Third Biennial Report of the Climate Neutral Working Group

Presented to

Governor James H. Douglas

July 2009

VERMONT

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Commonly Used Acronyms and Abbreviations

AHS	Vermont Agency of Human Services
ANR	Vermont Agency of Natural Resources
AOT	Vermont Agency of Transportation (also VTrans)
AR4	Intergovernmental Panel on Climate Change Fourth Assessment Report
BGS	Vermont Department of Buildings and General Services
CATMA	Campus Area Transportation Management Association
CCMPO	Chittenden County Metropolitan Planning Organization
CCTA	Chittenden County Transit Authority
CCTT	Climate Change Transition Team
CNWG	Climate Neutral Working Group
CO_2	Carbon Dioxide
CRCF	Chittenden Regional Correctional Facility
CRT	Cathode Ray Tube
DII	Vermont Department of Information and Innovation
DPS	Vermont Department of Public Service
ECR	Eastern Climate Registry
EDM	Electronic Document Management
EPMO	Enterprise Project Management Office (DII)
GCCC	Governor's Commission on Climate Change
GHG	Greenhouse Gas
GMTA	Green Mountain Transit Agency

iSTART	Information Strategies Taskforce on Archives, Records, and Technology
IPCC	Intergovernmental Panel on Climate Change
IT	Information Technology
LED	Light-Emitting Diode
MVRCF	Marble Valley Regional Correctional Facility
NEG ECP	Conference of the New England Governors and Eastern Canadian Premiers
NWSCF	Northwest State Correctional Facility
PSB	Vermont Public Service Board
PZEV	Partial Zero Emission Vehicle
RGGI	Regional Greenhouse Gas Initiative
SAEP	State Agency Energy Plan
SRMRF	State Resource Management Revolving Fund
SOV	Single Occupancy Vehicle (i.e., one person traveling in one vehicle)
TAP	Targeted Assistance Program
TCR	The Climate Registry
TDM	Transportation Demand Management
UA	Unlimited Access Program
UVM	University of Vermont
VCC	Vermont Climate Collaborative
VISION	Vermont Integrated System for Information and Organizational Needs
VIT	Vermont Interactive Television
VSARA	Vermont State Archives and Records Administration
VTrans	Vermont Agency of Transportation (also AOT)

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Executive Summary

In accordance with the directives outlined in Executive Order #14-03, this Third Biennial Report of the Climate Neutral Working Group (CNWG) provides an update regarding:

- The state of the science of responding to climate change
- Efforts to meet the goals of the Executive Order
- Future planned steps and their anticipated impacts, expected challenges, and opportunities
- Opportunities to initiate a statewide voluntary greenhouse gas emissions registry
- The feasibility of a carbon emissions cap and trading program

Also summarized within this report are a number of related ongoing efforts within state government that will facilitate an expanded and coordinated campaign to reduce greenhouse gas (GHG) emissions. Recommended actions for continued GHG emissions reductions are presented in this report to be considered for implementation during 2009 – 2010 by Vermont State Government. These recommendations are presented in more detail in Chapter IV. The major recommendations of this report include:

- Consider the Best Workplaces for Commuters program, and other effective marketing, outreach and incentive programs to help Vermont State Government address greenhouse gas emissions from, and the efficiency of state employees' commute trips.

- Examine the possibility of contracting with the recently implemented Burlington car-share program as a potential tool for Vermont State Government

- Improve marketing of the existing Go Vermont vanpool / rideshare program to state employees, and continue to review and enhance the ongoing program.

- Consider telecommuting as a greenhouse gas emission and cost reduction strategy

- Collaborate with VTrans, CCTA, GMTA, CATMA and other transit providers to improve & expand bus / shuttle routes.

- Conduct outreach and training for state employees to increase use of the Department of Information and Innovation's iLinc service, Vermont Interactive Television (VIT), and other telephone and web-based conferencing services.

- All state cafeterias should follow "green cafeteria" guidelines being developed by ANR.

- Investigate opportunities to integrate "Eco-driving" training and practices into operation of the Vermont state fleet.

- Evaluate the pros and cons of fuel-switching away from No. 6 fuel oil as heating fuel.

- Remain vigilant with regard to continued evaluation and implementation of energy efficiency improvements within state buildings. This should include the use of pilot programs, case studies, benchmarking and ongoing data collection.

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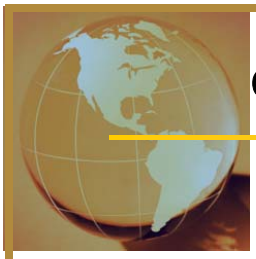

Chapter I: Introduction

With each passing year, volumes of peer-reviewed scientific research continue to underscore the link between greenhouse gas emissions from human activities and recent changes in the Earth's climate. The time that has elapsed since the release of the CNWG Second Biennial Report[1] was no exception. During 2007, we experienced the fifth warmest global surface temperature recorded since recordkeeping began in the mid 1800's[2]; thereby maintaining a consistent pattern where every year since 1994 can be counted among the 'top 20 warmest' years on record. The Intergovernmental Panel on Climate Change (IPCC) also released a new series of publications comprising the Fourth Assessment Report (AR4)[3]. Some of the key findings reinforced by the AR4 are summarized by the following statements:

- *"Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level."*

- *"Most of the observed increase in global average temperatures since the mid-20th century is very likely* (90% probability or higher) *due to the observed increase in anthropogenic GHG concentrations."* (Note that this is an important increase in certainty over the statement made in the 2001 IPCC report which concluded that humans were "likely," or with 66 percent probability, the cause of global warming)

- *"Continued GHG emissions at or above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century."*

- In addition, the IPCC AR4 asserts that the current atmospheric concentration of greenhouse gases *"exceeds by far the natural range over the last 650,000 years."*

A few outspoken critics have claimed that the future-year projections made by the IPCC are too extreme or pessimistic. However, in a recent testimony (July 2008) to the U.S. Senate Committee on Environment and Public Works, Dr. Kevin E. Trenberth of the National Center for Atmospheric Research stated: "Of particular note is the clear evidence that carbon dioxide concentrations are increasing at rates beyond the highest of the IPCC scenarios … suggesting that climate changes are apt to become larger than any IPCC projections".[4]

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[1] The First and Second Biennial Reports of the CNWG are available at http://www.anr.state.vt.us/air/Planning/htm/ccvtactions.htm

[2] According to data from the National Oceanic and Atmospheric Administration (NOAA)

[3] IPCC Fourth Assessment Report (AR4) available at http://www.ipcc.ch/

[4] Full Committee hearing entitled, "*An Update on the Science of Global Warming and its Implications*."
Tuesday, July 22, 2008 - Dr. Kevin E. Trenberth, Head of the Climate Analysis Section, National Center for Atmospheric Research Climate and Global Dynamics Division

Despite these unsettling findings, many scientists indicate that we can still avoid the most perilous consequences of climate change if we act swiftly to implement existing GHG emissions reduction strategies, and work diligently to develop still better strategies. The 2007 IPCC report identifies a number of these 'key mitigation technologies and practices' (see Table 1).

