

**Annual Legislative Proposal Report on
Greenhouse Gas
Emission Reductions**

and

**Biennial Greenhouse Gas Emissions Reduction
Report**

To The Minnesota Legislature

Minn. Stat. 216H.07, subd. 3 and 4

SUBMITTED BY

MINNESOTA DEPARTMENT OF COMMERCE

AND

MINNESOTA POLLUTION CONTROL AGENCY

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INTRODUCTION

This is the third annual report on legislative proposals to achieve greenhouse gas (GHG) emission reductions, and the second biennial GHG emissions reduction progress report. It is co-authored by the Minnesota Department of Commerce Office of Energy Security (OES) and the Minnesota Pollution Control Agency (MPCA). Statutory background for this report is listed in Appendix A.

The State of Minnesota continues to be a leader in renewable energy, renewable fuels, energy efficiency and other energy-related efforts that reduce emissions associated with energy production and use. Minnesota's Next Generation Energy Act of 2007¹ sets targets for energy conservation, renewable energy and GHG emissions. Minnesota legislative action helped spearhead other GHG reduction actions by state and local government agencies, educational institutions, businesses, communities and non-profit organizations throughout the state.

Statewide GHG emissions have declined by 1.2 percent between 2005 and 2008. Continued reductions at this rate may not be sufficient to achieve the state goal and further GHG reduction efforts are beginning to face structural barriers. These barriers must be addressed if reductions to Minnesota's GHG emissions are to continue.

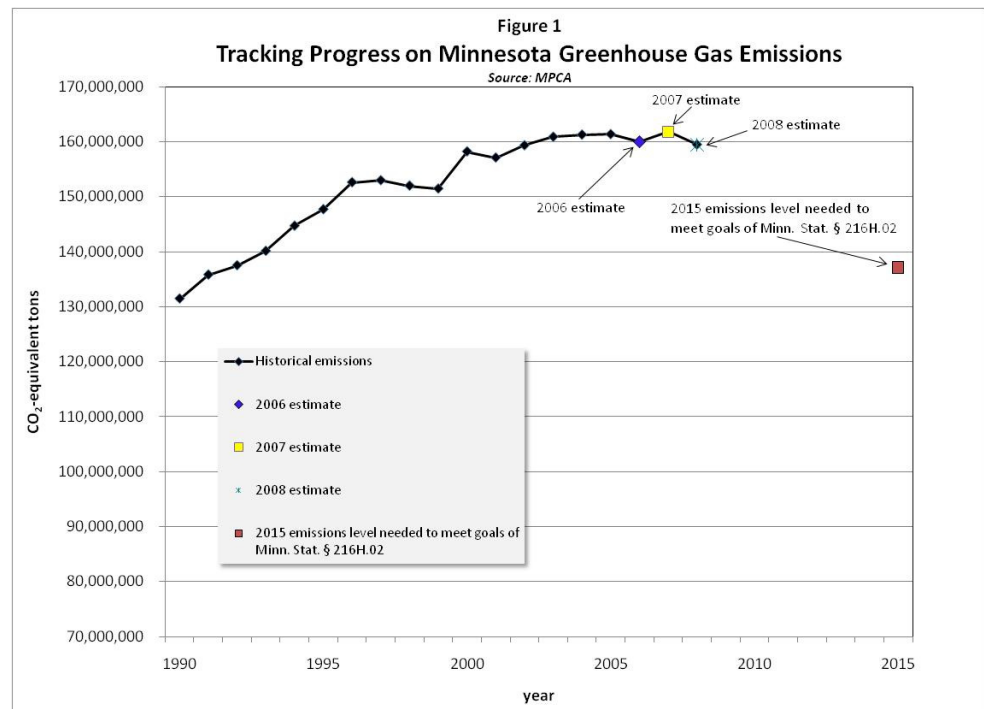
This report will discuss the changing trend line of Minnesota's GHG emissions; provide updates on pertinent programs that impact GHG reductions; identify significant challenges and barrier to achieving greater GHG reductions; and lay out policy initiatives to address barriers.

¹ Laws of 2007, Chapter 136

I. GHG EMISSIONS REPORT

Minnesota's greenhouse gas emissions are lower than 2005 levels and have not increased since the 2009 report.

Between 2005 and 2008², greenhouse gas (GHG) emissions from Minnesota declined by 1.9 million CO₂-equivalent tons, or about 1.2 percent. Emissions in 2008 totaled 159.4 million CO₂-equivalent tons. This is shown below in Figure 1. Also shown in Figure 1 is the historic trend in statewide Minnesota GHG emissions between 1990 and 2008. The Next Generation Energy Act of 2007³ established a 15 percent reduction goal for 2015. Based on Figure 1, while emissions are down, the state may need to increase its efforts to reduce GHG emissions to reach the first target in 2015 of a 15 percent reduction.



The methods used to develop these emissions estimates were discussed in the first Biennial Progress Report to the Legislature. As in 2009, the accompanying technical appendix to this report provides a more detailed discussion. With a few important exceptions, the methods used to develop the emission estimates, shown graphically in Figure 1, are unchanged from the 2009 report. The methodological changes made since the last report were made to better reflect total emissions. To assure consistency, these

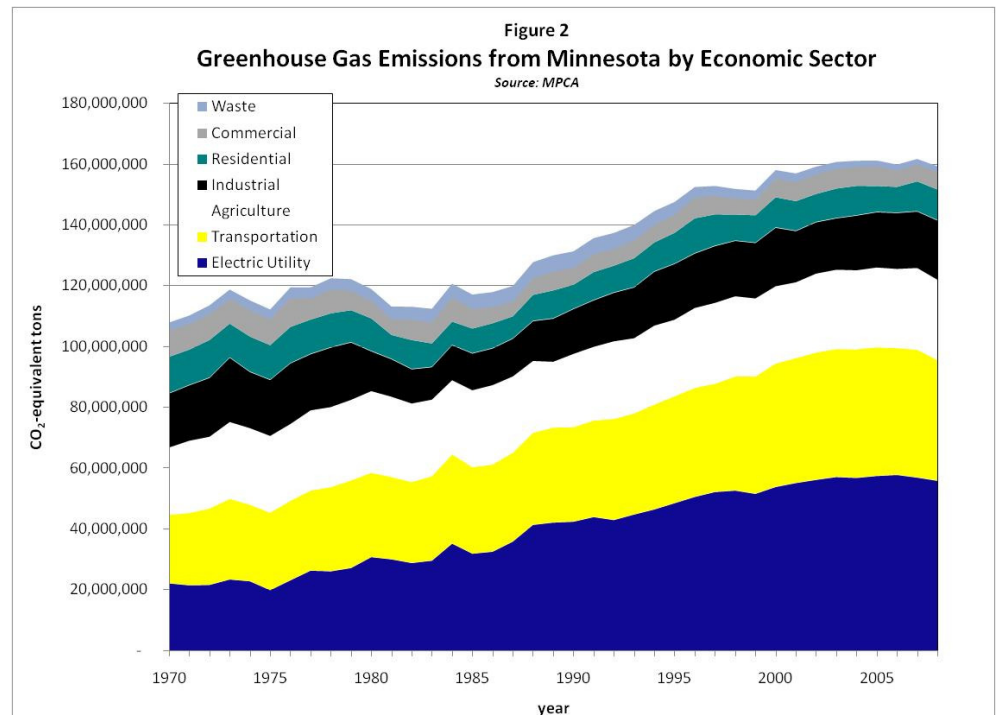
² Current data reporting and analysis procedures result in about a two year lag in tabulation of calendar year emissions.

³ MN Laws 2007, Ch. 136

changes were applied to all inventory years stretching back to 1970, including the baseline year of 2005 and the most recent inventory years, 2007 and 2008.

The aggregate emissions level for all years in the trend shown in Figure 1 is higher than was estimated in 2009. Estimated emissions for 2005, the baseline year, are 4 percent higher than was estimated in the 2009 Biennial Report. The 2009 Biennial Report did not estimate emissions for all possible sources, as was discussed in the technical appendix to that report. A number of new emission sources that were not treated in 2009 are included in the estimates shown in Figure 1. Changes to the array of emission factors used to develop the estimates shown in Figure 1 also contributed to the shift. These changes were made to better reflect the state of the scientific literature on GHG emission rates from fuel combustion and other activities.

Figure 2 shows the 38-year trend in emissions by economic sector. The electric power sector and transportation sectors account for about 60 percent of emissions from Minnesota. The long-term trend has generally indicated increasing emissions.



Between 2005 and 2008, emissions of GHGs from the electric power sector declined by 1.6 million CO₂-equivalent tons, while those from transportation declined by 2.6 million CO₂-equivalent tons. This was offset

by a 1.5 million CO₂-equivalent ton increase in residential sector emissions and a 0.6 million CO₂-equivalent ton increase from the industrial sector. About two-thirds of the increase in residential sector emissions between 2005 and 2008 was the result of decreased carbon storage in the structural parts of new housing as a result of the housing decline. As discussed in the 2009 Biennial Report, biogenic carbon that is stored for very long periods of time in the structural parts of housing is treated as an emission offset in the MPCA GHG accounting framework.

Between 2005 and 2008, electric power sector emissions declined, principally as a result of decreased reliance on coal as a power generation source. Roughly 3.1 million fewer megawatt-hours were generated from coal in 2008 compared to 2005, nearly all offset by a parallel 2.8 million MWH increase in wind power generation.

GHG emissions from transportation declined between 2005 and 2008, principally as a result of an increase in the fuel economy of the Minnesota light-duty vehicle fleet, a leveling of the trend in total vehicle miles traveled on Minnesota roadways, and the effects of the recession on air travel. Between 2005 and 2008, emissions from aviation declined by about 0.9 million CO₂-equivalent tons, those from highway vehicles by 2.1 million CO₂-equivalent tons. This decline in transport-related emissions appears to have resulted from high 2008 fuel prices and the onset of the recession in January 2008.

