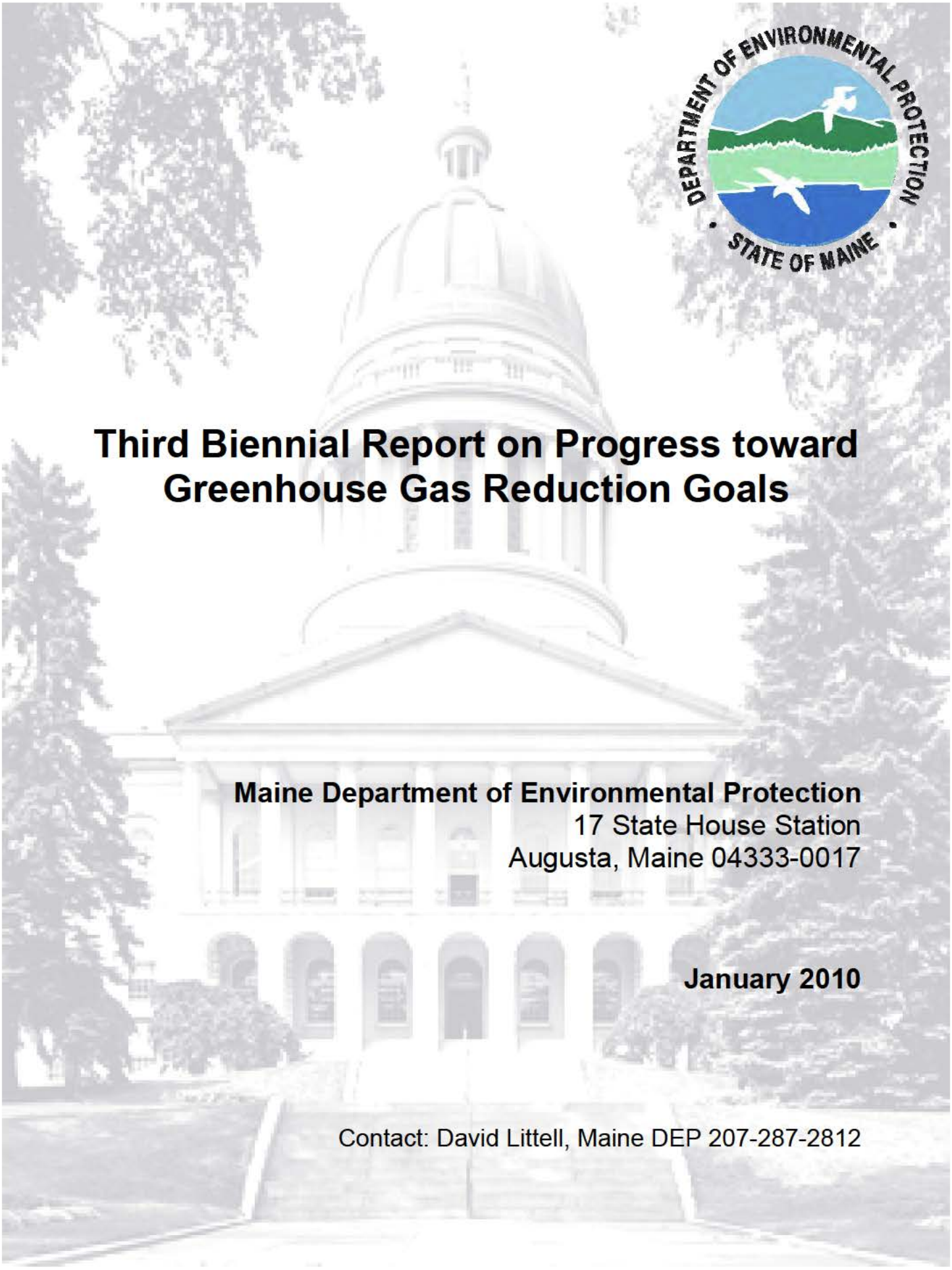


Third Biennial Report on Progress toward Greenhouse Gas Reduction Goals

Maine Department of Environmental Protection
17 State House Station
Augusta, Maine 04333-0017

January 2010

Contact: David Littell, Maine DEP 207-287-2812

February 1, 2010

Senator Seth A. Goodall, Co-Chair
Representative Robert S. Duchesne, Co-Chair
Members of the Natural Resources Committee
State House Room 214 A
Augusta, ME 04333

RE: Third Biennial Report on Progress toward Greenhouse Gas Reduction Goals

Dear Senator Goodall, Representative Duchesne, and members of the Joint Standing Committee on Natural Resources,

In 2003, the Legislature established greenhouse gas (GHG) reduction goals for 2010, 2020, and beyond (38 M.R.S.A. §576). The Maine Department of Environmental Protection (the Department) is submitting this report to the Joint Standing Committee on Natural Resources pursuant to 38 M.R.S.A. §578, which requires the Department to evaluate the State's progress towards meeting those reduction goals, and submit a report every two years from 2006 and thereafter.

This report summarizes the findings of the Department's first preliminary quantitative evaluation of Maine's progress towards meeting statutory greenhouse gas goals since the development of the original Climate Action Plan in 2004. The methods and processes we used to chart our progress were similar to the previous Plan with some notable exceptions, including the fact that our work was done "in-house" versus the previous use of consultants and an external stakeholder process.

