

Table 1. Energy saving goals for state agencies in the Governor's Executive Orders

- Executive Order 22 requiring fleet reduction and efficient car purchase
- Executive Order 17 requiring appliance purchases to be Energy Star rated

Table 2. Energy saving goals for state agencies in *CT's Energy Vision*

- By 2012, requiring 10% biofuel mixture for state fleet
- Requiring all state and school construction projects to incorporate energy efficiency technology
- Recommitting the state to significant reductions in agency and university use of energy
- Establishing a fund for energy efficiency improvements in state agencies
- Pursuing a more aggressive transition of the state vehicle fleet to hybrids
- Opening state buildings to serve as test locations for new alternative and energy efficient technologies
- Mandating the purchase of Energy Star appliances by state agencies

Buildings

State facility energy efficiency improvements

The Department of Public Works (DPW) Energy Unit, working with the Office of Policy and Management (OPM), compiled a list of potential energy-saving projects from various state agencies and submitted it for inclusion in the State Energy Plan to obtain federal American Recovery and Reinvestment Act (ARRA) funds. Subsequently, $5 million in federal stimulus funding was approved through the U.S. Department of Energy for DPW energy-saving projects at state facilities. To date, $3,550,000 of the $5 million has been provided to DPW for the projects listed in Table 3 below.

Table 3. State Agency Energy Efficiency Projects from Federal Stimulus Funds

Project	Status
University of Connecticut Health Center, Lighting	Construction underway; Kane St complete; Munson work begun
Bullard Havens VoTech	Construction underway
Western CT State University, Litchfield Hall	Construction underway
Uncas-on-Thames Campus	Construction underway
25 Sigourney St Parking Garage	Construction underway
Danbury Courthouse	Bidding; awaiting contract approval by DPW
79 Elm St Building	Bidding; awaiting contract approval by DPW
DEP Fish Hatcheries	Bidding; awaiting contract approval by DPW
410-470 Capitol Avenue Offices	Funded; anticipate work completion in 2010
Milford Courthouse	In design review
Governor's Residence	In design review
State Office Building	Evaluating potential projects
State Park Solar Installations	Conducting engineering assessments

The DPW Energy Unit has also utilized funding from the Connecticut Energy Efficiency Fund to identify more than 50 energy-saving retrofit opportunities in various state buildings. These opportunities involve lighting replacements, installation of occupancy sensors and HVAC (heating, ventilation and air conditioning) system controls, and replacement of major HVAC equipment. The DPW Energy Unit assigns on-call energy engineering firms to conduct audits, prepare analyses, make recommendations, prepare design documents for DPW approval, and bid out for implementation. The DPW Energy Unit also works with the Connecticut Light and Power Company

to implement a similar program in a variety of state facilities. Under this program, 20 projects were completed at state facilities during 2008 and 2009. These projects focused predominantly on lighting upgrades and are projected to save the state approximately 3.9 million kwh of electricity annually. The completed projects include the following facilities:

- DPW Buckingham Street parking garage, Hartford
- DPUC building, New Britain
- DCF Riverview Hospital, Middletown
- DCF Children's Place, East Windsor
- CCSU parking garages, New Britain
- Military Department Camp Rell, Niantic
- Military Department Stone's Ranch, East Lyme
- Asnuntuck Community College, Enfield
- Quinebaug Valley Community College, Danielson
- University of Connecticut Health Center, Farmington (16 Munson Road)
- NW Connecticut Community College, Winsted
- Veteran's Home and Hospital, Rocky Hill
- Corrigan Corrections Facility, Uncasville
- Western CT State University, Danbury (parking garages and convocation center/field house)
- Middlesex Community College, Middletown
- Rowland Government Center, Waterbury

The DPW Energy Unit is also responsible for the review and approval of Life Cycle Cost Analysis (LCCA) submissions for state-funded new buildings, additions and renovations, and state-funded municipal school projects. During the year, the DPW Energy Unit evaluated 45 LCCA submissions.

Demand response program

Connecticut state agencies have participated in the Demand Response Program for a number of years (see Table 4). Through this program, participating state agencies remove electric load from the grid when requested by the electric grid operator ISO-New England and receive payments for providing this capability. The State has received more than $5.7 million for agency participation in this program.

Table 4. Agencies Participating in Demand Response Program

CT Community College System
CT State University System
Department of Developmental Services
Department of Correction
Department of Veterans' Affairs
Department of Mental Health & Addiction Services
Office of Policy & Management
University of Connecticut Health Center
University of Connecticut Law School
Judicial Branch
Department of Information Technology
Department of Children & Families

Energy performance of state buildings

OPM is building a data base to track energy use by state agencies. The data base will help the state monitor state agency energy use trends and energy savings.