Table 1. Key mitigation technologies and practices – *excerpted from Table 4.2 of the IPCC AR4, Climate Change 2007: Synthesis Report*

Sector	Key mitigation technologies and practices currently commercially available
Energy Supply	Improved supply and distribution efficiency; renewable heat and power (hydropower, solar, wind, geothermal and bioenergy); combined heat and power
Transportation	More fuel-efficient vehicles; hybrid vehicles; cleaner diesel vehicles[5]; biofuels; modal shifts from road transport to rail and public transport systems; non-motorized transport (cycling, walking); land-use and transport planning
Buildings	Efficient lighting and daylighting; more efficient electrical appliances and heating and cooling devices; improved cook stoves ; improved insulation; passive and active solar design for heating and cooling; alternative refrigeration fluids; recovery and recycling of fluorinated gases; integrated design of commercial buildings including technologies such as intelligent meters that provide feedback and control; solar photovoltaics integrated in buildings

There is a high degree of commonality between this list produced by the IPCC and the recommended actions outlined in both the First and Second Biennial Reports of the CNWG. Given the clear importance attributed to such actions by experts around the globe, Vermont State Government remains committed to 'lead by example' through the efforts of the CNWG, and reduce its contribution to the growing pool of atmospheric GHGs. The status of progress made on implementation of the recommendations put forth in the First and Second Biennial Reports of the CNWG is summarized in Chapter II.

[5] Policies to promote diesel and biodiesel vehicles need to be thoughtfully developed and implemented to avoid potential conflicts between achieving GHG emissions reductions and increasing other air pollutants that harm human health.

Chapter II: Progress toward Greenhouse Gas Emission Reduction Goals ~ Strategies Implemented & Expected Benefits

Executive Order No. 14-03 directs "state government agencies and departments to reduce greenhouse gas emissions from state government buildings and operations. Vermont's goal is to reduce emissions by an amount consistent with the recommendations of The Conference of the New England Governors and Eastern Canadian Premiers (NEG ECP) Climate Change Action Plan[6]. The goals established by the Conference are to reduce region-wide greenhouse gas emissions from the 1990 baseline by: twenty-five percent by 2012; fifty percent by 2028; and, if practicable using reasonable efforts, seventy-five percent by 2050."

This chapter presents a summary of ongoing or recently completed actions by Vermont State Government to reduce GHG emissions and energy consumption. Section II a, provides an update regarding the status of various "*Recommendations and Next Steps*" from previous Biennial Reports. Section II b catalogs examples of specific ongoing actions organized by the four emissions sectors (i.e., "Electricity Consumption", "Space Heating", "Transportation for Official State Business", and "Employee Commuting"). The final Section (II c) outlines Vermont State Government's current and historical CO_2 emissions; and defines the emissions trend required to attain the 2012 emissions reduction goal.

Section II a: Update on *"Recommendations and Next Steps"* from previous Biennial Reports

CNWG First Biennial Report Recommendations that are Underway or Completed

- *Initiate widespread "Benchmarking" of buildings owned and operated by the State of Vermont, so that those with sub-optimal performance can be identified and given priority for performance upgrades.*
  - Status: Benchmarking and recommendations for specific performance upgrades have been completed on all District Courthouses and Correctional Facilities.

- *Identify and implement resource conservation measures that are compatible with the goals of the newly created Resource Management Revolving Fund (SRMRF).*
  - Status: Numerous projects are either underway or being reviewed. Some examples include: Emory Hebard State Office Building occupancy sensor installation; Pittsford woodchip boiler replacement, VTrans traffic signal upgrades to LED lighting

- *Purchase and install VendingMisers on all conventional vending machines, or specify mandatory use of ENERGY STAR Refrigerated Beverage Vending Machines in state vending contracts.*

[6] NEG ECP Climate Change Action Plan available at http://www.negc.org/documents/NEG-ECP%20CCAP.PDF

- Status: All new vending machines are required by state contract to comply with Energy Star guidelines. In addition, the majority of older machines have VendingMisers installed.

- *Work with information technology (IT) personnel to install automatic power management software on each computer or set up so that control is at the network level.*
  - Status: BGS Information Technology (IT) staff is currently working on a pilot program. IT has completed a two-week baseline to determine existing power usage, and all BGS computers are now operating under the power management software. The goal is to share this service with other departments.

- *Utilize Building Energy Performance Contracts wherever deemed appropriate.*
  - Status: BGS is in the process of making $4.7 million in energy-efficiency improvements to state-owned buildings in Waterbury, Montpelier, and Middlesex with the savings over 10 years expected to pay for the cost of the 10-year-loan.

- *Monitor electronic document management (EDM) implementation in state government and study ways to take advantage of possible facilities space savings*
  - Status:[7] The records task force, known as iSTART (Information Strategies: Taskforce on Archives, Records, and Technology), has worked on defining best practice guidelines for records management that extend to email and other systems like SharePoint. The Vermont State Archives and Records Administration (VSARA) has implemented the Targeted Assistance Program (TAP) which "…embraces statewide strategies for managing records and offers a unique opportunity for agencies to partner with the VSARA and, where possible, its collaborators, such as the Department of Information and Innovation's Enterprise Project Management Office (EPMO).

    Goals & Future Plans:
    - Implementation of the enterprise SharePoint infrastructure begins in early 2009 with the expectation to have it up and running by April 2009.
    - The Dept. of Information and Innovation (DII) is evaluating suitable pilot projects for utilization of SharePoint beginning in May 2009.
    - Once a stable production environment and a vetted pilot exist, DII will begin roll-out of SharePoint sites for agencies and departments. DII expects to have between twenty and forty individual agency/department SharePoint sites up and running by the end of 2009.
    - In the 3rd or 4th quarter of 2009 DII will begin Phase II of the infrastructure project implementation which will focus on implementing the external connector SharePoint functionality.
    - The Vermont Department of Public Service is planning to build and implement a case management solution utilizing SharePoint.
    - Both the Agency of Natural Resources and the Natural Resources Board have programs underway to build SharePoint solutions that will

[7] Courtesy of D. Thomson – Director, Enterprise Project Management Office, Vermont Department of Information and Innovation

revolutionize permitting processes for citizens and capture volumes of existing paper files into electronic format for immediate storage, archival and retrieval utilizing SharePoint.

- *All vehicles purchased for inclusion in the Vermont State Fleet shall be appropriately sized according to intended primary use, and shall be among the most fuel efficient and lowest emission vehicle models in each class.*
  - Status: This policy and guidance is currently in place at BGS, but there is a component of ongoing review with each new vehicle purchased. (see http://bgs.vermont.gov/sites/bgs/files/pdfs/BGS-Fleet-Bulletin-2_3.pdf)

- *Increase the use of video and online conferencing to reduce vehicle trips and vehicle miles traveled.*
  - Status: Use of Vermont Interactive Television (VIT) is continuing. In addition, the Vermont Department of Information and Innovation has recently launched an interactive conference call / webinar service known as iLinc, (see http://dii.vermont.gov/DII_Divisions/Customer/Wireless_Web/webconferencing)

- *Expand education and tracking of vehicle engine anti-idling campaigns pertaining to state fleet vehicles, as well as private sector vehicles operating on state-owned property.*
  - Status:
    - Anti-idling signs have been posted by BGS at key entryways and all loading areas at the Waterbury State Office Complex. A similar effort has recently been completed at the Montpelier & Middlesex complexes.
    - The Vermont Agency of Transportation (VTrans) has an anti-idling policy in place for the VTrans diesel vehicle fleet.

- *Convene a CNWG sub-workgroup to formulate innovative strategies that will reduce GHG emissions from the extensive non-passenger portion of the state fleet.*
  - Status: A CNWG subgroup met during 2005 to establish ongoing and future strategies that can be applied to the State of Vermont non-passenger fleet. Also, see the VTrans Climate Change Action Plan Updates at the following link (http://www.aot.state.vt.us/planning/Documents/Planning/VTransClimateActionPlanfinal1.pdf)

- *Convene a Transportation Demand Management (TDM) Committee to evaluate feasibility and effectiveness of various TDM strategies, and implement those deemed suitable to reduce GHG emissions generated by state employees commuting to and from the workplace.*
  - Status: Strategies to better comprehend employee commuting habits, and to improve the efficiency of state employee commuting continues to be examined by the CNWG. A pilot project conducted by the Agency of Human Services and the Campus Area Transportation Management Association (CATMA) is discussed in further detail in Chapter II.