I am pleased to report that Maine is on track to meet the goal of reducing greenhouse gas (GHG) emissions to 1990 levels by 2010. The report contains our findings and observed trends, a description of initiatives in place or underway, including regional and national efforts.

I will be happy to present the report to the Committee at your convenience.

Sincerely,

David Littell
Commissioner

Report to the Joint Standing Committee on Natural Resources
2nd Session of the 124th Maine Legislature

Third Biennial Report on Progress toward Greenhouse Gas Reduction Goals

Executive Summary

With this *Third Biennial Report on Progress*, the Department of Environmental Protection reports that Maine is on track to meet the goal of reducing greenhouse gas (GHG) emissions to 1990 levels by 2010. Gross statewide GHG emissions increased from 1990 until a peak in 2003, and have steadily declined since. Highlights of the Department's analysis include:

- The vast majority of GHG emissions in Maine are the result of energy consumption, largely produced by combustion of petroleum products.
- Petroleum consumption and associated greenhouse gas emissions have declined.
- The largest contributing sector is transportation.
- Vehicle miles travelled have continued to increase, but improvements in fuel efficiency have resulted in declining transportation emissions.
- Electrical generation in Maine consisted primarily of nuclear, hydro and petroleum-based generation during the early 1990's, and now consists primarily of natural gas, hydro and renewable biomass-based generation with wind power beginning to generate a notable portion of Maine's electricity.

The Department will continue to gather and evaluate information to determine how past and ongoing strategies have contributed to emission reductions, and what role economic changes may have played. The findings of this more comprehensive analysis will be presented to the Committee in the Department's *Fourth Biennial Report on Progress*. In addition to fulfilling statutory reporting requirements, the Department intends to institute an annual "top down" greenhouse gas inventory process using EPA's State Inventory Tool, augmented with a "bottom up" triennial analysis conducted as part of the National Emissions Inventory.

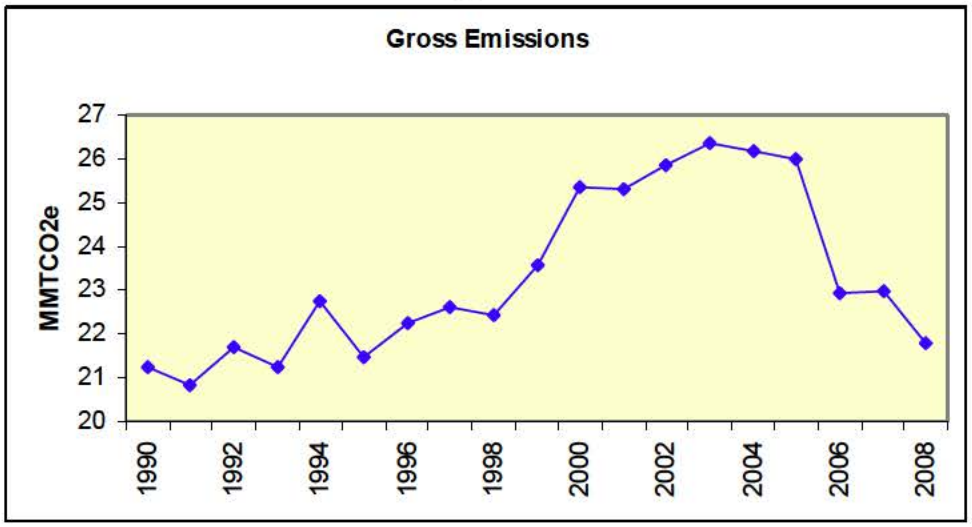
Looking into the future, the Regional Greenhouse Gas Initiative, programs and projects funded by the Efficiency Maine Trust, increases in energy efficiency, development of wind and tidal generating capacity, additional regulatory and non-regulatory actions such as new vehicle and fuel standards, fuel switching, and adjustments in consumer behavior are expected to produce further emission reductions. In addition, federal legislation may create a wholly new regulatory framework pertaining to greenhouse gas emissions that could have significant, long-term impacts on emission levels.

I. Introduction

As passed into law and signed by Governor Baldacci in 2003, Maine's Climate Change statute established greenhouse gas (GHG) reduction goals for 2010, 2020, and beyond (38 M.R.S.A. §576). The Maine Department of Environmental Protection (the Department) is submitting this Report to the Joint Standing Committee on Natural Resources pursuant to 38 M.R.S.A. §578, which requires the Department to evaluate the State's progress toward meeting those reduction goals and submit a report of its evaluation by January 1, 2006 and by that date every two years thereafter[1]. In addition to evaluating past and current emissions, this Report also looks forward to policies and programs, both on-going and envisioned, which will be needed over the next ten years to reach the 2020 goal: a 10% reduction from 1990 emission levels.

The Department's evaluation conducted in 2009 revealed that total estimated greenhouse gas (GHG) emissions in Maine increased from 21.26 million metric tons of carbon dioxide equivalents ($MMTCO_2e$) in 1990 to a peak of 26.37 $MMTCO_2e$ in 2003, then declined to almost 1990 levels by 2008 at 21.77 $MMTCO_2e$ (See Figure 1).

Figure 1.



The emissions estimates presented here were generated using EPA's State Inventory Tool (SIT) and are based on Maine-specific energy consumption and production data that are readily available from the Department of Energy's Energy Information Administration (EIA). The EIA released 2007 data for the state of Maine in August 2009, with national data for 2008 just released at the time of this report. The Department extended the analysis to include 2008 by using national energy trends to estimate 2008 energy consumption in Maine.