The emission reduction observed between 2005 and 2008 is broken out by economic sector in Table 1.

Table 1
Emissions Change by Sector

Source: MPCA

Economic Sector	Emissions Change, 2005-2008 (million CO₂-equivalent tons)	Principal Source of Change
Electric power generation	-1.6	Reduced reliance on coal
Transportation	-2.6	Increased light-duty fuel economy, aviation down-turn
Industry	+1.3	Energy use in ethanol, food processing, and pulp and paper
Commercial sector	-0.6	Reduced natural gas usage
Residential sector	+1.5	Collapse of new home construction, cooler than normal winter and spring, average fall
Agriculture	+0.2	Larger livestock herd
Waste management	-0.1	Reduced landfill emission

II. PROGRESS ON MAJOR PROGRAMS AND ACTIVITIES

Minnesota utilities are on track to meet the state's Renewable Energy milestone targets.

A. RENEWABLE ENERGY STANDARD

Minn. Stat. § 216B.1691, commonly referred to as Minnesota's Renewable Energy Standard (RES), requires that electric utilities have at least 25 percent of their total retail sales from renewable energy sources by 2025. The RES also sets milestones at intervals along the time line for the portion of renewable electricity that a utility must have in its mix to meet its Minnesota sales. To certify renewable energy that counts toward the milestones and goal, Minnesota utilities are required to file annual renewable energy reports in the Midwest Renewable Energy Tracking System (M-RETS). Utilities have up to four years following the year of generation to file in MRETS, creating a potential time lag for milestone assessment.

In 2009 utilities were required to provide one percent of their Minnesota retail electricity sales from renewable sources. Minnesota electric providers met this 2009 milestone, reporting 60,809,925 MWhs of total

generation sales, with 608,111 MWhs, or about 1 percent, certified as renewable energy. Of the total certified renewable energy in 2009, 71 percent came from wind generation, 16 percent from hydroelectric generation, and 13 percent from biomass generation.

The milestone targets for renewable energy increased in 2010, with Xcel Energy's renewable requirement set as 15 percent of its Minnesota sales, while other Minnesota electricity suppliers have a 7 percent requirement. Current MRETS data for 2010 indicate that Minnesota electric utilities are on track to meet their 2010 renewable energy requirements.

Conservation Improvement Program first year savings are over 649 GWh of electricity and 1.8 million MCF of natural gas, avoiding over 702 thousand tons of GHG emissions.

B. CONSERVATION IMPROVEMENT PROGRAM

The Minnesota Conservation Improvement Program (CIP) requires Minnesota natural gas and electric utilities to spend a portion of their revenues in energy efficiency and conservation programs. These programs are intended to provide incentives to consumers and businesses for saving energy through the purchase of energy efficient equipment and/or changing behaviors related to energy consumption. Typical conservation improvement incentives and services include furnace rebates, lighting rebates, and building design assistance. Utility CIPs are funded through surcharges added to the electric and natural gas rates charged to utility customers. OES provides regulatory oversight over the use of CIP funds and strives to ensure that the electricity and natural gas savings reported through CIP are accurate and that programs are operated cost effectively. OES employs a variety of methods and tools to review the plans and has authority to modify program goals or savings assumptions.

Energy efficiency and conservation are a critical part of Minnesota's efforts to meet its residents' energy needs and reduce GHG emissions. As shown in Table 2, Minnesota's utilities achieved approximately 649 GWh of electricity and 1.8 million MCF of natural gas in total first-year savings from new CIP participants in 2009, resulting in approximately 702,016 tons of avoided GHG emissions.⁴

⁴ At this time, OES tracks only incremental savings achieved through CIP, equivalent to the first-year savings of new participants in CIP programs, rather than cumulative savings. This is consistent with the 1.5 percent energy conservation goal as defined in Minnesota statutes.

Table 2
Electric and Gas CIP Incremental Savings, 2006-2009⁵

Source: OES

Year	Electric Savings (kWh)	CO ₂ Savings (tons)	Natural Gas Savings (MCF)	CO ₂ Savings (tons)
2006	411,998,552	360,499	2,095,047	126,750
2007	463,542,698	405,600	1,917,144	115,987
2008	600,178,882	547,270	1,572,734	95,150
2009	649,378,980	592,133	1,816,252	109,883

The savings levels reported above for 2006 through 2009 represent utility activities prior to the new energy conservation goal of 1.5 percent of average annual retail sales. This new goal was established in the Next Generation Energy Act (NGEA) of 2007 (Laws of 2007, Chapter 136) and took effect in 2010 for both electric and natural gas utilities. Before 2010, utilities had to meet a minimum program spending level as specified in statute (1.5 percent or 2 percent of annual gross operating revenue for electric utilities⁶, and 0.5 percent of annual gross operating revenue for gas utilities). Although the spending requirements remain in place, the establishment of the 1.5 percent energy conservation goal has placed greater importance on energy savings achievements. The CIP savings goal is an integral part of any effort to reduce statewide CO₂ emissions.

Meeting the 1.5 percent energy conservation goal of the NGEA will require a significant increase in program activity over previous levels. Utilities are using expanded marketing efforts and higher rebates, as well as targeted marketing campaigns and upstream incentives, to encourage greater program participation. The OES also supports efforts to pilot new methods for achieving cost-effective, measurable energy savings. These include programs that encourage consumers and businesses to save energy through behavioral and operational changes, community-wide energy conservation campaigns, and infrastructure improvement projects which increase the efficiency of electricity generation, transmission, and distribution.

In this spirit of innovation, the OES initiated the 1.5 Percent Energy Efficiency Solutions Project in 2010 in partnership with the Minnesota Environmental Initiative. This process used stakeholder groups to

⁵ The 2008 and 2009 figures are preliminary as the cooperative and municipal utility reported savings had not yet been reviewed by OES at the time of this report.

⁶ As an owner of nuclear generation plants, Xcel Energy's electric utility is subject to the 2 percent minimum spending requirement.

brainstorm new solutions to overcome barriers to producing and measuring increased levels of energy savings. The recommendations from this process are expected to inform efforts by the OES to establish guidelines for expanded program opportunities under CIP. In addition, OES continues to administer the Conservation Applied Research and Development (CARD) Fund established by the NGEA, which seeks to accelerate the deployment of energy efficient technologies and programs. Highlights of CARD-funded projects include the use of plug-load devices in Minnesota homes, commercial and institutional operations and maintenance program pilots, residential behavioral program pilots, an investigation of plug-load energy consumption in Minnesota homes, and a field study of tankless gas water heaters.

ARRA energy dollars have financed hundreds of projects that have saved energy and reduced GHG emissions.

C. AMERICAN RECOVERY AND REINVESTMENT ACT

Stimulus-funded Energy Programs in Minnesota - Overview

On February 17, 2009, President Obama signed into law the American Recovery and Reinvestment Act (ARRA). In May 2009, the Minnesota Legislature passed and Governor Pawlenty signed legislation⁷ that designated Minnesota’s share of the ARRA energy dollars into various programs. OES and several other agencies are managing stimulus-funded programs with energy and environmental benefits. Federal stimulus allocations for energy and environment related programs in Minnesota are shown in Table 3.

**Table 3
ARRA Allocations for OES**

Source: OES

Program Category	Amount (millions)
Weatherization Assistance Program	\$131.91
Sustainable Energy Resources for Consumers	\$ 6.16
State Energy Program	\$ 54.17
Competitive Energy Efficiency and Conservation Block Grants	\$ 10.64
Appliance Rebate Program	\$ 5.09
Clean Diesel Grants	\$ 1.57

The main goals of these programs are to save energy, reduce environmental pollution, and create jobs. Highlights from the ARRA-funded programs include:

⁷ Chapter 138 (S.F. 657)

Energy Efficiency and Conservation Block Grant (EECBG). EECBG is a competitive grant intended to enhance energy efficiency, create and retain jobs, and reduce emissions of greenhouse gases. In spring 2010, 92 cities and counties were awarded funds totaling approximately \$5.5 million. The grants include 82 direct energy savings projects. The remaining grants are for indirect energy saving programs (such as revolving loans and energy efficiency studies). The direct energy saving projects will save an estimated 69,812.70 mmBtu. This translates to an annual reduction of 8,683 tons of GHG emissions, the equivalent of taking 1,400 passenger vehicles off the road.⁸ Table 4 breaks down the GHG reductions by the fuel saved.

Currently, 70 projects are scheduled to be completed by March 31st, 2011; approximately \$4.32 million will be spent. To date about 15 projects have been completed or are near completion and \$1,093,623 has been paid to the grantees.

Table 4
Greenhouse Gas Reduction by Fuel Saved
(EECBG)

Source: OES

	Electricity	Natural Gas	Totals
Energy Savings	22,076 mmBtu (6.47 million kWh)	47,740 mmBtu (477,400 therms)	69,813 mmBtu
GHG Reduction	5,888 Tons	2,795 Tons	8,683 Tons

Facility Cost-share

The Facility Cost-Share grant awarded \$4.7 million to 83 Minnesota school districts, cities, and counties. The grant program required recipients to share costs of 50 percent or more for energy efficiency improvements to existing local government buildings and facilities, resulting in \$4.8 million in leveraged funds. This program is anticipated to save more than 72,000 mmBtu of energy and will result in a reduction of 8,400 tons of GHG emissions. Table 5 summarizes energy and GHG reductions by fuel saved.