- *Facilitate, coordinate and promote carpooling and vanpooling.*
  - Status: Vermont State Government is working to enhance outreach and utilization of VTrans' GoVemont program (see http://www.connectingcommuters.org/)

- *Establish new commuter shuttle routes.*
  - Status: The CNWG will continue to evaluate potential to work with transit providers such as CCTA / GMTA to improve & expand bus / shuttle routes

- *Conduct a survey of all state employees to determine more accurately the present level of employee participation in carpooling, vanpooling, or other mass transit as a means of commuting to and from the workplace.*
  - Status: BGS has developed a survey tool to establish a baseline of commuting activities for its employees, and will distribute soon.

CNWG Second Biennial Report Recommendations that are Underway or Completed

- *The Agency of Natural Resources (ANR) should endeavor to complete the rule-making process formalizing implementation of the Regional Greenhouse Gas Initiative (RGGI) in Vermont.*
  - Status: Vermont's rule-making process is complete, and it participates in official RGGI activities. Vermont's participation in RGGI is described further in Chapter III of this report (also see http://www.rggi.org/home).

- *ANR should continue its support for the multi-state Eastern Climate Registry (ECR), and work to encourage companies to report their national GHG emissions data into the system to demonstrate environmental leadership, manage carbon-related risks, increase operational efficiency, and document early action.*
  - Status: ANR has been an active participant in the development of the international registry now known as The Climate Registry (TCR). This effort is outlined more completely in Chapter III of this report (also see http://www.theclimateregistry.org/)

Section II b: Examples of Ongoing Actions

Infrastructure: Electricity Consumption[8]

- Implementation of recommendations from performance contract in Waterbury, Montpelier and Middlesex Complex.
- Middlesex solar-electric system is complete once again with the installation of twenty eight 80 watt photovoltaic panels. Net metering and other equipment were already on site.
- Continuous work on upgrading equipment with the use of the State Resource Management Revolving Fund (SRMRF) and Efficiency Vermont.
- Eliminating unnecessary office equipment. This is designed to maximize efficiency and improve energy savings in BGS technology – equipment will be used in areas of need or used as backup.
- Upgrading all cathode ray tube (CRT) monitors to flat screen monitors at end of life.
- Replacing lighting in state house as technology develops compatible lamps.

[8] Source: The Department of Buildings and General Services (BGS)

- Replaced 43 inefficient (150 watts each) lamps with compact fluorescent lamps (42 watts each) at the Newport State Office Building,
- Sub-meters have been installed for electrical and condensate tracking at the Montpelier and Waterbury Complexes with revised software being installed to make the data more accurate.
- Replaced incandescent lamps with compact fluorescent lamps in the BGS Commissioner's Office to lead by example.
- Replaced over 40 incandescent lamps in porcelain fixtures with compact fluorescent lamps and fixtures at 110 State Street and 120 State Street.
- Replacing all 10" fluorescent exit signs at 120 State Street and 110 State Street with LED exit signs.
- Upgrade lighting at Liquor Control Warehouse in Montpelier.

Infrastructure: Space Heating [9]

- Made changes to the coding in VISION for improved reporting accuracy of fuel and other energy-related purchases within state government.
- Improvements to building system efficiency through replacement of the vacuum type condensate pump assembly with a vented steam condensate receiver at 120 State Street.
- Replaced leaking steam traps at 120 State Street.
- Replaced aged continuous exhaust fan in the elevator control room with a thermostat controlled exhaust fan.
- Replace air conditioning system at Rutland 911 facility.
- Replace windows at Marble Valley Regional Correctional Facility (MVRCF), Chittenden Regional Correctional Facility (CRCF) and the Grand Isle County Courthouse.
- Replace doors at CRCF.

Transportation: Official State Business (Vehicles for Passenger and Non-Passenger Transport)

- Recently, 9 Toyota Prius hybrids were added to the BGS fleet. Since 2005, the average fuel economy of the BGS fleet has increased from 31.5 to 36.4 miles per gallon (mpg).[10]

- In FY '08, VTrans Central Garage purchased 221,971 gallons of B5 biodiesel for delivery to 7 locations, representing 18% of all diesel fuel purchased in bulk.[11]

Transportation: Employee Commuting [12]

- The Campus Area Transportation Management Association (CATMA), in partnership with the Burlington Business Association and the Chittenden County Metropolitan Planning Organization (CCMPO), conducted a Downtown Burlington Employee Transportation

[9] Source: BGS
[10] Source: BGS
[11] Source: VTrans
[12] Courtesy of S. Thibault, CATMA

Survey in November/December 2007. This survey was initiated to obtain baseline data; assess downtown employees commuting habits, costs and challenges; as well as gauge commuter satisfaction and willingness to alter commuting habits. Transportation management is a land use issue, but a human resource issue as well affecting employee recruitment and retention for businesses. During this Downtown 2007 survey, CATMA became aware of the State's downtown district's immediate parking issues and offered to implement a Pilot Program with the Vermont Agency of Human Services (AHS) working with Jane Helmstetter, Field Director Burlington District .

The Pilot Program offers the downtown Burlington State employees an opportunity to participate in CATMA's Bike-Walk reward program, confidential carpool matching service, Emergency Ride Home program, monthly drawings, off-site parking, commuter tabling events which provide current transportation resources (CCTA Bus Map & Guides, Bike Maps, Walk Maps, coupons at local bicycle shops to purchase bike/pedestrian safety gear, and personal commuting assistance).

CATMA has been conducting annual fall Employee Transportation Surveys since 2000 and annual Student Transportation Surveys since 2003 at its member institutions (American Red Cross, Champlain College, Fletcher Allen Health Care, and University of Vermont). In order to evaluate the effectiveness of the Pilot Program, CATMA included the State downtown Burlington district in our recent Employee Survey with baseline data already in place from the Downtown Burlington 2007 Survey. During the 9 month period between surveys, the percentage of Burlington-based AHS employees participating in single occupancy vehicle (SOV) commuting habits (i.e., driving alone) dropped from roughly 78% to 64%. The number of AHS employees who participated in carpooling increased from 7% to more than 19%. There are now 5 designated carpool spaces in the 108 Cherry Street Garage. It is also worth mentioning that the downtown state office had a dramatic increase in participation in the state's annual 2008 Way to Go! Commuter Challenge over 2007.

- The 2nd CNWG Biennial Report outlined the ongoing Unlimited Access (UA) program at the University of Vermont (UVM). Provided here is a clarification regarding the UA program details, as well as updated ridership numbers.

    - In January 2003, CATMA signed an Unlimited Access contract with CCTA establishing a means for CATMA to provide UA on all public transit routes operated by CCTA to employees, faculty, staff and students of any CATMA member institution. Every month, CCTA sends CATMA a monthly report and bill. UVM joined Unlimited Access during Fall 2003 and Champlain College joined UA in August 2006. Unlimited Access includes all CCTA local routes and the LINK routes (Middlebury, Montpelier and St. Albans).