The Department will continue evaluating information as it becomes available, and will provide a final evaluation of Maine's progress toward the 2010 GHG emissions target in the Fourth Biennial Report by January 1, 2012. At that time, energy production and consumption information through 2009 will be available from the EIA and supplemental 2010 state data will

[1] The Department requested and received an extension of this deadline for the 2010 report until February 1, 2010.

be available for point sources, transportation, and other sectors. The Fourth Biennial Report will also include a full assessment of the mitigation programs and policies implemented since 2005, with recommendations for both future actions and reduction targets.

II. Methodologies

EPA's State Inventory Tool

The State Inventory Tool (SIT) is an Excel-based tool that uses methods from the Intergovernmental Panel on Climate Change (IPCC) and the U.S. National Greenhouse Gas Inventory. EPA developed the SIT to enable states to apply a comprehensive, standardized approach to estimating GHG emissions, while also providing flexibility to input state-specific data when available. The SIT estimates carbon dioxide equivalent (CO_2e) emissions of six greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6).

The tool estimates greenhouse gas emissions from the following categories:

- Agriculture
- CO_2 from Fossil Fuel Combustion
- Coal
- Industrial Processes
- Land Use, Land Use Change and Forestry
- Mobile Combustion
- Natural Gas and Oil
- Solid Waste
- Stationary Combustion
- Wastewater

Maine's 2004 Climate Action Plan

In 2004, the Department and a broad stakeholder group employed EPA's 2003 version of the SIT, several advanced models and state-specific data to estimate statewide GHG emissions from 1990 to 2020 with and without selected mitigation strategies. The results of those efforts indicated that Maine's total economy-wide GHG emissions in 1990 were approximately 20 million metric tons (MMT) of CO_2e. This estimate included the assumption that Maine's forests are net emitters of CO_2.

In order to develop strategies to reduce these emissions, the stakeholders were organized into four Working Groups: Transportation and Land Use; Buildings, Facilities, and Manufacturing; Energy and Solid Waste; and Agriculture and Forestry. Each working group developed mitigation options for its sector, with prospective CO_2 savings in tons and the cost per ton then estimated for each option. The Department and stakeholders then estimated emissions for 1990 to 2020, assuming all mitigation measures were in place for the period 2005-2020. The results indicated that emission reduction goals would be met for both the 2010 and 2020 target years.

Estimating Progress

The Department's 2009 analysis excludes biomass combustion, forest carbon sequestration, and black carbon.

The 2004 analysis of greenhouse gas emissions for development of the Climate Action Plan was expensive and complex, and replicating that analysis at this time was not realistic or advisable under current resource constraints. Therefore, during late 2009, the Department's Bureau of Air Quality (BAQ) staff estimated Maine's total GHG emissions using the U.S EPA's SIT and available state-specific information. The Department supplemented default data in the 2008 version of the SIT with information from several sources: GHG emissions for some industrial processes, as reported to the BAQ in accordance with Chapter 137; vehicle miles travelled as calculated by Maine's Department of Transportation; and newly-released EIA data. Chapter 137 of the Department's regulations require all stationary sources which are licensed to emit any of eight criteria air pollutants above minimum reporting thresholds to submit annual emissions information to the Department, including estimates of emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6).

The Department conducted the 2009 analysis only for the period from 1990 through 2008, foregoing further modeling of potential benefits associated with various mitigation measures between now and 2020. Because of the lag in data availability from both federal and state sources, the Department will be able to conduct a more comprehensive estimate of 2010 emissions in late 2011, and to present these results in the *Fourth Biennial Report of Progress* in 2012. The Fourth Report will also present a full assessment of the mitigation programs and policies implemented since 2005, along with updated recommendations for both future actions and reduction targets.

For purposes of this analysis, the Department decided not to include quantitative examination of two issues that contribute to comprehensive estimates of GHG emissions: biomass combustion and the role of forests; and differences between accounting for electrical generation emissions based on generation vs. consumption. The Department also did not include an assessment of the role of black carbon, as was done in the 2004 modeling. Nevertheless, the Department believes that this approach produces conservative (that is, over-estimated) results that can be confidently used to evaluate Maine's progress toward its GHG emission reduction goals, and intends to address all three issues more fully in the 2012 Fourth Report.

> **Biomass combustion and the role of Maine's forests** – The SIT does not include biomass combustion as a source of GHG emissions, consistent with both international and national protocols. For this reason, biomass was also not included in the Department's 2004 emissions estimates. Although it is possible to manually supplement the SIT with biomass emissions data, comprehensive and accurate data is not available. Only industrial sources are required to report biomass combustion data to federal and state agencies, while EIA acquires biomass combustion data from other economic sectors (e.g., residential) by such means as telephone surveys. The Department plans to work

within the region and nationally to address these issues of data availability and carbon accounting.

In contrast, and also in accordance with other protocols, the SIT does include a module for "Land Use, Land Use Change and Forestry" (LULUCF) that estimates forest-related emissions and sequestration. As previously noted, the 2004 emissions modeling did include this factor. However, the default data in the 2008 version of the SIT result in estimated net emissions from Maine's forests of over 5.5 MMT annually every year since 1996. These estimates are not supported by Maine-specific data. In fact, annual plot sampling conducted by the Maine Forest Service since 1999 indicates that forestland in Maine has been a net sequester of carbon for the past decade, while continuing to support a vibrant, forest-based economy.