State electricity contract

OPM oversees a reverse auction process to bid contracts for the purchase of electricity to supply state agencies and has done so since 2007. The current contracts became effective in July 2008 and 2009 and are in effect for up to 48 months. The contracts include 18.24% clean energy beyond the amount required through Connecticut's Renewable Portfolio Standard. This equates to an estimated annual purchase of clean energy at 107,202,000 kWh, which is equivalent to avoiding the emissions of 76,989 metric tons of carbon dioxide, or the emissions of 14,721 passenger vehicles.

Clean Energy installations at state facilities

Clean energy installations at state facilities include a 23.1 kw solar photo voltaic system at the Connecticut Transit depot in Hartford and photo voltaic bus shelter lighting at Eastern Connecticut State University. As noted in Table 3 above, federal stimulus money will fund additional clean energy installations at several DEP facilities.

LEED state buildings (Leadership in Energy and Environmental Design)

The DPW Energy Unit has developed and administered, through design and construction, a number of "Green Building" projects based on standards set by the U.S. Green Building Council. Table 5 on the next page lists the six LEED state buildings completed and another 12 LEED buildings that are being designed or constructed. The LEED Green Building Rating System® is a set of voluntary standards for a new generation of highly energy efficient buildings. The LEED designation verifies an environmentally friendly design and sustainable building construction. A sustainably-designed building is more energy efficient, has better indoor air quality and occupant comfort, less environmental risk, uses materials that are less detrimental to the natural environment, and uses the building site's natural resources wisely. LEED provides a common framework for assessing building performance and meeting sustainability goals by emphasizing state of the art strategies for site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

The DPW Energy Unit continues to work other state agencies, the Connecticut Clean Energy Fund, the Connecticut Green Building Council, as well as design professionals and building contractors, to develop an information base and "best practices" regarding high performance buildings. The high performance building information is used to promote design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment. The goal of high performance buildings is to emphasize the positive effects of sustainable site planning, safeguarding water and natural resources and maximizing energy efficiency, the use of renewable energy, and indoor environmental quality. The DPW Energy Unit is also an information resource for the General Assembly and the public for detailed information and linkage to other organizations regarding high performance buildings.

High performance building regulations

The General Assembly[1] has directed the Office of Policy and Management to develop high performance building regulations for state agency buildings and school buildings. The regulations adopted by OPM in August 2009 apply to:

(1) the construction of a State agency facility projected to cost five million dollars or more and for which all budgeted bond funds are allocated by the State Bond Commission on or after 1/1/09;

(2) the renovation of a State agency facility projected to cost two million dollars or more and utilizing two million dollars of state funds approved and funded after 1/1/08;

(3) a new construction of a facility projected to cost five million dollars or more of which two million dollars or more is state funds and is authorized by the General Assembly pursuant to chapter 173 of the General Statutes on or after 1/1/09; and

(4) the renovation of a public school facility as defined in section 10-282(18) of the General Statutes that is also projected to cost two million dollars or more of which two million or more is state funding and is authorized by the General Assembly pursuant to chapter 173 of the General Statutes on or after 1/1/09.

The regulations and the Building Standard Guidelines Compliance Manual for High Performance Buildings are posted on OPM's website at http://www.ct.gov/opm/cwp/view.asp?a=2994&q=389836

[1] See: Section 70 of Public Act (P.A.) 06-187; Section 5 of P.A. 07-213; Section 10 of P.A. 07-242 Section 10, and Section 15 of P.A. 07-249

Table 5. LEED State Building Projects

Agency	Project Title	Location	System	Rating	Date of Application
Completed					
WCSU	Science Bldg	Danbury	LEED	Silver	9/29/2008
ECSU	Dorm Complex	Willimantic	LEED	Certified	11/28/2007
SCSU	Dorm	New Haven	LEED	Certified	
WCSU	Dorm	Danbury	LEED	Certified	
ECSU	Science Bldg	Willimantic	LEED	Silver	Not yet
MIL	Readiness Center	Niantic	Spirit	Silver	10/20/2008
Under Design/Construction					
CTC	Norwalk Science	Norwalk	LEED	Certified	
CTC	Gateway Campus	New Haven	LEED	Gold	
WCSU	Performing Arts Center	Danbury	LEED	Silver	
DCF	Girls Juvenile Facility	Bridgeport	LEED	Silver	
DCF	CT Juvenile Training (Renov)	Middletown	LEED	Silver	
CTC	Tunxis Community College Phase II	Farmington	LEED	Silver	
CTC	Quinebaug Middle College HS	Danielson	LEED	Silver	
JUD	Torrington Courthouse	Torrington	LEED	Silver	
MIL	Camp Rell Readiness Center	Niantic	LEED	Silver	
MIL	Camp Rell Armory	Niantic	LEED	Silver	
CSU	CCSU Academic Bldg	New Britain	LEED	Silver	
CSU	SCSU Academic Bldg	New Haven	LEED	Silver	