⁸ www.epa.gov

Table 5
Greenhouse Gas Reduction by Fuel Saved
(Facility Cost Share)

Source: OES

	Electricity	Natural Gas	Totals
Energy Savings	20,028 mmBtu (5.87 million kWh)	52,231 mmBtu (522,310 therms)	72,259 mmBtu
GHG Reduction	5,342 Tons	3,058 Tons	8,400 Tons

Weatherization Assistance Program

Minnesota’s Weatherization Assistance Program (WAP) provides energy auditing and conservation services to low-income families each year, reducing both the state’s energy dependency and GHG emissions from low-income residences. Using federal ARRA stimulus funds, WAP should weatherize over 17,000 homes statewide.

As of December 5, 2010, Minnesota was listed as one of the top ten states in the nation with 11,200 houses weatherized using ARRA funds, with another 3,700 houses in progress.

Minnesota recently received approximately \$6.16 million under the U.S. Department of Energy’s Sustainable Energy Resources for Consumers Grant (SERC). These funds will be distributed to nine WAP Service Providers for innovative measures using methods not yet approved for use by Weatherization programs. Equipment included in the Minnesota grant are solar air heating systems, high performance hot water heater systems, on-demand hot water systems for mobile homes, and high performance space conditioning system retrofits. SERC funds must be expended by March 31, 2012. If these systems prove effective, DOE may consider approving them for WAP nationally.

State Energy Program

The State Energy Program (SEP) allows states to design and implement energy efficiency and renewable energy programs. Select ARRA SEP programs for Minnesota are highlighted below:

Energy Saver Rebate Program - Minnesota Housing Finance Agency (MHFA).

This program provided rebates for energy efficiency improvements to homeowners who also received a MHFA Fix-Up Fund loan. Rebates were for installation of high efficiency furnaces, boilers, central air conditioners, water heaters, lighting fixtures, exterior doors and windows, attic air sealing, and wall and attic insulation. A total of \$7.7

million in ARRA grant funds has been committed to the program.

Over 2,230 Minnesota households have committed to or received \$24.7 million in Fix-Up Fund loans to date. The average rebate value is \$3,200, while the average value of energy efficiency improvements through the Fix-Up Fund is \$11,100. An estimated annual energy savings of 40,200 mmBtus should be achieved.

Project Re-Energize - Builders Association Of Minnesota

This program provided rebates for energy efficiency home improvements, including the installation of high efficiency windows, attic air sealing, wall and attic insulation, and orphaned water heaters. ARRA grant funds of \$3 million were committed to the program.

Over 1,185 households received rebates, with an average rebate of around \$2,200. In total, \$18 million in home improvements were made, realizing an estimated annual energy savings of 30,400 mmBtus.

Commercial, Industrial, & Non Profit – Energy Efficiency Projects & Programs

This program provides grants and establishes revolving loan programs for cost effective energy efficiency improvements to commercial, industrial, and non-profit facilities.

Grants provide for energy efficiency improvements including commissioning, system controls, lighting efficiency upgrades, HVAC system modifications, envelope improvements, and motor and pump efficiency improvements.

Forty-one direct improvement projects valued at \$4.96 million were selected for competitive grant awards. Three revolving loan programs valued at \$1.07 million were selected for competitive grant awards. Grant awards vary up to \$500,000 with the average award being \$137,000. Annual energy savings are estimated to be 463,000 mmBtus.

Trillion Btu Program – St. Paul Port Authority

This program provided a \$5 million grant to the St. Paul Port Authority to establish a revolving loan program for cost effective energy efficiency improvements at commercial, industrial, and non-profit facilities.

The grant provides loan funds for energy efficiency improvements including commissioning, system control improvements, lighting efficiency upgrades, HVAC system modifications, exterior envelope

improvements, motor and pump efficiency improvements, process heat improvements, and other pre-approved energy efficiency improvements.

The range of loan value permitted by the program is from \$10,000 to \$1 million. Twelve loans have been approved to date, with an estimated annual energy savings of 46,050 mmBtus.

State Public Building Enhanced Energy Efficiency Program (PBEEEP)

Federal ARRA funds were provided to the Minnesota Department of Administration to support energy efficiency work in state buildings. As of November 9, 2010, 649 buildings, comprising over 24 million square feet, were enrolled in the program.

Solar, Small Wind, Ground Source Heat Pump.

The Federal ARRA-funded solar rebate programs were opened early in 2009. The programs include residential and small business applications for the following technology types:

- Minnesota Solar Electric Rebate Program
- Minnesota Solar Hot Water Rebate Program
- Minnesota Solar Air Heat Rebate Program

OES received 329 applications to the Solar Electric Rebate Program. Funding was reserved for 266 projects, totaling \$2.6 million and resulting in an expected 1.5 MW of additional photovoltaic (PV) capacity in the state. This more than doubles known PV capacity in the state, and will result in an expected energy production of 1,800 megawatt-hours annually. The program was fully reserved as of April 2010.

OES received and approved six solar air heat applications and 54 solar hot water applications as of December 13, 2010. Over \$178,000 has been reserved to fund these projects (of which \$26,307 has been paid to the 16 projects completed to date). Expected annual energy production from solar thermal is 13,510 therms or 400 megawatt-hours equivalent. Approximately \$250,000 of funding remains.

In addition, in 2010 the OES opened rebate programs for small wind systems and ground source heating systems using ARRA funds. Status of the programs are shown in Table 6 and Table 7.

Table 6
Ground Source Heating System Rebates

Source: OES

	Status
Applications received	260 (1,291.5 Tons of capacity)
Confirmations sent	185 (856 Tons of capacity)
Dollar amount reserved	\$1,435,131
Rebates paid	110
Dollar amount paid	\$865,543
Total available	\$1,465,000

Table 7
Small Wind System Rebates

Source: OES

	Status
Applications received	39 29 residential, 10 commercial: 777.8 kW capacity 1,922,873 kWh est. annual production
Confirmations sent	35 27 residential, 8 commercial: 689.8 kW capacity 1,636,954 kWh est. annual production
Dollar amount reserved	\$464,399
Rebates paid	8
Dollar amount paid	\$79,894
Total available	\$500,000

State Energy Efficient Appliance Rebate Program

The State Energy Efficient Appliance Rebate Program provided \$296 million in ARRA funds nationwide to implement Section 124 of the Energy Policy Act of 2005, establishing DOE support to states for rebates for residential ENERGY STAR® appliance products. Minnesota received approximately \$5 million in formula-based funding to establish or supplement established ENERGY STAR appliance rebate programs. Minnesota’s program was launched on March 1, 2010 and rebates were offered on four appliance categories.

The initial program provided 20,096 rebates; this was followed by a smaller second phase program to provide an opportunity to residents that were unable to participate when the program was originally launched. To date the program has administered 23,795 rebates across all appliance categories, and verified the recycling of 8,561 refrigerators and freezers. The total numbers across all categories are shown in Table 8.

Table 8
Energy Efficient Appliance Rebates

Source: OES

	Total Rebates	Recycled Appliances
Refrigerators	9,089	7,667
Freezers	1,021	894
Clothes Washer	7,323	-
Dishwasher	6,362	-
Totals	23,795	8,561

Total first year energy savings for the program is estimated to be 8,957,732 kWh and 43,685 therms. Total lifetime energy savings for the program is estimated to be 75,055,998 kWh and 472,074 therms.

Clean Diesel Grants. The MPCA received \$1.57 million in ARRA funding for clean diesel grants; these grants are discussed in Section H below.

Minnesota is adapting to the impacts of climate change.

D. ADAPTATION

A changing climate has the potential to cause disruptions in ecological, economic and social systems. Adapting to changes in climate includes developing strategies, initiatives, and measures to help natural and human systems thrive as our climate changes. Adapting effectively can limit damage, reduce costs, and ease the transition to a changing regional climate. It makes sense to plan ahead to be better prepared to deal with the result of those changes.

In July, 2009, an Interagency Climate Adaptation Team (ICAT) began to explore the potential effects of climate change in Minnesota and develop an adaptation plan for the state. The ICAT includes representatives from the Office of Energy Security, the Departments of Agriculture, Health, Natural Resources, Public Safety (Division of Homeland Security and Emergency Management), Transportation, and the Minnesota Pollution Control Agency. It is important to note that the ICAT efforts are focused solely on adapting to the effects of a changing climate in Minnesota. Also note that the ICAT is not considering why the climate is changing, only how

to adapt to a changing climate.

The ICAT issued a report of its efforts in 2010. This report—the first work product of the team—is a preliminary assessment of how climate change may affect Minnesota. It provides a framework for future planning, investigation, and action.

The ICAT will continue to coordinate activities among state departments and will collaborate with the University of Minnesota Climate Adaptation Working Group on climate adaptation research priorities. The ICAT will also begin developing a long-term strategic plan including goals and objectives. As that planning effort proceeds, the team has identified key priorities for the next year:

- Existing regional climate change forecasts are imprecise and efforts should be made to improve their accuracy and resolution.
- Current efforts to coordinate and expand the collection of benchmark environmental data should be leveraged to build a climate monitoring infrastructure capable of detecting climate change impacts and informing appropriate management and policy responses.
- Initial review of potential risks suggests increased spring flooding and flash flooding are of most concern in the near-term. Refined assessment of flooding potential should be a priority.

Managing our lands to increase the amount of CO₂ captured from the atmosphere can help offset the state's GHG emissions.

E. BIOMASS AND BIOLOGICAL CARBON SEQUESTRATION

Plants remove CO₂ from the atmosphere by photosynthesis and store it in above- and below ground biomass. Biological carbon sequestration, the uptake and storage of carbon in plants and soils, can be enhanced by land management practices and may help offset GHG emissions within the state. The Interagency Terrestrial Carbon Sequestration Team (ITCS) includes the Minnesota Departments of Natural Resources, Transportation, Agriculture, and Commerce, the Minnesota Pollution Control Agency, and the Board of Soil and Water Resources. The team is identifying opportunities for increasing carbon sequestration. The team and member agencies will continue to support research that identifies land management practices on northern landscapes to increase carbon sequestration and invest in land management practices and programs that contribute to carbon sequestration, including the following:

- Improving forest health and productivity—including enhanced silviculture and minimizing the impacts of forest pests,

particularly the Emerald Ash Borer.