According to the Maine Forest Service, Maine's millions of acres of forestland already store in excess of 5 billion metric tons of CO_2e, and the potential for Maine's forests to sequester additional CO_2 is certainly a major variable in the calculation of Maine's net emissions. However, applying this sequestration component in the SIT can minimize the apparent benefits of activities in other economic sectors and mask the importance of implementing mitigation options.

At the present time, the Department does not believe the data are available to accurately quantify either the emissions contributed from biomass combustion or the sequestration by Maine's forests. However, preliminary analysis by the Department, based on data from EIA and the Maine Forest Service, indicates that Maine's forests sequester more than is emitted during combustion. Accordingly, both the LULUCF module and CO_2 emissions associated with biomass combustion were omitted from the 2009 analysis because the data, analyses and tools available are not providing a consistent or reliable picture.

Accounting for electricity sector emissions – There are two basic approaches to estimating GHG emissions associated with the electricity sector: estimates based on electricity produced within the state and those based on electricity consumed in the state. Both approaches create accounting dilemmas for purposes of determining reductions required and progress being made. The approach applied is determined by the answer to the question: "Who is responsible for the emissions?"

According to both international and US national protocols, the answer is "The one who produces". Thus the SIT approach incorporates data that is production-based rather than consumer-based. However, for a state like Maine where production commonly exceeds demand, production-based accounting may result in an inflated estimate of total emissions for which the state is then held accountable, raising the question: "Why are our mitigation programs paying for the demand from consumers outside our state?"

Since 2000, Maine has generally been a net exporter of electricity into the New England power pool. For this reason, the stakeholders directing the 2004 emissions modeling included an adjustment to reflect consumer decisions, producing a lower emission

estimate than if the SIT default approach had been applied. This adjustment was not applied in the Department's 2009 analysis, with the likely result that emissions estimates for the electricity sector are over-stated.

Black carbon – Black carbon, commonly known as soot, is a substance primarily associated with incomplete combustion of fossil fuels and wood. In Maine, the two primary sources of black carbon are diesel engines and wood-burning equipment. Black carbon is not a GHG, and thus the SIT does not include an option to consider its potential impacts. However, black carbon suspended in the atmosphere and deposited on land surfaces can contribute a warming effect, and the Department's 2004 emissions modeling addressed this warming potential by evaluating emissions both with and without black carbon impacts. The 2009 analysis did not include this evaluation, although it will be reconsidered for the more comprehensive 2012 Fourth Report. In Maine, black carbon impacts are currently being addressed through requirements for improved efficiencies and control technologies in both diesel engines and wood-burning equipment and lower sulfur, petroleum-based, fuel products.

III. Results of 2009 Evaluation

Economy-wide

Maine's gross GHG emissions in **2008 were 21.77 MMTCO$_2$e**, compared to the **2010 target of 21.26 MMT** (See Table 1).

There has been a steady downward trend in total emissions during the past six years, with 2008 emissions over 17% lower than Maine's emissions **peak of 26.37 MMT in 2003**. According to the Bureau of Economic Analysis, Maine's gross domestic production continued to increase throughout this period[2], suggesting that emissions reductions were not primarily related to economic activity (see Appendix A).

Table 1.
Emissions (MMTCO2e)

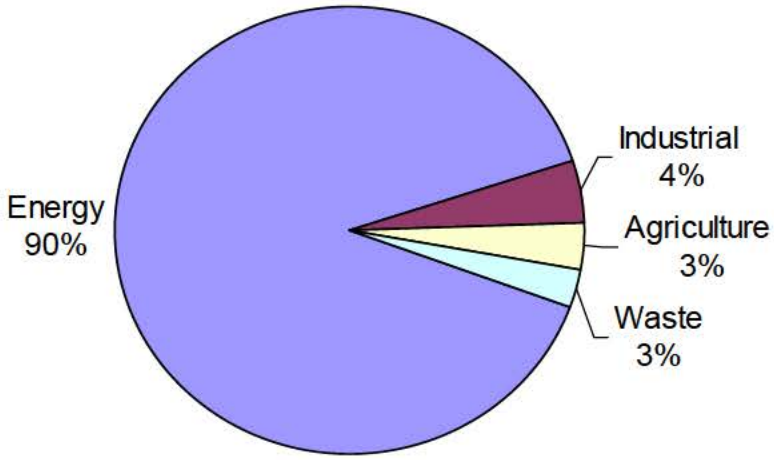
	1990	2003	2004	2005	2006	2007	2008
Energy	19.77	24.13	23.91	23.55	20.61	20.64	19.47
Industrial Processes	0.36	0.84	0.88	0.96	0.94	0.94	0.97
Agriculture	0.48	0.56	0.60	0.66	0.69	0.69	0.69
Waste	0.65	0.83	0.78	0.83	0.68	0.68	0.63
Gross Emissions	**21.26**	**26.37**	**26.18**	**26.00**	**22.92**	**22.95**	**21.77**

As previously noted, this estimate of emissions reflects conservative assumptions and does not include the sequestration benefits of Maine's extensive forestland. Further reductions, as a result

[2] U.S. Bureau of Economic Analysis. Regional Economic Accounts, Gross Domestic Product by State. www.bea.gov/regional/gsp/

of the numerous mitigation programs and policies already implemented (discussed in Section IV), can be expected in the future.