    - UVM Unlimited Access
        - FY07 (July 1, 2006 - June 30, 2007)- Total rides (including local and LINK routes) 203,465 trips

        - FY08 (July 1, 2007 - June 30, 2008)- Total rides (including local and LINK routes) 238,311 trips (this is more than double the 2004 total of 104,000 trips reported in the 2nd CNWG Biennial Report)

    - Champlain Unlimited Access
        - FY07 (July 1, 2006-June 30, 2007)- Total rides (including local and LINK routes) 16,563 trips (1st year of Unlimited Access)
        - FY08 (July 1, 2007 - June 30, 2008)- Total rides (including local and LINK routes) 26,766 trips

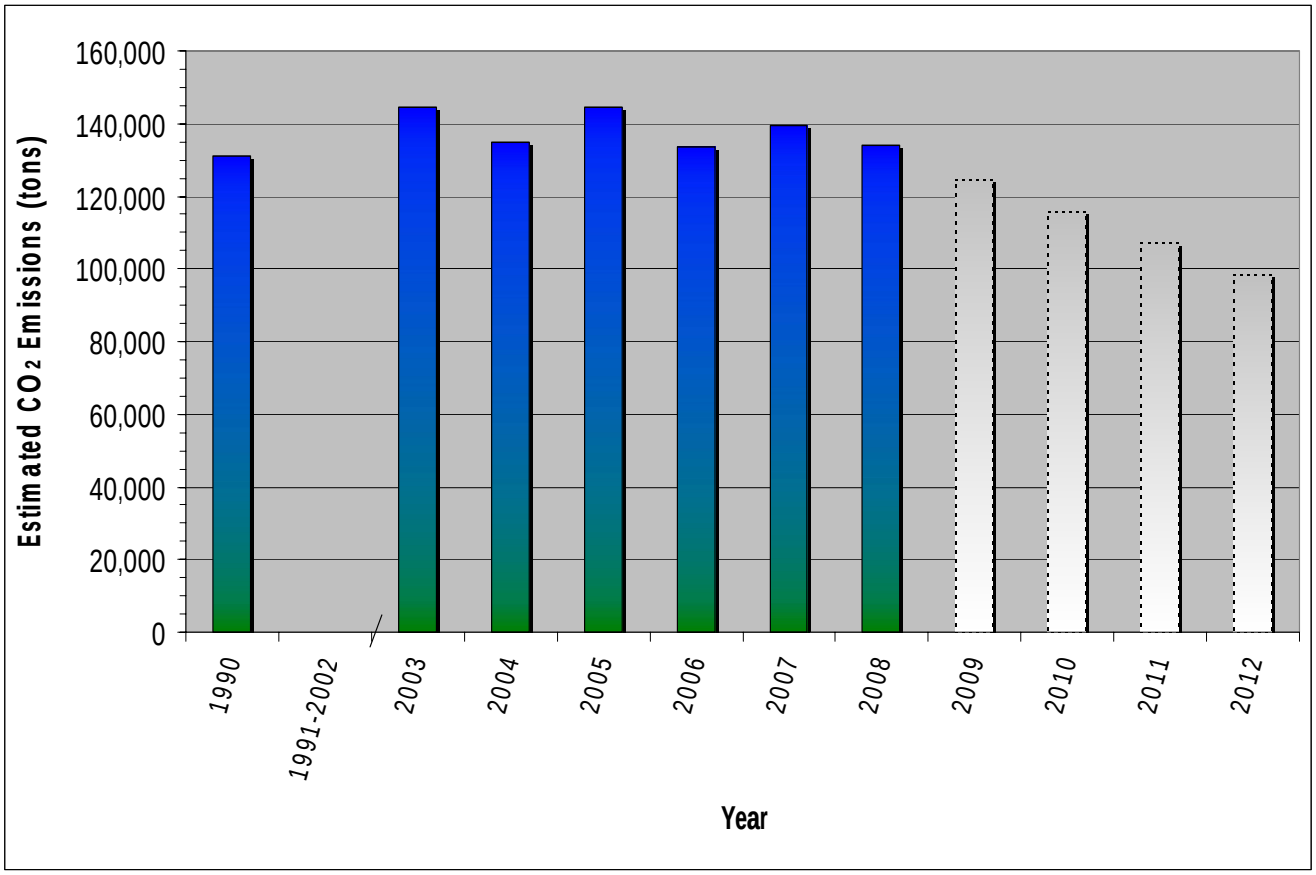
- 2007 Way to Go! Commuter Challenge: The State of Vermont won the Honorable Mention for 270 employees signing up to participate. Those employees saved about 1,340 gallons of gasoline, the equivalent of 13 tons of CO2 emission avoided, by using alternatives (such as bicycles, public transportation or car pooling) for a week.

- VTrans is a financial supporter of Way to Go! Week

Section II c: CO2 Emissions Summary:

Vermont State Government must continue to reduce its annual CO_2 emissions by approximately 8,894 tons per year for each of the next 4 years to meet the 2012 goal of reducing GHG emissions 25% below 1990 levels by 2012. This is a formidable task. However, according to the most recent BGS data [13], Vermont State Government did better than the interim emissions target for 2007 (as projected in the Second Biennial Report) by roughly 1,700 tons. Emissions declined between 2007 and 2008 (by roughly 5,500 tons), falling only 1,350 tons short of the 2008 interim target projected in the Second Biennial Report. This demonstrates that Vermont State Government still has the ability to meet the rapidly approaching 2012 goal if it diligently pursues both ongoing and new greenhouse gas emission reduction strategies. Figure 1 shows estimated historical GHG emissions (colored bars) and identifies the future annual emissions reductions necessary to achieve the provisions of Executive Order #14-03 (gray bars). These emission reductions will come about as Vermont State Government buildings, operations, and transportation become increasingly more energy efficient.

Figure 1. Summary of Vermont State Government CO_2 Emissions



[13] Corrections have been made to the CO_2 emissions estimates for 2003 and 2006 following a comprehensive energy consumption data review performed by BGS since April 2007. As a result, the historical data presented for 2003 and 2006 in Figure 1 herein, differ slightly from those presented in the Second Biennial Report.

Chapter III: Update on Related Greenhouse Gas Emission Reduction Efforts

Section III-a: Regional Greenhouse Gas Initiative (RGGI)

The Regional Greenhouse Gas Initiative (RGGI) is the regional cap and trade program that has been developed to limit carbon dioxide emissions from fossil fuel-fired electricity generators. Complete details about RGGI can be found at http://www.rggi.org/home; however, a summary of the highlights that occurred during 2007-2008 is provided below.

- The number of official RGGI participating states increased to ten as the states of Massachusetts, Rhode Island and Maryland signed onto the Memorandum of Understanding agreed to by the other seven states (which included Vermont) in 2005.

- The first "CO_2 Allowance Auction" was held on September 25, 2008.
  - At this auction, 12.5 million CO_2 allowances were sold at a price of $3.07 per allowance, generating more than $ 38.5 million.
  - The proceeds from the auction will be distributed to the six RGGI states (Connecticut, Maine, Maryland, Massachusetts, Rhode Island and Vermont) that offered allowances for sale at the first auction.
  - Vermont's share of the proceeds from the first auction was $620,000. Vermont will auction 1.2 million allowances each year, and at current prices, could earn almost $3.7 million annually to fund energy efficiency and renewable energy technologies and programs to benefit energy consumers, including research and technology to curb CO_2 emissions.

- A second RGGI auction was held on December 19, 2008. Vermont's share of the proceeds from this auction was over $680,000, while the March 2009 RGGI auction generated $760,000 for Vermont. There will be additional RGGI auctions held in June, September and December 2009.

- Revenues from the RGGI auctions will significantly boost the state's energy efficiency initiatives. The Vermont Public Service Board (PSB) will appoint trustees to oversee the RGGI proceeds. The Department of Public Service (DPS) will make recommendations to the PSB and its trustees for programs and activities such as weatherization, low-carbon generation projects, and improving energy efficiency.

- In 2008, the Vermont General Assembly established a *Heating and Process Fuel Efficiency Program* through Act 92 (30 V.S.A. § 235). This Act directs the DPS to "solicit and monitor any combination of energy efficiency and conservation programs, measures, and compensation mechanisms to provide fuel efficiency services on a statewide basis for Vermont heating or process fuel consumers." This program will be funded through a Fuel Efficiency Fund supported by RGGI auction revenues.