- Reducing the loss of carbon sequestration potential due to forest fragmentation and conversion to other land uses.
- Protecting and restoring native plant communities, including climate adaptation strategies to make plant communities more resistant and resilient to climate change.

The ITCS Team and member agencies will also continue to refine and enhance the ability to manage carbon through:

- Pilot projects to test and demonstrate practices and accounting protocols (e.g., Manitou Demonstration Forest).
- Refining the carbon accounting protocols in development by the Midwest Governors' Climate Accord Offset Committee and the North American Forest Carbon Standards Committee.
- Evaluating and implementing methods to monitor changes in landscapes and carbon stocks.
- A priority project is a recommendation to the Legislative-Citizen Commission on Minnesota Resources (LCCMR) carbon and methane monitoring project in the Red Lake peatlands, building on the scientific capacity of the University of Minnesota's Department of Geology and Geophysics' Red Lake Peatland Observatory.

State agencies, colleges, and universities are leading the way in saving energy, reducing fuel consumption, recycling and conserving resources, and promoting innovative, cost-saving practices.

F. AGENCY SUSTAINABILITY PLANS

Leading by Example: Nearly half of Minnesota State agencies and the Minnesota State Colleges and Universities (MnSCU) developed new sustainability plans in 2010 incorporating existing environmental Executive Orders, current statutory requirements for state agencies, and additional strategies to reduce energy use, pollution and GHG emissions. Examples of strategies⁹ include:

- Installation of energy management systems/energy efficient lighting in state buildings;
- Shipping purchases in bulk packs;
- Reducing fuel consumption through staff business carpooling and use of efficient vehicles;
- Reducing waste generation (e.g. paper and plastic water bottles); and
- Increased recycling of materials.

⁹ More can be found at www.pca.state.mn.us by following the link to this section: [State Agency Sustainability Action Plans](#).

Energy conservation activities in the 17 buildings that comprise the Capitol Complex resulted in a reduction of 4,408 tons of CO₂, and recycling from state agencies in the metro area resulted in the reduction of another 28,145 tons of CO₂ over landfilling the materials. Three state agencies also voluntarily report “Scope 1” and “Scope 2” emissions¹⁰ to The Climate Registry (MPCA, Metropolitan Council and Department of Natural Resources). MPCA has reduced by 7 percent the amount of greenhouse gas emissions in energy and fleet fuel use reported to The Climate Registry in 2009 from its 2008 baseline.

Metropolitan Council. Metro Transit currently operates 97 hybrid buses and Metro Mobility operates 24 electric/hybrid buses in each of their fleets. The hybrid buses achieve about 20 to 25 percent better fuel economy than the buses they replaced. Metro Transit also continues to reduce fleet emissions and fuel costs by replacing buses at the end of their service life with new buses equipped with the latest clean diesel technology. In 2010, Metro Transit upgraded to a digital building automation system for the heating, ventilation, and air conditioning systems at Fred T. Heywood Office and Garage and MJ Ruter Garage. Comparing November 2009 to November 2010 natural gas usage, FT Heywood saw a 65% decrease and MJ Ruter saw a 40% decrease. Metro Transit also completed major lighting retrofits in 2010 at the following facilities: East Metro Garage, Nicollet Garage, Metro Transit Police Headquarters, Rail Operations and Maintenance Facility. These lighting retrofits will reduce electrical consumption over 1.6 million kWh annually.

Metropolitan Council Environmental Services has completed a number of projects to reduce energy use and GHG emissions, including recommissioning buildings, lighting retrofits, and replacing fleet vehicles. These efforts save an estimated annual \$1.6 million in energy costs.

A public-private stakeholder group has made recommendations for legislative and policy changes to decrease GHG emissions in the waste sector.

G. WASTE MANAGEMENT STAKEHOLDER PROCESS

The MPCA formed the Integrated Solid Waste Management Stakeholder Work Group to focus on reducing waste and increasing recycling and organics diversion in order to have a positive impact on energy conservation and GHG emissions. The stakeholder group’s recommendations were considered in the MPCA 2009 Solid Waste Policy Report to the Legislature.¹¹

¹⁰ Scope 1 emissions include all direct emissions from a facility, including anthropogenic sources and biomass combustion; Scope 2 emissions include indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, or cooling.

¹¹ The report can be found at: <http://www.pca.state.mn.us/index.php/about-mpca/legislative-issues/legislative-reports/legislative-reports.html>

The primary conclusion of the policy report is that fundamental structural problems prevent Minnesota from being able to significantly reduce GHG emissions in the waste sector. Perhaps the single largest problem involves the solid waste governance system and the lack of clear responsibility, absence of viable tools (laws and financial resources) and accountability for results. Several of the recommendations would require new legislative initiatives to attain state energy and climate change goals.

In 2010 the MPCA also redeployed solid waste resources to further focus on GHG emission reductions in the Duluth, Saint Cloud, and Rochester watersheds. Another unit was redesigned to focus on the Twin Cities watershed. GHG emissions have decreased by 2.7 million tons in these watersheds since 2005. The primary cause of the reduction is less waste generation—likely related to the economic recession.

New federal regulations for permitting and reporting GHG emissions start in January 2011.

H. CLEAN AIR ACT REGULATORY UPDATE AND CLEAN DIESEL PROGRAM

Clean Air Act Regulatory Update – GHG Emissions Reporting and the Tailoring Rule.

Starting in 2011, the U.S. Environmental Protection Agency (EPA) will require facilities that emit more than 25,000 tons of CO₂-equivalent (CO₂-e) emissions per year to report their GHG emissions. Companies that supply transportation fuels and natural gas will also be reporting. Also starting in 2011, EPA will require certain new or expanding facilities to receive permits for GHG emissions.

In order to minimize the number of facilities in Minnesota that will be subject to this regulation, the MPCA is promulgating rules to align state permitting thresholds for GHG emissions with the new federal thresholds.

Minnesota's nationally-recognized clean diesel program has reduced children's exposure to school bus diesel emissions and helped small business owners save on fuel costs.

MPCA Clean Diesel Program.

The MPCA Clean Diesel Program works in partnership with Project Green Fleet to reduce heavy duty diesel vehicle emissions, which include particulate matter, nitrogen oxides, and carbon dioxide, through state and federal funding to purchase pollution reducing technology, idle reduction devices, or replace engines and exhaust systems.

- The state grant program focuses on retrofitting school buses with emission reduction equipment and so far has retrofitted 1,800 school buses across Minnesota.
- About 145 idle reduction devices will be installed on long haul trucks with the Federal stimulus (ARRA) grant. These units will achieve annual savings of an estimated 143,200 to 264,800 gallons of fuel and reduce GHG emissions by 1,600 to 2,500 tons.

- A second federal grant (Congestion Mitigation Air Quality) focuses on reducing emissions from public heavy duty vehicles in the Twin Cities metro area—including snowplows, dump trucks, and fire trucks. By the end of 2010 we will have retrofitted 400 trucks.
- MPCA also offers loans for idle reduction devices on long haul trucks through its Small Business program using state small business funding and federal Diesel Emission Reduction Act (DERA) grant-funded loans. Over the past several years, this program has issued 74 loans for 118 idle reduction units. (69 loans for 111 auxiliary power units/heaters (APUs) through state revolving loan funds; 5 loans for 7 APUs using federal DERA dollars). These devices reduce GHG emissions by an estimated 2.4 million to 3.8 million pounds each year.

The state promotes energy independence by requiring the blending of biodiesel and ethanol in our fuel.

I. AGRICULTURAL BIOFUELS AND LOW CARBON FUELS

BIODIESEL CONTENT MANDATE. Minnesota Statute¹² requires that all biodiesel fuel sold or offered for sale in MN for use in internal combustion engines contain the specific percentages of biodiesel fuel oil by volume are shown in Table 8.

Table 8
Biodiesel Content

Source: MN Statute

Date	Percentage
May 1, 2009	5 %
May 1, 2012	10 %
May 1, 2015	20 %

Status. Due to industry concerns about cold weather problems related to #1 diesel/biodiesel blends, the 5 percent biodiesel blend (B5) requirement was suspended for #1 diesel fuel in 2009 and that suspension was extended—for the months of October, November, December, January, February, and March—until March 31, 2012. Minnesota’s Biodiesel Task Force, a public and private sector stakeholder group, continues the review of cold weather properties and other issues that pose barriers to attaining the state’s higher blend goals.¹³

¹² 2009 Minnesota Statute, 239.77 Biodiesel Content Mandate

¹³ <http://www.mda.state.mn.us/en/renewable/biodiesel/biodieselforce.aspx>

With the addition of a 3 million gallon biodiesel production facility in Isanti, Minnesota, the state's annual production capacity stands at 66 million gallons. The SoyMor plant in Glenville has been shut down for an extended period of time for upgrading to a multi-feedstock facility. In general, biodiesel production has declined due to combination of high market price of soy oil and the loss of the federal biodiesel tax credit which expired on December 31, 2009.

OXYGENATED GASOLINE. Minnesota Statute¹⁴ required that by August 30, 2013, all gasoline sold or offered for sale in Minnesota must contain at least 20 percent denatured ethanol by volume. In the 2009 Session, this statute was changed to peg Minnesota's level of ethanol to the level that EPA certifies for use in vehicles (beyond 10 percent). The 2010 legislature clarified that this requirement was to take effect only for ethanol blending levels approved by EPA for *all* vehicle years.¹⁵

EPA efforts have focused on evaluating environmental performance of a 15 percent ethanol blend standard (E15) in gasoline fueled vehicles. On October 13, 2010, EPA granted a partial waiver to the clean air act that allows fuel and fuel additive manufacturers to introduce gasoline that contains greater than 10 percent ethanol (and up to 15 percent ethanol) for use in 2007 and newer motor vehicles, if other conditions are fulfilled. Pending additional test results, EPA may issue a second decision concerning 2001 and newer vehicles by the end of 2010, and anticipates a decision on vehicles older than 2001 in the spring of 2011.