Figure 2. 2008 Emissions by Source Category



Energy

Energy consumption accounts for roughly 90% of gross GHG emissions every year.

97% of those emissions are CO_2 from fossil fuel combustion, 84% of which is from petroleum. Since 2003, energy related emissions have declined by 4.6 MMT to below 1990 levels (see Appendices B and C).

Figure 3. 2008 Emissions from Fossil Fuel Combustion

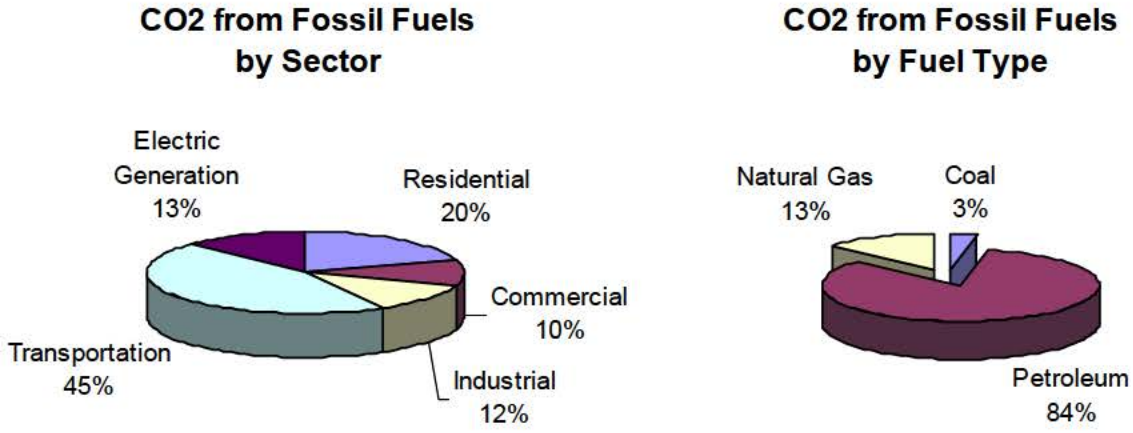


Table 2 below shows that the largest reductions in energy consumption-related emissions were produced by the Electric Generation (2.36 MMT or 49%) and Residential (0.94 MMT or 20%) sectors. In 2008, the two sectors with the largest CO_2 emissions from fossil fuel combustion were Transportation (45%) and Residential (20%) (see Appendix C). Although the Department did not conduct an economic analysis of the correlation between fuel prices and emissions, a simplistic analysis of fuel pricing information available from the Energy Information Administration did not indicate that prices were an accurate predictor for emissions from those two sectors (see Appendix D).

Table 2.
MMTCO2 from Fossil Fuel Combustion

	2003	2008
Residential	4.74	3.80
Coal	0.00	0.00
Petroleum	4.67	3.73
Natural Gas	0.08	0.07
Commercial	2.15	1.89
Coal	0.00	0.01
Petroleum	1.85	1.52
Natural Gas	0.30	0.36
Industrial	2.49	2.25
Coal	0.29	0.26
Petroleum	2.00	1.80
Natural Gas	0.21	0.18
Transportation	9.27	8.56
Petroleum	9.22	8.51
Natural Gas	0.05	0.04
Electric Generation	4.79	2.43
Coal	0.40	0.33
Petroleum	1.05	0.25
Natural Gas	3.33	1.85

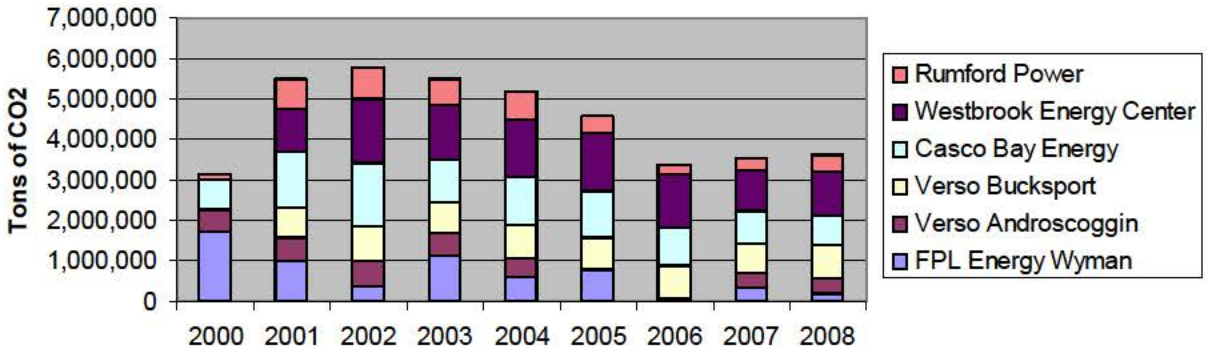
Since 2003, emissions from petroleum combustion in all sectors have declined by 3 MMT, while emissions associated with natural gas combustion have decreased by half that amount. Petroleum emissions due to residential combustion declined 28% from 2004 to 2008, but 2008 levels remain above those in 1990. Maine's perennial dependence on petroleum is evident in most sectors except electrical generation, which markedly decreased consumption during 2003-2008.