Section III-b: The Climate Registry (TCR)

The Second Biennial Report of the CNWG summarized Vermont's involvement with The Eastern Climate Registry (ECR). During 2007, there was a tremendous surge of interest from other U.S. States, Canadian Provinces, Mexican States, and Native American Tribes to expand the registry beyond the ECR on the east coast and the California Climate Action Registry on the west coast. As a result The Eastern Climate Registry effort has now merged efforts with a larger international registry initiative known as The Climate Registry (TCR). The Climate Registry was established by states, tribes and provinces in North America as a system to measure GHG emissions consistently across industry sectors and borders. It is a 501(c) (3) nonprofit organization governed by a board of directors of state, tribal and provincial representatives. The Climate Registry encourages voluntary early actions to decrease GHG emissions; and its accounting infrastructure supports a wide variety of programs that reduce GHG emissions including voluntary, regulatory and market-based programs. For complete details please visit The Climate Registry's website at http://www.theclimateregistry.org/.

The Vermont Agency of Natural Resources (ANR) has served as a founding member on TCR's board of directors, and also participates in a number of technical workgroups that have helped develop the key infrastructure and various protocols of TCR. In addition, ANR has voluntarily committed to measure, verify, and report its GHG emissions to TCR. Joining ANR are 333 (as of 4/16/09) other government entities, educational institutions, businesses, manufacturers, non-profits, etc., including 6 other Vermont-based organizations. [14]

Section III-c: Governor's Commission on Climate Change (GCCC)
Climate Change Transition Team (CCTT)
Vermont Climate Collaborative (VCC)

During the latter part of 2007, the Plenary Group presented its final recommendations to the **Governor's Commission on Climate Change (GCCC)**. These 38 recommendations were the culmination of numerous meetings and conference calls held between September 2006 and July 2007. The recommendations were developed chiefly through the hard work of four Technical Working Groups (TWGs), each having members from the GCCC and Plenary Group, as well as other technical experts. The resultant recommendations were categorized under four distinct sectors / issues:

- Energy Supply and Demand (ESD)
- Transportation and Land Use (TLU)
- Agriculture, Forestry, and Waste Resource Management (AFW)
- Cross Cutting Issues (CC)

[14] Other Vermont organizations committed to report GHG emissions to TCR include: Vermont Technical College, Green Mountain Power Corp., NativeEnergy Inc., Resource Systems Group Inc., Spring Hill Solutions LLC, and Vermont Energy Investment Corp.

The 6 appointed members of the GCCC carefully reviewed and incorporated the recommendations of the Plenary Group into a final report that was presented to Governor Douglas in October 2007. The GCCC Final Report and Plenary Group Recommendations can be found at http://www.anr.state.vt.us/air/Planning/htm/ccvtactions.htm

Climate Change Transition Team (CCTT)

During January through September 2008, representatives from four state agencies (Agency of Natural Resources, Agency of Transportation, Agency of Agriculture Food & Markets & Department of Public Service), known collectively as the Climate Change Transition Team (CCTT) worked to examine the recommendations in the GCCC report and to develop work plans for each recommendation. The resulting report provides these draft work plans and also serves as a current inventory of ongoing activities and programs that either directly or indirectly address the climate change/GHG emission issue. Through its work, the CCTT concluded that of the more than 260 action steps contained in the 38 GCCC recommendations, approximately 35% are currently being implemented at some level within the state of Vermont. The Climate Change Transition Team's "*Proposed Draft Work Plans Developed from the Recommendations of The Governor's Commission on Climate Change (GCCC) Report*" can be downloaded or viewed in its entirety at the following link: http://www.anr.state.vt.us/air/Planning/docs/0926_CCTT_final_report_hyperlinked.pdf

The major recommendations of the report include:

- *Maintain an Ongoing Workgroup:* Maintain an ongoing workgroup of individuals representing state agencies taking actions to address climate change.
- *Report Results of Actions:* Policies and actions implemented by state agencies resulting in greenhouse gas reductions from any Vermont sector should be reported to the working group to be included in an annual report.
- *Identify and Track Indicators:* Identify, track and report on indicators related to the major topics in the GCCC report
- *Biofuels Task Force:* Convene a group of individuals representing the various areas of expertise regarding biofuels to discuss, analyze and develop appropriate work plans for the use & / or production of biofuels in Vermont.
- *Establish a Vermont Climate Change Funding Source:* Establish a funding source to support climate change /GHG emission reduction activities in Vermont.

The participating CCTT Agencies have recently been asked to collaborate in documenting implemented policies and actions that result in greenhouse gas (GHG) emissions reductions. This would be a recurring activity with a goal of presenting a first annual report during 2010. The participants will identify relevant activities or policies implemented at their respective agencies, track appropriate metrics, work with ANR to produce an estimate of the total GHG emissions reduced, provide an evaluation of the effectiveness of the various activities or policy options , and put forth recommendations for future activities.

The Vermont Climate Collaborative (VCC) is a signature partnership among Vermont's higher education, government, and private sectors dedicated to finding workable solutions for climate change mitigation. Creation of the VCC was among the major recommendations of the GCCC. The VCC will serve as a nucleus for research, information, and activity related to climate change in Vermont. The VCC will create and facilitate connections between people and projects to:

- build on research strengths statewide,
- get like-minded people working together,
- develop funding sources for worthwhile projects, and
- prioritize research needs.

University of Vermont President Fogel and Governor Douglas signed the VCC Charter on October 1, 2008. The Charter describes the organizational structure and objectives of the Collaborative. For further information about the VCC's charter, mission, and activities, please visit http://www.uvm.edu/~vtcc/

Section III-d: Vermont State Agency Energy Plan for State Government (SAEP)

The State Agency Energy Plan is currently being reviewed for re-adoption. Legislation requires that the plan be evaluated every five years to ensure that the objectives of saving energy, promoting resource conservation, and reducing pollution are met through the institution of environmentally and economically sound practices. Some examples of activities undertaken since 2007 can be found below.

• The Department of Finance and Management and the Department of Buildings and General Services (BGS) reviewed the PeopleSoft software, Vermont Integrated System for Information and Organizational Needs (VISION) being used to manage the accounting and assets for state government. It was found that, in order to meet the fiscal and environmental standards set before us, we must track our current usage to establish benchmarks for future conservation monitoring. This requires a reporting structure and process in the General Ledger system that accurately records payments made to third party vendors for all of energy costs as well as consumed quantities. As of 7/1/2008, new VISION accounting codes have been created (and in some cases, old codes have been inactivated) to facilitate a more specific / accurate reporting structure for energy supply expenditures.

• Continued monitoring of the BGS purchasing program to ensure that the program is selecting the most efficient vehicles in all vehicle classes. This includes the selection of hybrids and partial zero emission vehicles (PZEV).

• The Department of Public Safety and BGS have a new field station in St. Albans that is heated by two wood pellet boilers. The pellets are purchased in bulk and a silo is used as the delivery system for the boilers. The field station also has light tubes providing natural daylight to the inner hallway of the field station.

• Vermont Veteran's Home has conducted an extensive audit on the condition of the home. A preventative maintenance program was set up as the result. The savings in utility costs and labor was immediate. Currently, they are installing a geo-thermal system for their space conditioning needs as part of a large renovation project.

• The Agency of Commerce and Community Development is reviewing the buildings in their inventory for potential energy savings that will comply with the Historic Preservation criteria.

• The Military Department is conducting a wind study at their headquarters site in Colchester as well as installing a geothermal system at their training site in Jericho. Commissioning and energy audits play a large part in their construction and maintenance decisions.

• The Agency of Transportation reviewed the lighting in their state garages and upgraded the interior technologies with the funding assistance of the State Resource Management Revolving Fund. They are currently reviewing the lighting technology used in their traffic and airport lighting.