Status. State Blending Goals. In 2010, the state's production capacity was 1.1 billion gallons of ethanol. Actual production may be one billion gallons or less because of temporary plant closings and fluctuating margins created by volatile commodity prices. Combined gallons of ethanol in the state's E10 and E85 sales are estimated at 250 million gallons or about 10 percent of the 2.5 billion gallons of gasoline sold annually.

About 15 percent of Minnesota private vehicles were built in 2007 or later years, a market size that is probably too small to warrant blending costs to fit the current EPA E15 waiver. If the EPA approves a percentage between E10 and E15 for use in 2001 and newer vehicles, the market segment increases to about 50 percent of the private vehicles in Minnesota. Although state legislation does not require adoption of E15 in Minnesota until EPA certifies its use for all vehicle model years, a market size entailing half of Minnesota vehicles may provide an opportunity large enough to

¹⁴ 2005 Regular Session Minn. Stat. §239.791 Subd. 1a.

¹⁵ Laws of Minnesota for 2010, Ch. 333, §19, subd. 2a.

attract blenders and ethanol distributor support. If EPA approves use of E15 for all vehicles built in 2001 or later, approximately 180 million gallons of the state's current 1.1 billion gallon/year production capacity could be used in Minnesota vehicles and conservatively represents a 2.5 percent reduction in GHG emissions for use of gasoline transportation fuel in the state.

Minnesota E85: Minnesota Clean Cities program, coordinated by Minnesota's Clean Air Choice team, is one of the most successful programs promoting use of E85 in the nation. It is responsible for the growth in number of E85 fueling stations and use of E85 as a fuel in the state. In the early part of the decade, Minnesota had 17 E85 fueling sites and only a few thousand flex fuel vehicles (FFV). Today, Minnesota is home to more than 250,000 FFVs and 351 E85 retailers. Since 2000, E85 is estimated to have reduced emissions of GHG by 430,000 tons—but the level of emissions reduction attributed to use of E85 may not continue due to decreased sales. During 2009, use of E85 declined due to the comparatively low price of gasoline by about 30 percent from 2008.

Minnesota Government Vehicle SmartFleet: Minnesota's SmartFleet Committee sets goals for reducing state government consumption of petroleum fuels for transportation.¹⁶ According to the Committee, state agencies have consistently increased their use of E85 in the state's approximately 2,500 flex-fuel vehicles. In 2009, state agencies used almost 817,000 gallons of E85, compared to 97,000 gallons in 2005—more than an eightfold increase over 4 years. If use of E85 for the first nine months is consistent with the last three months of 2010, state agencies would meet their "million gallon challenge" to purchase 1 million gallons of E85 by the end of 2010. This would be an eleven fold increase over the last 5 years.

The Smart Grid offers a way to modernize our electric grid.

J. SMART GRID

Modernization of the electric grid. The nation's electric power industry is in the early phases of an effort to upgrade the communications and control technologies that provide reliable electrical service. As discussed in further detail in Section III.B, the efforts to modernize the grid will be critical to effectively incorporating the increased production of renewable energy into the wholesale electric markets. These efforts will also be critical to maximizing the efficiency of electricity production, transmission and distribution. While there are no simple fixes to develop a modernized electric grid, some promising load-balancing resources, including Smart Grid technologies, may mitigate the need for transmission

¹⁶ Executive Order 04-10.

expansion and help establish a new infrastructure for a modernized electricity grid.

Smart Grid technologies defined. Smart Grid technologies are devices that allow for two-way informational flows between electric suppliers and consumers. Smart Grid technologies provide the capability to monitor transmission flow, electric generation, customer preferences, and individual appliances or energy-using devices. Smart Grid technologies include (but are not limited to) infrastructure that integrates digital information and controls technology to improve the reliability, security, and efficiency of the electric grid. Currently, new technologies and alliances are being announced on an almost daily basis, much of it focused on reducing peak energy demand and enabling greater energy efficiency.

Stimulus funding uncorks the bottleneck. Recently, the U.S. DOE provided a billion dollar stimulus fund to pursue an array of projects which will prove the value of the Smart Grid to consumers and regulators. A great deal should be learned from these stimulus-funded projects. The 100-plus selected projects will help identify and quantify benefits and make the case for additional utility investment in Smart Grid technologies.

Smart Grid is not a panacea. Although it is tempting to view Smart Grid technology as a panacea, the large-scale deployment of Smart Grid technology will be neither cheap nor easy. Standardization and system integration are crucial to the interoperability of the Smart Grid; the fragmented structure of the utility industry and a lack of federal authority make such standardization and system integration challenging. Regulatory hurdles such as cost allocation, pricing schemes, and split incentives need to be overcome.

A Smart Grid Deployment Initiative introduced. To promote Smart Grid standardization and system integration and to encourage smart grid technology deployment in Minnesota, the OES has introduced the “Smart Grid Deployment Initiative” for consideration by the 2011 legislature.¹⁷ This initiative is intended to provide financial incentives for electric utilities to deploy new Smart Grid technologies by allowing utilities to count energy savings resulting from the implementation of Smart Grid technologies for their statutory Conservation Improvement Program (CIP) savings goals. To qualify for the incentive, utilities would be required to show that Smart Grid technology deployment resulted in energy efficiency greater than that which would have occurred through

¹⁷ See DOC #1412 and Revisor #11-0294.

normal maintenance activity.

III. BARRIERS TO FURTHER REDUCING GREENHOUSE GAS EMISSIONS

Lack of adequate electric transmission capacity in Minnesota requires immediate attention.

A. TRANSMISSION

Despite significant population and economic growth in Minnesota during the past twenty-five years, relatively little investment has been made in the critical electric transmission infrastructure. The electric transmission grid provides the backbone for system reliability and enables Minnesota to import approximately 25 percent of the state's total energy requirements, which is necessary due to insufficient in-state generation resources.

The existing transmission grid was designed to deliver power from conventional power generators to consumers within a local market. Transmission bottlenecks are already imposing significant constraints on daily power delivery, not to mention the effects the expansion in renewable (wind and solar) power will have. Wind facilities are typically location-constrained and most abundant in rural areas. To take advantage of renewable resources in rural areas, the current transmission system needs to be reinforced and expanded, with new transmission lines built in areas not already served by existing transmission infrastructure.

In Minnesota, the transmission renewal efforts have centered on the CAPX2020 project, which is a joint effort of 11 utilities in Minnesota and surrounding states. The first phase of the transmission upgrades includes more than 600 miles of new high voltage transmission lines for an estimated investment of \$1.3 billion.¹⁸

A number of roadblocks remain, including:

¹⁸ The proposed CapX2020 transmission line projects would be built in phases designed to meet this electricity growth as well as to tap into vast wind energy resources in southern and western Minnesota and the Dakotas. CapX2020 is proposing to build three 345 kilovolt (kV) transmission lines, one 230 kV line and associated substations. The Group 1 projects include:

- A 230-mile, 345 kV line between Brookings County, South Dakota and Hampton, Minnesota
- A 210-mile, 345 kV line between Fargo, North Dakota and St. Cloud, Minnesota
- A 28-mile, 345 kV line between Monticello and St. Cloud, Minnesota
- A 150-mile, 345 kV line between Hampton and Rochester, continuing to La Crosse, Wisconsin
- A 68-mile, 230 kV line between Bemidji and Grand Rapids in north central Minnesota

The regulatory process for these lines is underway. The CapX2020 utilities filed a Certificate of Need application in August 2007 with the Minnesota Public Utilities Commission (MN PUC) for the three 345 kV projects. A separate Certificate of Need application was filed with the MN PUC in March 2008 for the 230 kV line. The MN PUC granted both applications in May 2009 and July 2009, respectively.

Route Permit applications have been filed with the MN PUC for all four projects.

Permits and regulatory approval for the 345 kV projects is also required from North and South Dakota and Wisconsin regulatory commissions. Permits will be filed for each project in 2010. (See <http://www.capx2020.com/more2.html>)

- (1) obtaining the necessary permits from state and federal regulators; and
- (2) addressing opposition from local landowners and environmental groups.

To address these two major roadblocks, the OES has proposed the introduction of two legislative initiatives. The first initiative is to reorganize and streamline the reliability administrator position to include a focus on improving relationships with federal regulators and to participate fully in regional and quasi-governmental entities such as the Midwest Independent Transmission System Operator (MISO). The second initiative is to establish an ombudsman function at the department to facilitate resolution of disputes between utilities and landowners. In addition to the proposed legislation, the OES also recommend continuing participation in the Governor’s Upper Midwest Transmission Development Initiative (UMTDI).

Diversity of generation mix adds transmission planning complexity and need for energy storage technology.

B. SUPPLY TECHNOLOGY AND STORAGE

To expand the use of renewable energy, Minnesota Statute¹⁹ requires that electric utilities have at least 25 percent of their energy from renewable energy sources by 2025.²⁰ The “25-by-25” standard focuses on adding wind and solar generated electric power. These renewable resources are “intermittent” supply sources.²¹ Integrating wind and solar energy production to the needs of the power grid is an ongoing planning issue for the utility industry and will become even more important as the implementation of both of these renewable resources increases on both regional and national levels.

Renewable energy expansion, like transmission construction, may face opposition during the siting and permitting process. Some challenges include, but are not limited to:

- health (setback distance needed to avoid low frequency noise and shadow-flicker);
- scale (number of acres apportioned to wind generation);
- size (effects of large-scale wind generation towers up to 400 feet tall and greater numbers of generators);
- aesthetics;
- compatibility with current land use; and
- cost.