Electrical Generation

In 2003 the contribution of electrical generation was more than 20% of all CO_2 emissions from fossil fuel combustion; in 2008 it was 13%. During that same period, emissions due to petroleum combustion by electrical generators declined 76%; natural gas emissions declined 44%. The reasons for these reductions are believed to be fluctuating petroleum and natural gas prices and corresponding fuel switching, the continuation of milder winters and cooler summers in Maine and New England, economic conditions, and the increased availability of renewable energy sources including wind and biomass.

Maine's stand-alone electrical generators are part of the Regional Greenhouse Gas Initiative (RGGI). They report their CO_2 emissions to the Department annually in accordance with Department regulations. Figure 4 below illustrates their emissions since the beginning of the baseline period established by RGGI.

Figure 4. Maine RGGI Source Annual CO2 Emissions



Methane and nitrous oxide – Although energy related emission reductions of these GHG are orders of magnitude smaller than those associated with CO_2 from fossil fuels, they are nonetheless significant as indicators of progress toward mitigation goals. Of particular note are emission reductions associated with Mobile Combustion, which includes all gasoline and diesel highway and non-highway sources. Total emissions in 2008 were 47% lower than 1990 and 40% lower than the peak emission year of 2003, due largely to reductions in gasoline highway emissions (see Appendix B).

Other sectors: Industrial processes, Agriculture, Waste

Although emission changes in the industrial process, agriculture and waste sectors can be evaluated, they have a relatively insignificant impact on statewide GHG emissions.

Since 2003, small increases of 0.13 MMT each in the Industrial Processes and Agriculture sectors have been largely offset by a reduction in the Waste sector of 0.20 MMT. The Industrial Processes (IP) sector contributes less than 5% of the total economy-wide emissions, in the form of three minor GHG: hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). In Maine, the activities that produce these emissions are primarily associated with the cement and semi-conductor industries. In contrast to the trend in the Energy sector, estimated emissions from Industrial Processes have steadily increased and are now almost three times greater than the 1990 level. This is due largely to increased production by the semiconductor industry. Cement production has fluctuated from year to year, with notably higher than average production in 2005-2007.

Agricultural emissions are due mostly to enteric fermentation and soils management, contributing 68% and 24% of sector-wide emissions, respectively, in 2008. Emissions from these activities have increased since 1990 due to more than a doubling in the population of horses and goats in the state[3], a four-fold increase in the amount of synthetic nitrogen applied for

[3] Livestock population data provided in EPA's SIT, obtained from the U.S. Department of Agriculture's National Agricultural Statistics Service

fertilization and more than a seven-fold increase in the amount of organic nitrogen applied for fertilization[4].

Emissions associated with the Waste sector have decreased by 24% since 2003, and are now back to the 1990 level. The primary sources of emissions from this sector are municipal solid waste (MSW) and pulp and paper process wastewater. Wood pulp production levels increased steadily from 1990 to 2000, and generally remained around 4 million metric tons (MMT) with a notable decline in 2008 to approximately 3.7 MMT. The downward trend in MSW emissions suggests steady improvements in managing this waste stream, while declining wood pulp production is a result of declining pulp markets in 2008.

IV. Mitigation Efforts Underway and Projected for 2010 - 2020

Maine's 2004 *Climate Action Plan* identified over 50 options - programs and policy initiatives - that, if implemented, would significantly reduce Maine's overall GHG emissions and likely result in reaching statutory targets. Most of these options have been initiated, and many are already accomplished or well underway. As a result, some carbon reduction benefits are already occurring, and more can be expected during the coming decade. In addition to these state programs, federal initiatives – some already in place and others under development – will also result in reductions in Maine's total emissions.

Initiatives in Place	New Initiatives for Further Reduction
Regional Greenhouse Gas Initiative (RGGI)	Efficiency Maine Trust
Energy & Carbon Savings Trust	Ocean Energy Task Force and Recommended 2010 Legislation
Tailpipe Emission Standards	DEP Woodstove Buyback Program
Wind Energy Permitting under 2008 Wind Energy Act	Regional Low Carbon Fuel Standard
Renewable Portfolio Standard	National Fuel Efficiency Program
Methane Gas Management Program	Energy Efficiency Labeling provisions
PUC Efficiency Maine programs	Building & Energy Codes
PUC Competitive Grant Program	Federal Cap & Trade legislation
Governor's Carbon Challenge	Combined Heat & Power (CHP) Incentives
National Clean Fuel Vehicle Incentives	
MSHA Green Building Standards	
Municipal & School Energy Conservation	
Green Power Use in State Buildings	

[4] Fertilizer use information provided in EPA's SIT, obtained from the U.S. Department of Agriculture and the Fertilizer Institute's *Commercial Fertilizers* report

Regional Greenhouse Gas Initiative (RGGI)

RGGI is the only operational cap and trade program in the nation. Applying to electric generating units (EGU) with capacity greater than 25 megawatts, RGGI regulates only six facilities in Maine. The portion of the program that caps CO_2 emissions came into effect in January 2010, with current RGGI requirements mandating a 10% decline in the cap by 2019. This reduction has been estimated at 2 MMT for Maine. Since September 2008, the trading portion of RGGI has successfully conducted six CO_2 allowance auctions, generating $15.2 million to be used for energy efficiency improvements in Maine.

RGGI States and Transportation. The RGGI states recently took tentative steps to chart out a RGGI expansion initiative intended to build upon the collaborative working relationship of environmental and energy agencies in the ten Northeast and Mid-Atlantic states by engaging transportation agency heads in the collaboration to address transportation issues. The initiative is also proposed to include coordination with the Ozone Transport Commission, broadening the scope to coordinate GHG reductions with work on conventional air pollutants. This broad coalition will establish a workgroup to examine policy initiatives and potential actions, and will work together on the reauthorization of the transportation bill.