• BGS installed sub-meters at the Waterbury State Office Complex and the Capitol Complex. The sub-meters make it possible to view the electrical and condensate usage for each building more accurately.

Chapter IV: Recommendations and Next Steps

Continuing efforts to enhance energy efficiency and conservation have enabled Vermont State Government to reduce its CO_2 emissions to nearly the same as base-year 1990 levels. Reducing Vermont State Government emissions an additional 25% by 2012 will take continued vigilance and action. Meeting this challenge will require that Vermont State Government pursue feasible strategies already outlined in earlier CNWG reports, as well as those described below.

- Consider the Best Workplaces for Commuters program and other effective marketing, outreach and incentive programs to help Vermont State Government address greenhouse gas (GHG) emissions from, and the efficiency of state employees' commute trips. (see http://www.bestworkplaces.org/index.htm)
    - Next Steps: Task a work group to evaluate options and report to CNWG Co-chairs on feasibility by December 1, 2009.

- Examine the possibility of contracting with Burlington's recently implemented car share Vermont program as a potential tool for Vermont State Government. This program provides a local network of readily-accessed vehicles with cost based on how much the vehicles are driven. Vehicles could be located at various state offices to provide an alternative to buying and managing fleet vehicles. As another option, car share vehicles could be made available for short-term employee personal use (lunchtime errands, etc.), providing an increased level of convenience that would remove a major barrier that currently prevents some employees from utilizing carpool, vanpool or public transit service. In addition to reducing GHG emissions and providing an employee incentive, it could also alleviate parking and traffic issues in increasingly congested areas. (see http://www.carsharevt.org/)
    - Next Steps: This recommendation should be evaluated concurrently with the Best Workplaces for Commuters program and other programs described earlier.

- Improve marketing of the existing Go Vermont vanpool / rideshare program to state employees and continue to review and enhance the ongoing program. (see http://www.connectingcommuters.org/)
    - Next Steps: Add specific elements to the GoVermont "roll out" that engages Vermont State Government as not only the program sponsor, but as a participating employer.

- Consider telecommuting as a greenhouse gas emission and cost reduction strategy
    - Next Steps: Establish an executive management-level work group to consider the potential savings and costs of telecommuting.

- Collaborate with VTrans, CCTA, GMTA, CATMA and other transit providers to improve & expand bus / shuttle routes.
    - Next Steps: Initiate and maintain active contact with Vermont transit providers to explore mutual interests and partnership opportunities.

- Now that the Department of Information and Innovation's iLinc service, Vermont Interactive Television (VIT), and other telephone and web-based conferencing services are readily available;

Vermont State Government needs to focus on conducting outreach and training for state employees to increase use of these services.

- Next Steps: CNWG should collaborate with DII to better publicize the available conferencing services, as well as develop state policies regarding use. CNWG and DII should work with the Department of Human Resources to make relevant training opportunities available to state employees through venues such as The Summit Center for State Employee Development

- All state cafeterias should follow "green cafeteria" guidelines being developed by ANR. These guidelines will address waste prevention, re-use, recycling, composting, and green purchasing.
  - Next Steps: Compile an inventory of all state cafeterias to assess current "green" practices and whether they are state-operated or under contract. Cafeterias under contract with BGS should include specific minimum requirements in their contracts.

- Investigate opportunities to integrate "Eco-driving" training, practices, and tracking into operation of Vermont state fleet. Efforts to modify driving behavior of fleet vehicle users will result in enhanced safety, reduced vehicle maintenance costs, lower fuel consumption, and reduced emissions of GHGs. There are commercially available tools that provide driver education often through real-time, on-board tracking of driving behavior, complete with feedback to the driver on a simple display. [15]

- Evaluate pros and cons of fuel-switching away from No. 6 fuel oil as heating fuel in Vermont State buildings. A comprehensive analysis of potential replacement fuels should compare fuel costs and availability, short and long-term operational costs, GHG emissions, and other potential environmental and health concerns

- Remain vigilant with regard to continued evaluation and implementation of energy efficiency improvements within state buildings. This should include the use of pilot programs, case studies, and ongoing data collection including benchmarking energy consumption in all state buildings. Substantial reductions in cost, energy consumption and GHG emissions would likely result from a comprehensive "re-lamping" plan for all state buildings. (See below for additional potential projects)
  - Next Steps: Continue to look for efficiency opportunities not already identified while actively implementing those known to be feasible.

Vermont State Government can significantly reduce energy consumption and greenhouse gas emissions by implementing energy efficiency improvements in state buildings either through new design or cost-effective retrofits. Energy efficiency provides an economically viable means for reducing operating expenses and GHG emissions. Energy efficiency should be considered as a central part of the state's decision making process when designing new buildings and identifying building maintenance and upgrades.

Efficiency Vermont has identified the following retrofit opportunities. This list is not comprehensive, but serves as an example of relevant opportunities that can be implemented today. Vermont state government will consider implementing options such as these wherever it is deemed feasible and cost-effective to do so.

[15] Available resources include http://www.greenroad.com/our_solution.html and https://www.drivingchange.org/Pages/Technology.aspx

- Install occupancy sensors in spaces that are sporadically occupied such as courtrooms, break areas, conference rooms, committee rooms, bathrooms, etc.
- Upgrade existing metal halide lighting in larger storage hangers and large common spaces at correctional facilities to linear fluorescent lighting.
- Upgrade exterior and parking garage lighting to Efficiency Vermont performance-approved LED lighting.
- Retrofit all flashing yellow traffic beacons from incandescent to LED lighting
- Upgrade cooler and freezer refrigeration fan motors to be brushless DC motors at all state owned commercial kitchens (statehouse, correctional facilities, etc).
- Implement commercial kitchen exhaust hood controls that vary the exhaust rate based on actual heat and smoke load.
- Install outdoor air ventilation controls for statehouse, correctional facilities, and state office buildings. Revisit building time of day scheduling to ensure that the programmed time matches the actual space needs. Implement demand control ventilation on zones controlling heavily ventilated spaces (auditoriums, conference centers, legislative chambers, dining facilities).
- Add variable frequency drives (VFDs) to supply and exhaust fan motors over 3 horsepower
- Add heat tape temperature controls to reduce the runtime of the gutter heaters on older state buildings. Simultaneously, develop a thermal shell upgrade plan and schedule so that the heat tape can eventually be eliminated.
- Further utilize hot and cold aisle design at state managed data centers to minimize air flow needed to maintain a proper IT environment.
- Consolidate all relevant servers and storage systems.
- Consolidate printer, copiers, fax machines into one device and remove unnecessary machines.
- Install and properly set-up 7 day programmable timers on plug-in appliances that are not continuously needed.
- Better air seal state facilities to minimize uncontrolled air leaks and drafts
- Bring insulation of buildings up to current commercial energy guidelines

As time progresses more energy efficiency options will develop; the intent of the list above is to highlight that, at any point in time, the state can make cost effective improvements. Technology is constantly evolving, providing even more energy efficient choices. Over the last few years, small single phase motors have increased in efficiency by over 300%, data center server systems have become 2 to 10 times more efficient, and new lighting systems have appeared every couple years that are more efficient than the year before. The greatest opportunities can be obtained when the entire building is viewed comprehensively, particularly when some of the energy efficiency opportunities are synergistic with other opportunities.

For new construction and extensive building renovations, the savings and opportunities are even greater. Looking comprehensively and at the overall integration of the building systems will yield the greatest results. Efficiency Vermont can work with the design team to discuss various strategies to build a cost effective energy efficient building. There are also many national resources, including the New Buildings Institute (www.newbuildings.org).