¹⁹ Minn. Stat. § 216B.1691

²⁰ Xcel Energy has the requirement to obtain a minimum of thirty (30) percent of its generation from renewable energy sources by 2020.

²¹ For example, when the wind stops blowing, the amount of wind-generated power curtails.

Without a significantly improved grid, the expansion of renewable energy will be challenged. Revamping the outdated infrastructure, however, is very difficult and costly. It is made even more difficult when opposition to generation-specific technology causes extensive project delays. While there are no simple fixes to quickly develop a modernized electric grid, some promising load-balancing resources, including smart grid devices, demand response resources, and energy storage technologies, may mitigate some of the need for transmission expansion.

Currently, energy storage technology is necessary to expanding the use of renewable energy. More research, development, and commercialization assistance are needed. Coordinated regional grid operations and significant investment are also necessary. Most importantly, a major breakthrough in energy storage technologies is necessary to provide the grid with large-scale back up storage when called upon by system operators.

In Minnesota, since 2008, Xcel Energy has been testing cutting-edge technology to store wind energy in batteries, including a 1mw battery storage system.²² This is the first application of the battery as a direct wind energy storage device in the United States. Significantly, the project also uses smart grid technology to provide the communications and control system for system integration, remote control, and data access. Moreover, this system will allow the battery system to be the first of its kind to act like a power plant, including selling power into the MISO market and responding to Automatic Generation Control signals. While the Xcel project is small, it is an example of the type of energy-storage technology demonstration projects needed to realize the full potential of renewable energy.

Abundance of natural gas found in shale is changing energy-market dynamics.

C. Role of Recently Identified Natural Gas Reserves

With the potential to access deposits of recently identified shale deposits that were once thought unattainable, natural gas provides an ample fuel source and is expected to gain market share. Natural gas also emits between one-third to one-half of the greenhouse gases of coal when used to generate electricity, in Minnesota.²³

²² Xcel Energy is testing a one-megawatt wind energy battery-storage system, using sodium-sulfur (NaS) battery technology. The test will demonstrate the system's ability to store wind energy and move it to the electricity grid when needed, and to validate energy storage in supporting greater wind penetration on the Xcel Energy system. NaS technology has been selected for this project because of its high storage capacity; its ability to handle a large number of charge-recharge cycles as would be incurred with an intermittent renewable energy resource; its large scale and potential for even larger scalability; its dynamic response to system changes; and its demonstrated commercial performance and availability. (See <http://www.xcelenergy.com/SiteCollectionDocuments/docs/wind-to-battery.pdf>)

²³ Xcel Energy's 2010 Integrated Resource Plan (IRP)

As shown in Figure 3, natural gas resources in shale formation are now identified and represent previous unknown natural gas reserves.²⁴

Figure 3 Shale Gas Plays, Lower 48 States

Source: EIA



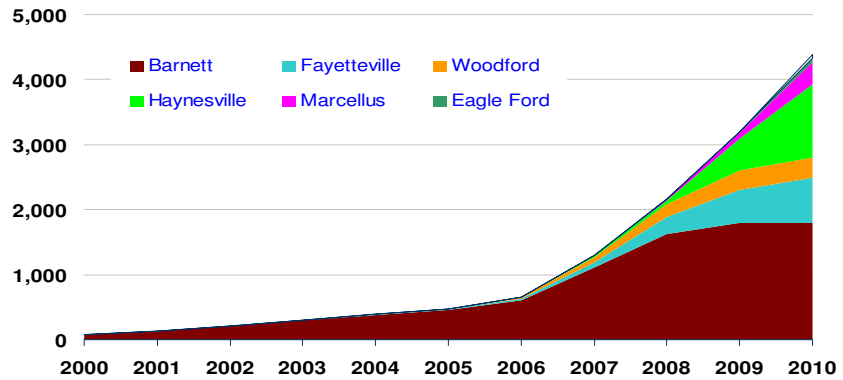
Source: Energy Information Administration based on data from various published studies
Updated: May 26, 2009

Over the last 10-15 years, natural gas producers have advanced technology in hydraulic fracturing to extract natural gas from shale formations. As shown in the Figure 4, the Barnett deposit developed relatively slowly between 2000 through 2006 and then began producing at increasingly greater levels. The hydraulic fracturing process was refined, which ultimately led the industry to “crack the code.” Although the fracturing process faces potential regulation regarding the environment implication to water use, the technique is touted to be the future for extraction of shale gas. Since 2006, other shale deposits in the United States began showing that the success in the Barnett deposit is “repeatable” with the potential to produce greater amounts of natural gas over a shorter period.

²⁴ See http://www.eia.gov/pub/oil_gas/natural_gas/presentations/2010/gasstorage/index.html.

Figure 4
Shale Production by Basin, 2000-2010

Source: EIA²⁵



With additional “technically recoverable” natural gas in shale formations and with the proven technology resources to extract natural gas from shale, the dynamics of energy markets are changing. Natural gas prices are low (relative to the historical highs) largely because of a national recession that has helped curb energy demand and because of greater-than-usual production and historically high levels of storage. Shale gas wells will keep producing, translating into lower break-even points when compared to other fuel generation sources including coal and traditional natural gas. Investment in plants that generate power by burning natural gas may increase if natural gas maintains a price advantage over other traditional and renewable fuel sources.

Obtaining DSM Goals present challenges to majority of utilities.

D. Demand Side Management (DMS)

Minnesota Statute²⁶ establishes an across-the-board savings goal of 1.5 percent for all utility types in Minnesota, adjustable to a minimum of 1.0 percent by the Commissioner of Commerce. Legislation passed in 2009 allowed the Commissioner to approve an interim average savings goal of 0.75 percent over 2010-2012 for gas utilities based on the findings of a gas conservation potential study. As shown in Table 9, utility Conservation Improvement Program (CIP) performance has varied greatly in recent years. While certain utilities (such as Alliant Energy-Electric and Minnesota Power) have exceeded the 1.5 percent savings, other utilities are far below the minimum 1.0 percent goal, reflecting the varied capacity of utilities with regard to CIP, as well as the unique characteristics of each service territory.

²⁵ See http://www.eia.gov/pub/oil_gas/natural_gas/presentations/2010/gasstorage/index.html.

²⁶ Minn. Stat. § 216B.1691

Table 9
Conservation Improvement Program Performance

Source: OES

Utility/Agency	Average Annual Sales	2004-2008 Avg. Annual % Savings	2010 % Savings, Planned
<i>Electric IOUs</i>			
Alliant Energy	852,534 MWh	1.9	1.5
Minnesota Power	3,298,723 MWh	1.8	1.5
Otter Tail Power	2,077,284 MWh	0.7	1.0
Xcel Energy	30,815,330 MWh	0.9	1.1
<i>Gas IOUs</i>			
Alliant Energy	1,830,000 Mcf	1.1	1.0
CenterPoint Energy	148,502,961 Mcf	0.6	0.7
Great Plains Natural G	5,886,496 Mcf	0.3	0.6
Minn. Energy Resource NMU	13,137,121 Mcf	0.2	0.8
Minn. Energy Resource PNG	41,725,154 Mcf	0.2	0.8
Xcel Energy	70,669,742 Mcf	1.1	1.1

Although large differences in individual utility CIP performance persist, significant progress was seen in the development of the 2010 plans falling under the minimum 1.0 percent or 0.75 percent savings requirements. Whether utilities will be able to realize their approved savings goals in 2010 and beyond will depend on a number of factors, including the effectiveness of their marketing and incentive offerings, the availability of large industrial conservation projects, the extent of economic recovery and credit availability, the price of input fuels such as coal and natural gas, natural gas prices at retail, and continued federal funding for energy efficiency programs and incentives.

**Energy Efficiency Incentive
Process needs
modernization and
customer creativity.**

E. Energy Efficiency Incentives

The current energy efficiency incentives process uses a hard-copy paper process. The paper process limits the ability to work in a timely manner because it requires applying for the incentive and waiting for written notice of any award. The paper process also inhibits information sharing and program integration, since it is implemented differently across utilities with a wide range of customers and systems. In short, the current process is antiquated. To be functional in the future, the incentive process needs to be updated and modernized with an electronic energy saving platform across utilities. Such a platform would not only provide timely processing

of incentive requests and awards, but a consistency of energy efficiency programs and related incentive awards. An electronic platform allows for comparison among utilities for program availability, program-level administrative cost, and program effectiveness.

Additionally, energy efficiency incentives are based on the level of savings of pre-established utility programs that are specific to one technology. Rather than restricting energy efficient efforts to strictly utility offerings, it may be more enticing to customers to direct their own energy efficiency efforts and to obtain incentives for a reduction in overall energy use. This approach rewards individual creativity to implement an array of possible energy efficiency measures to lower energy use rather than receiving a specific incentive for one individual technology—which may or may not decrease customers' overall consumption.

Reducing emissions in the transportation sector is a daunting challenge.

F. TRANSPORTATION

The transportation sector, which includes on-road cars and trucks, off-road vehicles, trains, planes, and boats, is the second largest contributor to GHG emissions in Minnesota. It is also, arguably, the most difficult to address through state policy and regulation.

Section I of this report states that emissions from the transportation sector are down since 2005. However, this reduction is attributed to increased light-duty vehicle fuel economy and a reduction in aviation activity. These reductions may be the wave of the future according to December, 2010 report by the Associated Press, which claims that “U.S. gasoline demand is at the start of a long-term decline.” Vehicle fuel economy and emission standards are the sole purview of EPA (according to the Clean Air Act) and recent change in aviation activity is linked to the economy.