Policies and investments in energy efficiency

Efficiency Maine. Foremost among Maine's efforts to reduce GHG emissions within all economic sectors has been a strong energy efficiency policy and a suite of programs known as Efficiency Maine, under the administration of the Maine Public Utilities Commission (PUC). Established in 2004, Efficiency Maine is a statewide effort to promote the more efficient use of electricity, help Maine residents and businesses reduce energy costs, and improve Maine's environment.

In 2009, Efficiency Maine administered six main programs, each targeting a different approach toward immediate energy savings and long-term changes in societal attitudes and behaviors: business; low-income; building operators; residential; education and training; and high performance schools. Their *2009 Annual Report* summarizes the cumulative benefits from all programs 2004-2009:

- Lifetime energy generation savings of 3.8 million MWh (megawatt-hours);
- Lifetime energy cost savings to Maine businesses and residents of almost $400 million, at a total cost to Efficiency Maine of $63.4 million and to program participants of $67.4 million;
- 2.0 MMT of CO_2 of avoided emissions from electricity generation.

Initially funded solely by electricity consumers, additional resources for Efficiency Maine were made available in 2009 through federal American Resource & Reinvestment Act (ARRA) economic stimulus funds, as well as through quarterly auctions of CO_2 emission allowances under the Regional Greenhouse Gas Initiative (RGGI). To date, the RGGI auctions have generated more than $15.2 million to be applied toward energy efficiency and fossil fuel conservation efforts throughout Maine.

Utilizing ARRA and RGGI funds, a recent PUC Competitive Grant Program for Large Energy Efficiency and Conservation Projects resulted in a total of $9 million in awards to 16 Maine businesses. Approved projects addressed the programs' primary goals of reducing electricity consumption, encouraging alternative and renewable energy use, and reducing GHG emissions. For example, one project will convert a 30-year-old, multi-fuel boiler to a more efficient steam co-generation unit, while another project will convert a 45-year-old oil burner to an electricity generating system fueled with biomass.

There remains, however, a significant portion of Maine's population that has not yet been involved in the various efficiency programs. Clearly the potential exists in the future for stronger gains in this area, with its associated economic and environmental benefits. The goals of the Efficiency Maine Trust (see below) are directly targeted at this potential.

Efficiency Maine Trust. In July 2010, the combined programs of Efficiency Maine and the Energy & Carbon Savings Trust (investing proceeds from RGGI auctions) will be merged into the Efficiency Maine Trust. Created by the 2009 Maine's Energy Future Act, the Trust's mandate is "to administer energy efficiency and alternative energy programs in the State of Maine." The targets of the Trust's design, planning, and implementation efforts have already been established by statute:

- Weatherizing 100% of Maine residences and 50% of Maine businesses by 2030;
- Reducing peak-load electric energy consumption by 100 megawatts by 2020;
- Reducing the State's consumption of liquid fossil fuels by at least 30% by 2030;
- By 2020, achieving electricity and natural gas savings of at least 30%, and heating fuel savings of at least 20%;
- Capturing all cost-effective energy efficiency resources available for electric and natural gas utility ratepayers;
- Saving residential and commercial heating consumers not less that $3 for every $1 of program funds invested by 2020 in cost-effective heating and cooling measures that cost less than conventional energy supply;
- Building stable private sector jobs providing clean energy and energy efficiency products and services in the State by 2020; and
- Reducing GHG emissions from the heating and cooling of buildings in the State by amounts consistent with the State's goals established in the 2003 Climate Change Act.

The comprehensive planning effort required by these targets has already been initiated, with a draft report completed in January 2010 entitled *Strawman Stakeholder Input Facilitation Tool.* The report presents program information for each of three sectors of customers - Residential, Commercial, and Industrial – and projected budget and savings targets by program for the Trust's activities during 2010-2012:

- *Residential programs*: retrofits, energy efficient products, and new construction – combined annual funding of $70 million will save 3.8 million gallons of fossil fuel, 19,000 therms of natural gas, and 69 Gigawatt-hours of electricity in the year 2012;
- *Commercial programs*: retrofits and new construction – combined annual funding of $30 million will save over 1 million gallons of fossil fuel, 78,000 therms of natural gas, and 85 Gigawatt-hours of electricity in the year 2012; and

- *Industrial program*: $18 million in annual funding will save nearly 690,000 gallons of fossil fuel, 120,000 therms of natural gas, and 80 Gigawatt-hours of electricity in the year 2012.

Other Efficiency Measures. A variety of measures undertaken at both the state and federal levels will enhance the goals and benefits of Efficiency Maine, further reducing energy demand and associated GHG emissions. These include the development and adoption of commercial and residential energy efficiency building codes and labeling provisions, weatherization incentives, and appliance efficiency programs. In 2008, the statutory authority necessary to reach and implement ambitious efficiency building code improvements was passed into Maine law as "An Act to Establish a Uniform Building and Energy Code," which took effect January 1, 2010. Similarly, the Green Building Standards of the Maine State Housing Authority, the first of their kind in the country among housing finance agencies, are projected to result in housing projects that are 30% more energy efficient compared to conventionally built projects.