Implementing cost effective energy efficiency upgrades to state buildings will further the state's aggressive goals for increasing energy efficiency and reducing greenhouse gas emissions, the long-term viability of its real estate, and its opportunities for saving money.

Appendix A – State of Vermont Energy Consumption and GHG Emissions Reduction Case Studies

State of Vermont Case Study

Volume 1, Issue 1
2009

Preventative Maintenance

Vermont Veterans' Home

BENEFITS

- Easier to Track the Age of Equipment / Installation Dates
- More Accurate Existing Plans
- Savings on Utility Bills and Energy Consumption
- Savings on Labor Costs
- More Accurate Prioritized Project List
- Increased Comfort for Tenants

APPLICATIONS

Any existing building or group of buildings would benefit from an active preventative maintenance program. As long as the facility managers have an accurate picture of the current condition of the facility, the program will be beneficial. This could consist of a simple spreadsheet, or software designed to send reminders for routine changes.

Additional Information:

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Summary

The Vermont Veterans' Home was established in 1884 in Bennington and provides a range of specialized health care services for veterans. The combination of the age of the building and the fact that it is in operation 24 hours a day, year-round created wear on the equipment and an increase in labor hours. This was addressed by a thorough review of the energy use data and the condition of the existing equipment. During the review, a detailed preventative maintenance plan was updated and put into action to ensure that the energy savings from the review would be sustainable. The Department of Buildings and General Services has been working with the Vermont Veterans' Home to renovate the mechanical system by installing a geothermal system to provide heating and cooling. The maintenance staff has also started work on repairing the steam traps, improving the distribution lines for heating and cooling, and cleaning the radiators and vents. The lighting has been upgraded for enhanced efficiency, with photocells and timers installed where possible. The results of all this hard work is seen in the increased comfort of the veterans' home as well as in the decrease in work orders and utility bills.

Results

The maintenance staff inspected all of the ductwork, controls, traps, lines, lighting, wiring, and other equipment. This gave them invaluable knowledge of the existing system as well as an accurate project list prioritized for future funding requests. As the maintenance staff worked on the various no-cost and low-cost improvements, the preventative maintenance program was updated and routine work was added with reminders. The Vermont Veterans' Home has already started receiving positive feedback from the staff and veterans regarding the increased comfort within the facility. Upgrades to the mechanical system and the lighting with controls are in progress with savings already being seen. The heating fuel consumption has dropped about 12% and the electricity consumption has been reduced by roughly 10%. These reductions in energy consumption have reduced annual CO_2 emissions at this location by approximately 250 tons.

State of Vermont Case Study

Volume 1, Issue 2
2009

Low Energy & Low Mercury Lighting

Lighting Contract with WESCO

BENEFITS

- Lower electrical use
- Lower mercury content in fluorescent lamps
- Mercury is 100% recycled in 'end of life' lamps for new lamps
- Longer lamp life
- Lower labor costs

APPLICATIONS

For the best savings, upgrade T12 lighting systems that have the magnetic ballasts. Newer lighting systems such as higher watt T8 lighting systems will also save energy and mercury when replaced by the 25 watt T8 ALTO lamp and electronic ballast system.

AWARDS

- *2002 California's "Flex Your Power" Energy Conservation Award*
- *2007 LightFair's Best of Category: Conventional Lamps*
- *2007 LightFair's Technical Excellence co-presented to Philips Lighting's ALTO II and Philips Lumileds' LUXEON Rebel*

Summary

The current lighting contract through WESCO includes Philips Lighting. Philips has a T8 (lamps that are one inch in diameter) technology that will reduce the electricity and mercury in office buildings. This technology is called the ALTO Energy Advantage. The ALTO is a 25 watt (W) T8 lamp that currently consumes the least amount of energy of any four foot T8 fluorescent lamp on the market. Products that utilize ALTO Lamp Technology introduce less mercury into the environment. Philips ALTO fluorescent lamps combine low mercury with long life and energy efficiency which together help achieve sustainability. Philips ALTO lamps average 70% less mercury than the 2001 industry average for fluorescent lamps up to 60 inches which are not TCLP4-compliant. Source reduction during the manufacturing phase is essential to mercury management throughout the product lifecycle. Philips ALTO PLUS T8 lamps achieve 50% longer life than standard T8 lamps, safer for the environment. Energy-efficient lighting not only reduces operating costs; it also supports a clean and sustainable environment. ALTO lamps use 100% recycled mercury during the ALTO manufacturing process. Philips encourages recycling of all spent mercury-containing lamps at end of life.

Results

These new lamps allow maintenance staff to replace existing 32W T8 lamps on any instant start system for an immediate savings of seven watts - or approximately 25% energy savings. For every 1000 hours of use, each new lamp will reduce CO_2 emissions by approximately 10 lbs. Replacement of older technology fixtures such as the T12 with magnetic ballasts can result in energy savings of up to 60 watts per fixture - or approximately 40% energy savings. For every 1000 hours of use, each new fixture will reduce CO_2 emissions by approximately 75 lbs. ALTO T8 lamps require no burn in (leaving the fixtures on for a period of time) before dimming and can contribute to Leadership in Energy and Environmental Design for Existing Buildings (LEED-EB) certification. The contract also includes a recycle program to collect the end of life lamps and disposed of in an environmentally preferred manner.

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State of Vermont Case Study

Volume 1, Issue 3
2009

State Resource Management Revolving Fund

BENEFITS

- Low interest funding mechanism for energy improvement projects
- Available to all Vermont state agencies
- Small projects can be bundled together in one application
- Payment schedules can be negotiated
- Energy efficiency utility provides assistance in calculations

APPLICATIONS

Any energy improvement project within state government that shows a reasonable payback and savings in state utility costs is eligible to apply. Common uses are to fund motor or drive upgrades, lighting upgrades, or heating system renovations. If the project will result in savings on electrical or heating bills, it is worthwhile to calculate the payback to see if the project is a worthy candidate.

Additional Information:

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Agency of Transportation
Statewide Garage Lighting Fixture Replacement

Summary

The Vermont Agency of Transportation (AOT) has been improving the energy efficiency of its buildings for several years. In order to address much needed and budget consuming roof and heating system replacements *and* undertake an important efficiency efforts project, AOT contacted the Department of Buildings and General Services (BGS) for help. BGS directed AOT to the State Resource Management Revolving Fund (SRMRF, pronounced *'smurf'*). AOT applied for and received funding for a statewide garage lighting fixture replacement project. Out of 66 garages, 51 still had old T12 fixtures in need of replacement. The project met the minimum total cost of $5,000. The payback was reasonable for the project type, and, as the entity responsible for the utility bill, AOT was an appropriate applicant. AOT was able to calculate the estimated savings and payback, and the Commissioner of BGS readily approved the project.

Results

AOT consulted with the energy efficiency utility to identify the older-technology fixtures. Garage personnel were included in discussions on what replacement fixtures and lighting controls would be most suitable. The energy savings are estimated to be 110,000 kilowatt-hours per year, avoiding nearly 70 tons of CO_2 emissions. The investment payback is approximately eight years during which AOT will repay the SRMRF with the savings from reduced electricity costs. The SRMRF includes an administrative charge of 0.005 (1/2 of one percent) added to the repayment total.

AOT reports that, from beginning to end, the SRMRF process was a success. The work was done with little or no disruption to garage activities. The Agency's energy consumption and costs have been reduced. In addition, lighting levels are improved and easier to control for building occupants.

State of Vermont Case Study

Volume 1, Issue 4
2009

Reuse of Existing Buildings

Bennington Downtown State Office Building Renovation

BENEFITS

- Included in previously established community
- Access to public transportation and services
- Preservation of community architecture
- Reduction of construction waste by reusing all or part of existing structure
- Reduction of environmental impact by reusing land already disturbed by development instead of new development

APPLICATIONS

Any structure in the downtown area that is in good condition structurally could be reused as a state government office space. The use of the building can easily be changed to suit the state government needs.