Figure 5
Minnesota Annual Vehicle Miles Traveled

Source: MPCA

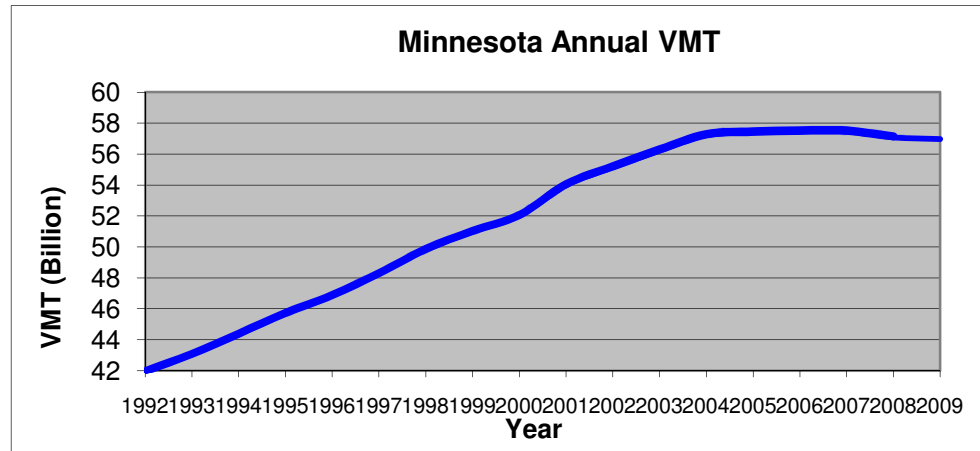


Figure 5 shows vehicle miles traveled (VMT), used to track trends in on-road vehicle emissions. VMT has shown steady growth in the past. However, since 2004 VMT growth has been flat and from 2008 to 2009 it declined by 0.2 percent. While there is no data that confirms with certainty why the VMT trend has changed, it may be due to the spike in fuel prices and the downturn in the economy. It is uncertain whether this change will be sustained or if VMT will revert to something more like the long-term trends when the economy improves. In any case, the causes that are thought to have produced this decrease in VMT (and the emission reductions discussed earlier) are not the direct result of state policy or action.

There are a number of actions the state *has* taken and should continue to take to help reduce emissions from the transportation sector, including advocating for cleaner fuels, more fuel efficient vehicles, options to single-occupancy vehicle trips, and reductions in trips.

IV. LEGISLATIVE PROPOSALS

A. STATUS OF 2010 LEGISLATIVE INITIATIVES – A number of legislative initiatives were introduced in 2010. The status of each is discussed below:

1. Appliance Standards. Adopt appliance standards for high energy-using appliances such as electronics and ice making machines that are not currently covered by federal standards. Minnesota could save an estimated 214 Gigawatt Hours (GWh) of electricity and 449 million cubic feet (CF) of natural gas a year by adopting energy efficiency standards for

15 appliances that are not federally regulated. That savings would grow to 1,082 GWh of electricity and 3,906 Million CF of natural gas by 2020.

Update: *Bill introduced last session, but did not pass the legislature. This is a continuing recommendation for 2011. See IV.B. #8.*

2. New Building Energy Code Adoption. Adopt new building energy code revisions, both commercial and residential, within one year after the national code has been adopted or publish an explanation of the rationale for not adopting the most recent energy code.

Update: *This Initiative was not proposed due to concerns about its fiscal impact.*

3. White Tags for Energy Efficiency. Ensure that statutory energy efficiency goals are met cost-effectively by allowing utilities that are exceeding their statutory requirements to market “white tags” to other utilities that have not yet met their statutory requirements. The white tags concept is an offshoot of the more mature renewable energy credit or “green tag” trading. White tags are documents certifying that a certain reduction of energy consumption has been attained.

Update: *No action last year; this is a continuing recommendation for 2011 with a bill proposed for introduction in the upcoming session. See IV.B. #6.*

4. Open Utility Conservation Improvement Project (CIP) Market and Provide Statewide Access to CIP Through Fuel Neutrality. Expand the current definition of “Energy Conservation Improvement” under Minn. Stat. § 216B.241 to allow utilities to count energy conservation projects toward CIP saving goals regardless of fuel type. The new definition and eligibility should also apply to customer-generated energy such as combined heat and power, solar photovoltaic, and methane digester projects that are used to offset retail purchases.

Update: *This Initiative was not proposed due to concerns about its fiscal impact.*

5. CIP Up-Front Payments. Develop a pilot “pre-bate” program in partnership with a utility and assess demand, efficacy and project cost in comparison to that of normal rebate process. A pre-bate is an up-front payment by a utility of CIP incentives to provide project seed financing. Pre-bates would allow utilities to provide rebates before the installation of eligible equipment for large energy users in lieu of the typical rebate provided after a project is completed. Pre-bate are a financing mechanism to speed up a large project’s implementation date.

Update: No action last year; this is a continuing recommendation for 2011 with a bill proposed for introduction in the 2011 session. See IV.B. #7.

6. Energy Efficiency Financing. Develop rules and legislation for a voluntary Energy Loan Tax Assessment Program (ELTAP). An ELTAP would allow homeowners to finance energy efficiency and renewable energy improvements to their homes, paying back the up-front capital over time as part of their property tax bill. ELTAPs provide the financial tool necessary to undertake energy retrofits of existing homes. Additionally, as the property improvement benefits will be realized by future owners, ELTAPs will transfer the financial obligation to future owners as a property changes hands.

Update: This initiative was introduced in 2010. The PACE legislation enacted in the 2010 session incorporated the voluntary energy loan tax assessment program. The OES is working with other state agencies to refine the program with the intent of supporting proposed legislation to modify the program.

7. Greater Opportunity for Green Power Purchases. Provide opportunities for large commercial and industrial customers to make green power purchases.

Update: No action taken.

8. Consistent Statutory Definition of Renewable Biomass. Harmonize statutory definitions of renewable biomass to maximize opportunities for job energy, economic development and GHG emissions reductions.

Update: No action taken; the Department of Agriculture is the lead agency on this issue.

9. Smart Grid Plans. Require utilities to prepare a joint Smart Grid Development and Implementation Plan for approval by the Minnesota Public Utilities Commission (PUC). Smart grid technologies allow for two-way information flows between suppliers and consumers, and will be capable of monitoring power plants, customer preferences and individual appliances. Smart Grid technologies enable consumer and utilities to save energy, reduce cost, increase reliability, allow for better management of renewable energy, and increase transparency.

Update: Utilities are submitting annual implementation plans to the Public Utilities Commission. A new initiative is proposed for 2011 to expand this initiative: IV.B. #11, Smart Grid Deployment Initiative.

10. Ownership of Large-Scale Ground Source Heat, Waste Heating, and Renewable Energy Systems. Align state and local rules, regulations, definitions and permitting systems to allow utility ownership of large-scale energy systems (such as ground source heat systems and solar systems) that are

located on premises of end users—other than the utility. Include such system under the definition of “infrastructure” projects. Utility ownership of large energy systems for the end user would eliminate the large first cost differential for the end user and open the door for cost effective widespread application.

Update: *No action taken; this is a continuing recommendation for 2011 with a bill proposed for introduction in the 2011 session. See IV.B. #5.*

11. Coal-fired facility emission requirements. Replace the statutory prohibition on new coal-fired facilities with an in-state generation emissions requirement that exceeds best available practices

Update: *No specific legislation introduced by the state agencies; a bill may be proposed for introduction in the 2011 session.*

12. Nuclear Power Ban Removal. Lift the statutory ban on new nuclear energy facilities to allow for consideration of next generation nuclear technology to meet future energy needs.

Update: *No specific legislation introduced by the state agencies; this is a continuing recommendation for 2011 with a bill proposed for introduction in the 2011 session. See IV.B. #1.*

13. Cost recovery for GHG reduction projects. Allow “emissions rider” cost recovery for utilities that complete plant efficiency and grid improvements not covered by Minn. Stat. 216B.1636(b)(2), and for biomass and natural gas co-firing that result in GHG emission reductions.

Update: *No action taken.*

B. NEW LEGISLATIVE INITIATIVES FOR 2011 – We recommend the following initiatives for 2011:

1. **NUCLEAR POWER BAN REMOVAL** (OES Preliminary Proposal 1401)
This initiative is to lift the statutory ban on new nuclear energy facilities to allow for consideration of next generation nuclear technology to meet future energy needs. Nuclear is—and can continue to be—a critical part of our nation’s energy mix with safe, reliable, and low cost energy. New nuclear plants will likely begin construction in a few years in the Southeast US and around the world. If the ‘first wave’ is successful (cost & schedule), the potential is there for development in other states. If the prohibition is lifted and nuclear power is established as a safe, reliable, and cost effective option, construction will depend on how it fits into Minnesota’s and the region’s energy plans as well as successfully addressing the waste disposal issue.

2. AUTHORIZE THE FORMULATION OF RENEWABLE ENERGY GENERATION COOPERATIVES (OES Preliminary Proposal 1408)

This initiative allows the authorization of renewable energy generation cooperative by introducing a new law in Minn. Stat. Ch. 308A. The proposed new law provides:

- Definitions of a “Renewable energy generation facility” and “Renewable energy generation power supply services;
- States the conditions under which a renewable energy generation cooperation may be formed;
- Specifies that a renewable energy generation cooperative has all of the powers described in section 308A.201, except that a renewable energy generation cooperative does not have the power of eminent domain. A renewable energy cooperative is not a cooperative electric association as the term is used in this chapter and chapter 216B;
- Identifies the role and membership of the renewable energy generation cooperative’s “Governing Board”;
- Identifies the conditions of membership in the cooperative; and
- Establishes that the Minnesota Public Utilities Commission shall review the rates and tariffs to ensure that the standards encourage the use of renewable energy, while allowing electric utilities to recover the cost of service of renewable energy generation cooperatives.