State building operator certification training

Building inefficiencies and unnecessary energy costs often result from insufficiently or improperly trained building operators. Buildings may have energy efficient equipment and systems, but if they are not managed and maintained properly, both energy and dollars are wasted. To address this issue and save energy, OPM has sponsored a building operator certification training program for private and public facilities managers. To date, 105 staff from state agencies have been trained and 14 more are in training. This program is ongoing using federal stimulus funds. The estimated savings for state facilities from building operator certification training include:

- 69 million kWh,
- 577,000 gallons of oil, and
- 682,000 ccf natural gas.

Vehicles

Efficient state fleet use and cleaner fleet vehicles

In recent years, energy savings from State fleet vehicle use have resulted from a reduction in total fleet vehicles, a reduction in miles driven, and an increasing percentage of hybrid vehicles in the fleet. Governor Rell's Executive Order (E.O.) 22 addresses the purchase and use of state vehicles. Pursuant to E.O. 22, DAS reduced the number of non-law-enforcement vehicles in its fleet by 20% by July 1, 2009, resulting in a fleet total of 3,691 vehicles in October 2009 (not counting DOT vehicles).

Between 2007 and 2009, both the number and the percentage of hybrid vehicles in the state fleet increased. As the state fleet became smaller, the percentage of hybrids in the fleet has doubled from under 6% to 11.5%. There are currently over 425 hybrids in the state fleet. Hybrid vehicles typically reduce fuel consumption, resulting in cost savings and a corresponding decrease in greenhouse gas emissions and other pollutants.

DAS vehicle use reduction and hybrid replacement policies have resulted in the following savings from the first quarter of fiscal year 2009 to the first quarter of fiscal year 2010:

- Estimated reduction of 2,016,891 miles driven or 14.76%
- Estimated fuel use reduction of 16 – 21%
- Estimated GHG reductions ranging from 1,300 to 1,700 tons of carbon dioxide

VMT reductions from state employee commuting

Since 2005, Connecticut DOT has supported an incentive-based online ride sharing program called NuRide. The program is available to all employers in Connecticut. NuRide participants carpool, use public transit, walk, bike, or telecommute resulting in reduced fuel use and vehicle emissions. Many State employees have participated in the NuRide program, resulting in significant savings to NuRide participants and society from reduced fuel use, reduced commuting costs, and reduced air pollution. Table 6 below summarizes the savings from State employee participation only since 2005. NuRide relies on voluntary participation by employees and voluntary tracking of trips. There are additional individuals using clean commuting methods that are not captured in the NuRide data.

Table 6. Savings from State Employee Participation in NuRide, 2005 – present

532 NuRiders from 20 state agencies
47,074 NuRide trips (includes carpooling, transit, walking, biking, and telecommuting)
1.655 million miles avoided
$371,700 saved
1.3 tons of pollution reduced from nitrous oxides
0.45 tons of pollution reduced from volatile organic compounds
Over 809 tons of carbon dioxide pollution reduced

Appliances and Other Purchases

The DAS promotes the purchase of Environmentally Preferable Products and has such products and services available on a number of contracts on the DAS website. These contracts are available to state agencies, municipalities, cities, towns, and many non-profit organizations. DAS contracts for appliances and office equipment have exclusively included Energy Star-rated models for a number of years.

In addition, the State makes surplus equipment which is no longer needed by state agencies available for reuse -- first to other state agencies, then to Connecticut municipalities, schools, and not-for-profit organizations. After that, remaining equipment is auctioned to the general public. To facilitate reuse, the DAS Property Distribution Center website lists surplus items available to municipalities, schools, and not-for-profit organizations. The surplus items range from furniture to computers, lawn equipment to 2-way radios, and commercial and residential kitchen equipment to jersey barriers. The reuse of surplus items reduces disposal costs for the State and saves energy for society by reducing the need for new equipment.