AWARDS

- *2006 Better Buildings by Design Conference's Honorable Mention for Renovation*

Additional Information:

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Summary

This historic building located in downtown Bennington started out as an auto dealership and garage, built in 1921. In 2001, BGS purchased the building and reused the structure to create the Bennington Downtown State Office Building. A major renovation was designed with efficiency and sustainability in mind. When the building opened for business in 2006, the space had been transformed into a comfortable office atmosphere that uses natural daylight whenever possible. The comfort in the building is the result of efficient lighting, temperature controls, low Volatile Organic Compound (VOC) paint, and a geothermal heating and cooling system. The Bennington Downtown State Office Building is part of the Vermont Arts Council 'Vermont Art in State Buildings' Program which supports and promotes the work of Vermont artists. The artwork on display in the Bennington Downtown State Office Building can be found on the floor in the entryway to the state offices. The Vermont Arts Council has a map that highlights each of the participating buildings with the Bennington Downtown State Office Building as the starting point. The building is currently occupied by a couple of different agencies as well as non-agency groups.

Results

Some of the efficient features that resulted from this project include; more efficient envelope (improved exterior walls, windows, doors and roof), day lighting (use of natural light), geothermal ground source heat pumps (for heating and cooling), water conservation (efficient toilets), lighting controls (occupancy sensors and bi-level switching). The energy efficiency utility provided incentives to help defray the costs. Energy expenditures are about 50% less than estimated by the engineer, which means that annual CO_2 emissions associated with energy use at this building are approximately 100 tons less than expected. This project achieved its goals by providing easy access for the public and an efficient, comfortable environment for occupants.

Appendix B – Complete Text of Vermont Executive Order # 14-03

STATE OF VERMONT
Executive Department
EXECUTIVE ORDER

[Climate Change Action Plan for State Government Buildings and Operations]

WHEREAS, the scientific evidence, reviewed by the U.S. National Academy of Sciences, the Intergovernmental Panel on Climate Change, and an overwhelming majority of the world's climate scientists, indicates greenhouse gases are accumulating in the Earth's atmosphere as a result of human activities; and

WHEREAS, these scientists also contend that the increases in greenhouse gases are causing the global climate to change at a greater rate and magnitude than would otherwise be expected, projecting an increase in globally-averaged surface temperatures of 2.5 to 10.4 degrees Fahrenheit by the end of the century; and

WHEREAS, even small changes in surface temperatures are projected to cause significant changes in our regional climate and Vermont's environment; and

WHEREAS, the United States, with only 5 percent of the world's population produces 20 to 25 percent of all greenhouse gas emissions from human activities and is, therefore, a significant factor affecting the global climate; and

WHEREAS, Vermont, although it plays a small role, contributes to greenhouse gas emissions via car and truck traffic, with Vermonters driving more miles per person than the national average, and the burning of fossil fuels for home heating and power generation; and

WHEREAS, the federal government and numerous private sector businesses in the United States and abroad are discovering that it is a sound business decision, both financially and environmentally, to decrease their greenhouse gas emissions - simultaneously increasing productivity and employment; and

WHEREAS, ambitious energy efficiency and conservation efforts will not only reduce greenhouse gas emissions, but will also reduce a host of other pollutant emissions (including toxic chemicals) associated with fossil fuel combustion for electricity generation and transportation.

NOW, THEREFORE, BE IT RESOLVED THAT I, James H. Douglas, by virtue of the power vested in me as Governor of the State of Vermont, do hereby direct state government agencies and departments to reduce greenhouse gas emissions from state government buildings and operations. Vermont's goal is to reduce emissions by an amount consistent with the recommendations of The Conference of the New England Governors and Eastern Canadian Premiers Climate Change Action Plan. The goals established by the Conference are to reduce region-wide greenhouse gas emissions from the 1990 baseline by: twenty-five percent by 2012; fifty percent by 2028; and, if practicable using reasonable efforts, seventy-five percent by 2050.

To promote these goals I hereby order as follows:
(1) A Climate Neutral Working Group is established to be jointly chaired by the Commissioners of the Department of Environmental Conservation, the Department of Buildings and General Services, and the Department of Public Service, and to include Secretaries, Commissioners, and technical representatives from the Agency of Natural Resources, Department of Public Service, Agency of Administration, Agency of Commerce and Community Development, Agency of Transportation, Department of Buildings and General Services, Vermont Energy Investment Corporation, and other agencies as interested. The working group is tasked with coordinating, documenting, and encouraging efforts to meet Vermont's greenhouse gas emission reduction goals. It will prepare a biennial report documenting efforts to meet the goals, identifying future planned steps and their anticipated impacts, and highlighting any challenges for meeting those goals, as well as opportunities for expediting greenhouse gas emission reductions.

(2) The report shall include the state of the science for responding to climate change, including the status of methods and measures available to meet the goals. In addition, the working group will identify opportunities to share lessons learned with Vermont businesses, other state and provincial governments, and the federal government.

(3) All state government agencies, offices, and departments are hereby directed to: (i) Purchase only energy-consuming devices that meet or exceed the Energy Star® or comparable standards established by the U.S. federal government, and to operate these devices in a manner that maximizes their energy efficiency features. (ii) Purchase vehicles that have the highest available fuel efficiency in each respective vehicle class (e.g., passenger cars, light duty trucks, etc.), pursuant to performance specifications approved by the Climate Neutral Working Group. In setting these performance specifications, the Working Group shall consider vehicles that not only meet high fuel economy standards but that also provide lower total overall emissions of greenhouse gases, criteria pollutants, and hazardous air contaminants. (iii) Develop programs to encourage state employees, through the use of incentives, to use transportation alternatives to a single person in a single motor vehicle for commuting and business travel, including incentives as may be bargained with the collective bargaining units.

(4) The Department of Buildings and General Services shall work with the Climate Neutral Working Group and all state facilities to ensure that every state building reduces its energy consumption to meet the outlined greenhouse gas reductions.

(5) The Department of Buildings and General Services shall investigate cost-effective opportunities to purchase renewable energy to reduce the State of Vermont's reliance on fossil fuels. Renewable energy includes electricity derived from sources such as solar, wind, geothermal, landfill methane gas, or small scale (less than 30 megawatts) hydroelectric projects.

(6) The Climate Neutral Working Group shall prepare a report to the Governor and the General Assembly describing opportunities to initiate a statewide voluntary greenhouse gas emissions registry, and investigate the feasibility of a carbon emissions cap and trading program for the state as a strategy for further reducing region-wide greenhouse gas emissions. The Agency shall identify the effort required to establish sector-specific baselines, develop an emissions tracking protocol, and institute an emissions trading mechanism. It should also recommend greenhouse gas reduction targets and identify activities to help meet those targets.

(7) The Climate Neutral Working Group shall request input from representatives of the business, environmental, forestry and transportation sectors regarding opportunities for the private sector to reduce emissions and conserve energy.

(8) The chairs of the Climate Neutral Working Group shall consult with representatives from the other New England states to establish a broad-based approach to these environmental issues.

Administrative support shall be provided by the Agency of Natural Resources.

This Executive Order shall take effect upon signing and supersedes and replaces Executive Order #11-02 (renumbered Executive Order #10-28) dated August 22, 2002.

This Executive Order shall sunset on July 1, 2020.

Witness my name hereunto subscribed and the Great Seal of the State of Vermont hereunto affixed at Montpelier this 16th day of September, 2003.

James H. Douglas Governor

By the Governor:

Neale F. Lunderville
Secretary of Civil and Military Affairs Executive Order No. 14-03

VERMONT