3. PAY-AS-YOU-SAVE (OES Preliminary Proposal 1409)

The implementation of an on-bill financing option does not require legislation. However, since there has not been widespread application of on-bill financing by utilities, new legislation providing some general guidelines may inspire the use of such an option for installation of renewable and clean energy technologies. The guidelines would establish that utility customers would be eligible for utility financial assistance and other provisions related to equipment ownership and transfer. The guidelines would also establish the participating utility return of appropriate operation and maintenance (O&M) expenses and a return-on the installation costs for a customer’s renewable micro-generation. Additionally, the participating utility may also include the energy savings from the customer’s installation as CIP energy savings to meet the utility’s energy goals.

4. EXPANDED DEFINITION OF BIODIESEL CONTENT MANDATE (OES Preliminary Proposal 1410)

This initiative would send a policy signal to early investors and producers needed to establish Minnesota as a leader in this expanding area—an expansion due to decreasing costs of renewable fuels. The bill would enhance the ability to meet state renewable energy goals and supports

Minnesota’s development of reliable, cost-competitive renewable fuel.

5. OWNERSHIP OF CERTAIN OFF-PREMISE ENERGY SYSTEMS (OES Preliminary Proposal 1411)

This proposal would align state and local rules, regulations, definitions, and permitting systems to allow utility ownership of large-scale energy systems—such as ground source heat systems, waste heating, and solar systems—that are located on the premises of end users other than the utility. Utility ownership of large energy systems for the end user would eliminate the large first cost differential for the end user and open the door for cost-effective widespread application.

6. SELLABLE “WHITE TAGS” FOR ENERGY EFFICIENCY (OES Preliminary Proposal 1412)

This proposal will ensure that statutory energy efficiency goals are met most cost-effectively by allowing utilities that are exceeding their statutory requirements to independently market “white tags” to other utilities that have not yet met their statutory requirements. The white tags concept is an offshoot of the more mature renewable energy credit or “green tag” trading. White tags are documents certifying that a certain reduction of energy consumption has been attained. Currently, under Minn. Stat. § 216B.241, subd. 1c., utilities or associations may elect to carry forward energy savings in excess of 1.5 percent for a year to the succeeding three calendar years, except that savings from electric utility infrastructure projects allowed under paragraph (d) may be carried forward for five years. This initiative allows utilities and associations the option to sell energy savings in excess of 1.5 percent to other utilities or carry the excess energy savings forward.

7. PILOT CIP UP-FRONT PROGRAM (OES Preliminary Proposal 1413)

Currently, there are no provisions that allow for up-front financing of cost-effective CIP projects. This initiative would amend current statutes to allow for the development of a pilot “pre-bate” program in partnership with a utility and assess demand, efficacy, and project cost in comparison to that of normal rebate process. A pre-bate is an up-front payment by a utility of CIP incentives to provide project seed financing. Pre-bates would allow utilities to provide rebates before the installation of eligible equipment for large energy users in lieu of the typical rebate provided after a project is completed. Pre-bates are a financing mechanism to speed up the implementation of a large project.

8. ENERGY EFFICIENCY STANDARDS FOR CERTAIN APPLIANCES (OES Preliminary Proposal 08)

The purpose of this initiative is to adopt appliance standards for high energy-using appliances such as electronics and ice making machines that are not currently covered by federal standards. Minnesota could save an estimated 214 GWh of electricity and 449 Million CF of natural gas a year by adopting energy efficiency standards for appliances that are not federally regulated. That savings would grow to 1,082 GWh of electricity and 3,906 Million CF of natural gas by 2020. It is important to qualify that this initiative is for labeling of high efficiency appliances, thereby identifying the appliances eligible for Minnesota CIP rebates. It is *not* to identify products that are prohibited for sales in Minnesota.

9. FUEL NEUTRALITY IN CIP (Preliminary Proposal 1415)

This bill would add to the definition of an "Energy Conservation Improvement" under Minn. Stat. § 216B.241. Utility projects that create energy savings regardless of fuel type would be allowed (for example, an electric utility insulates a home and counts any propane or fuel oil savings). This bill would provide for additional project types that will help utilities and the state realize energy savings goals, and will assist customers with controlling the cost of energy purchases.

10. CUSTOMER GENERATED ENERGY IN CIP (OES Preliminary Proposal 1416)

Currently, customers who generate energy do not typically receive financial incentives from utilities to assist with capital costs. This proposal will allow that customer-generated renewable energy—used to offset retail purchases—would count as utility-generated conservation. This initiative would allow customer-produced energy to count towards utility conservation goals; would remove one of the barriers to these types of projects; and would encourage more utility participation. It is important to note that some customer-generated energy is allowed to be counted for utility-generated conservation pursuant to Minn. Stat. § 216B.2411, subd. 1, which allow any municipality or rural electric association to use 5 percent of the total amount to be spent on energy conservation on certain qualifying renewable energy projects. This initiative *expands* the current provisions to allow customer-generation from additional renewable energy sources to be counted towards utility-generated conservation goals.

11. SMART-GRID DEPLOYMENT INITIATIVE (OES Preliminary Proposal 1417)

This initiative provides financial incentives for electric utilities to deploy smart grid technologies by allowing utilities to count quantifiable energy

saved as a result of smart grid technologies for their statutory Conservation Improvement Program (CIP) savings goals.

12. CLIMATE ADAPTATION.

Continue the Interagency Climate Adaptation Team. Expand cooperative efforts between departments to better identify potential state and regional climate change impacts and to develop appropriate responses.

13. WATER CONSERVATION INITIATIVE.

Support initiatives for water conservation and reduction of water use, emphasizing energy savings and water quality benefits.

14. OPPORTUNITY TO RECYCLE.

Expand the “opportunity to recycle” to commercial businesses and institutions (buildings housing more than ten people and businesses employing more than ten people).

15. PRODUCT STEWARDSHIP FRAMEWORK.

Develop a product stewardship framework to reduce waste and increase recycling for high-GHG reduction potential products (e.g. carpet, electronics, packaging).

16. ADOPT STATEWIDE CODE TO EXPEDITE LOCAL APPROVAL OF ELECTRIC VEHICLE CHARGING STATION INFRASTRUCTURE.

As electric vehicles become widely available, the state needs a uniform standard for residential plug-in charging stations. Potential permit delays due to this volume increase could be a deterrent for consumers seeking to make an electric vehicle purchase. To address this concern the National Renewable Energy Lab has developed a model permitting template that allows a qualified electrician to perform the home charger installation to National Electrical Code standards²⁷ coupled with spot inspections. Electricians are required to notify utilities once the installation is complete to ensure adequate electrical capacity. The Department of Labor and Industry can adopt this amendment to the Code in Minnesota. Under this model there are significant incentives to complete the installation work correctly since inspection failure can result in steep fines or other penalties. Permit fees continue to be collected by the authorized jurisdiction (local or state) so there is no loss of revenue.

²⁷ NFPA 10, Article 625 Electric Vehicle Charging Stations

V. ACKNOWLEDGEMENTS

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VI. APPENDICES

A. STATUTORY BACKGROUND

Minn. Stat. §216H.07 was enacted by the Minnesota legislature during the 2008 session. It addresses attainment of the greenhouse gas reduction timetable in Minn. Stat. §216H.02 and outlines a process for reporting progress in reducing greenhouse gas (GHG) emissions and for recommending policies to achieve the statutory emissions reduction timetable. This report by the commissioners of the Department of Commerce (Commerce) and the Pollution Control Agency (MPCA) to the chairs of the legislative committees with primary policy jurisdiction over energy and environmental issues is submitted to fulfill reporting requirements under both Minn. Stat. §216H.07, subd. 3 and subd. 4. The report outlines the most recent GHG emissions data relative to the 2005 GHG emission reduction baseline; the level necessary to achieve the reductions timetable in Minn. Stat. §216H.02; and any legislative proposals determined necessary to achieve these reductions.

Minn. Stat. 216H.07, Subd. 3. Biennial reduction progress report.

By January 15 of each odd-numbered year, the commissioners of Commerce and the Pollution Control Agency shall jointly report to the chairs and ranking minority members of the legislative committees with primary policy jurisdiction over energy and environmental issues the most recent and best available evidence identifying the level of reductions already achieved and the level necessary to achieve the reductions timetable in section [216H.02](#). The report must be in easily understood nontechnical terms.

Minn. Stat. 216H.07, Subd. 4. Annual legislative proposal.

The commissioners of Commerce and the Pollution Control Agency shall annually by January 15 provide to the chairs of the legislative committees with primary policy jurisdiction over energy and environmental issues proposed legislation the commissioners determine appropriate to achieve the reductions. The legislation must

be based on the principles in subdivision 5. If the commissioners determine no legislation is appropriate, they shall report that determination to the chairs along with an explanation of the determination.

Minn. Stat. 216H.07, Subd. 5. Reduction principles.

Legislation proposed under subdivision 4 must be based on the following principles:

- (1) the greenhouse gas emissions-reduction goals specified in section [216H.02](#), subdivision 1, must be attained;
- (2) the reductions must be attained on a schedule that keeps pace with the reduction timetable required by section [216H.02, subdivision 1](#);
- (3) conservation, including ceasing some activities, doing some activities less, and doing some activities more energy efficiently, is the first choice for reduction;
- (4) public education is a key component;
- (5) all levels of government should lead by example;
- (6) strategies that may lead to economic dislocation should be phased in and should be coupled with strategies that address the dislocation; and
- (7) there must be coordination with other federal and regional greenhouse gas emissions-reduction requirements so that the state benefits and is not penalized from its reduction activities.

B. GREENHOUSE GAS EMISSIONS REPORT TECHNICAL APPENDIX

A final version of this report will be posted on the MPCA website when it is completed.