Agency Policies and Behavior Change

Some agencies have developed internal policies and initiatives to reduce energy use and avoid unnecessary energy costs. For example, DEP adopted policies that have resulted in field staff reducing their travel to the DEP's Hartford headquarters as well as changing fish hatchery practices to enable fewer vehicle trips for fish stocking. This has reduced air pollution, saved energy and cut costs while allowing staff to focus on their respective primary missions. These actions demonstrate some of the unique ways the state is leading by example on energy and climate change. Other state agencies, municipalities, and businesses can learn from these agency efforts to implement actions and promote behavioral changes that result in energy and cost savings.

DEP Green Team

The Department of Environmental Protection's Green Team is an intra-agency workgroup made up of staff from throughout the department. The Green Team's mission is to:

- Implement DEP's Energy Conservation Plan in order to reduce energy, waste, and greenhouse gas emissions;
- Measure progress; and
- Make DEP a model for other state agencies.

Table 7.
DEP Green Team Committees

Building Improvements
Energy Efficiency
Green Purchasing
Lean and Green
New Employee Orientation
ReSupply Center
Waste Reduction and Recycling
Water Conservation

The Green Team promotes its mission so that every DEP staff member understands they have a role in energy conservation. The DEP Green Team's recent accomplishments include:

- Continuation of a comprehensive recycling program that includes all mandated items, plus alkaline batteries, electronics and electronic accessories, packing materials, Tyvek envelopes, printer ink jet and laser toner cartridges, magazines and other kinds of mixed paper.
- Establishment of the "Unsung Hero" award, which recognizes an employee who continuously works on improving DEP's sustainability record by being creative and implementing a variety of projects that help the DEP save money and energy.
- Establishment of the Resupply Center in the DEP basement, which offers free reusable office equipment to employees.
- Replacement of some printers with high volume multi-function machines. New machines allow staff to copy, print, scan, and fax from one machine, decreasing equipment needs.

CCEF Greening Actions

The Connecticut Clean Energy Fund (CCEF) has undertaken a variety of green initiatives at their office in Rocky Hill. It is important to note that CCEF leases office space and some of these measures have required the acceptance and approval of the building owner. These efforts provide a good example for other agencies that lease office space.

- Implemented telecommuting program.

- Reduced lighting by removing excess bulbs from fixtures and not keeping certain lights (e.g., kitchen, copy area, etc.).
- Upgraded printer to more efficient model; changed default printer to double-sided option.
- Provided coffee mugs for staff and guests in lieu of paper cups.
- Met with janitorial staff to improve recycling efforts and provided recycling bins for each office.

CCEF will be relocating in the near future. The staff has worked to green their future space by asking CL&P to perform a walkthrough and recommend efficiency upgrades which resulted in plans to install better lighting prior to CCEF occupancy.

DPUC Greening Actions

The DPUC has accomplished the following actions to improve environmental performance and energy efficiency at their facility in New Britain:

- Support 100% clean energy for building's electricity consumption.
- Replace all lighting in the building with a high efficiency lighting system upgrade.
- Return the agency's 4 state vehicles to the Department of Administrative Services. These vehicles were driven a total of approximately 10,000 miles per year with subsequent fuel charges averaging $2,300 per year (these savings may be offset by anticipated increases to employee reimbursements for using their personal vehicles).

Proposed Activities and Policies to Save Energy and Reduce Greenhouse Gas Emissions at State Agencies

There are many additional actions state agencies can take to save money, reduce energy use, and lower greenhouse gas emissions. The following activities should be considered by state agencies on the Governor's Steering Committee on Climate Change:

- Continue to build the data base to track state agency energy use and monitor trends (OPM).
- Continue to work to quantify energy, dollar, and greenhouse gas savings from energy efficiency projects at state agencies.
- Continue to pursue energy efficiency goals in the Governor's CT's Energy Vision, including:
    - Recommitting the state to significant reductions in agency and university use of energy
    - Establishing a fund for energy efficiency improvements in state agencies
    - Opening state buildings to serve as test locations for new alternative and energy efficient technologies
- Provide education and outreach to other agencies on green initiatives, energy, and greenhouse gas reduction actions.
- Provide targeted outreach to all state agencies on resources and programs available to help state agencies reduce energy and greenhouse gas emissions, including the Connecticut Energy Efficiency Fund, Connecticut Clean Energy Fund, federal stimulus funds, and the DAS Environmentally Preferable Purchasing program.
- Share state agency "lead by example" actions through the climate heroes section of Connecticut climate change website, www.ctclimatechange.com.
- Share state agency energy and greenhouse gas reduction successes with municipalities, businesses, and other sectors, as appropriate.

Additional Information

For additional information on Connecticut's climate change initiative, please visit www.ctclimatechange.com.