Coupled with these policies and programs that contribute to GHG reductions are Mainers' quintessential qualities of conservation and frugality. According to the *2008 Maine Residential Heating and Energy Survey*, many Mainers respond to higher heating fuel prices by turning to heating units that burn home-grown fuels (wood and pellet stoves) for both primary and supplemental heat, and by adapting their living space, even if it means some loss of creature comfort, such as turning down the thermostat or closing off rooms.

Renewable and low-carbon energy sources for the future

Wind Power. Recognizing Maine as New England's leader in potential for terrestrial wind power development, in 2007 Governor Baldacci established the Wind Power Task Force to review and recommend policy changes that would facilitate development of that potential and protect Maine's unique resources.

The result of Governor Baldacci's Wind Power Task Force work was the 2008 Wind Energy Act which modified permitting standards. The 2008 Wind Energy Act also set installed wind power capacity goals of at least 2,000 megawatts (MW) by 2015 and 3,000 MW by 2020, including offshore wind projects. Since then, the four state agencies with responsibilities under the Act have streamlined the wind power development and environmental review process.

Maine is now host to 95% of the installed wind power in New England at 170 MW. A total of 430 MW of land-based wind has received environmental approvals for construction through January 2010, with an approximate value exceeding $1 billion. When the full 430 MW now permitted is installed, it will result an approximate 15% addition of wind power to Maine's electrical generation fleet when the wind resource is blowing. With hundreds of additional megawatts expected to file for approvals in 2010, Maine appears on track to meet the goals set in the 2008 Wind Energy Act and to remain the leader among New England states in developing this renewable and sustainable energy resource.

Ocean Energy. In 2008, Governor Baldacci established an Ocean Energy Task Force to develop the policy, legislative, and economic development recommendations necessary to encourage

ocean-based energy projects, including wind and tidal. This initiative reflects the status of the Gulf of Maine as a world-class resource of clean power, with a theoretical capacity three times greater than all of New England's current installed capacity. The Governor's Ocean Energy Task Force produced a comprehensive report in 2010 and is preparing legislation similar to the 2008 Wind Energy Act with a focus on addressing the unique issues of the marine environment. The report recommends modifications to the Department's, Department of Conservation's, and State Planning Office's permitting and submerged land processes. The report also recommends that the Legislature set a goal of developing 5 GW (5,000 MW) of ocean energy by 2030. The objective is to use Maine's unique resources to create a regional clean energy hub to move the New England electrical grid towards a markedly reduced carbon footprint.

Renewable Portfolio Standard. For over a decade, Maine has been committed to an overall energy policy that emphasizes independence from, and reduced use of, imported fossil fuels through the development of local sources of renewable energy supplies. This policy is manifest in Maine's Eligible Resource Portfolio Requirement (commonly known as the Renewable Portfolio Standard or RPS) and in continuing progress toward developing Maine's full energy potential.

Maine's initial RPS was passed by the Legislature as part of its electric restructuring law which went into effect in 2000. The RPS at that time was set at 30%. In order to increase the development of renewable energy technologies, in 2008 the Legislature enacted a new RPS for facilities constructed after September 2005. The standard starts at 1% and increases by 1% per year for 10 years, capping at 10% by 2017. The total requirement in Maine will be 40% in 2017. To the extent that these renewable energy technologies displace higher-carbon sources, Maine's overall GHG emissions will be correspondingly reduced.

Improved fuel and vehicle efficiencies

Petroleum-based transportation fuels accounted for 41% of Maine's gross GHG emissions (including CH_4 and N_2O) in 2008, more than double the contribution from any other economic sector. Policies and programs at state, regional, and federal levels to address this situation must of necessity be a critical component of any effective GHG reduction strategy. Examples include a Low Carbon Fuel Standard, vehicle efficiency standards, incentive programs, and education and outreach.

Low Carbon Fuel Standard. A Low Carbon Fuel Standard (LCFS) is a market-based program designed to lower the GHG emissions from petroleum-based transportation fuels, and potentially from fuels used for space heating as well. The LCFS will require regional fuel suppliers to demonstrate that the average carbon content of the fuel they deliver is reduced over time. A credit trading system will provide opportunities to control costs by allowing a supplier to purchase credits from low carbon fuels and average them with higher carbon fuels delivered to customers. Rather than imposing restrictions on specific fuel types, this approach allows fuel providers to choose among different fuels, based on cost effectiveness and environmental impact, in order to meet the carbon intensity reduction targets set by the program. This policy will allow the fuel industry flexibility to determine when and where new infrastructure can be introduced

most efficiently, such as the use of electric vehicles or additional supplies of liquid low carbon fuels.

The nation's first LCFS program was initiated by California in 2007, and similar programs are now being considered in Oregon, Washington, and ten Midwestern states. Maine is now a signatory, along with ten other New England and Mid-Atlantic states, to a Memorandum of Understanding which affirms each state's commitment to working together toward developing a regional LCFS program framework by 2011. The preliminary goal of the program is a 10% reduction in the carbon intensity of transportation fuels used in the region, which would result in an annual reduction of approximately 30 million tons of GHG emissions throughout the region. This effort is paralleled by Maine's participation and leadership in transportation initiatives among the New England Governors/Eastern Canadian Premiers (NEG/ECP).

Vehicle Fuel Efficiency. Efforts to address vehicle fuel efficiencies are also underway at state and federal levels. In 2009, EPA and the Department of Transportation's National Highway Safety Administration (NHTSA) proposed an historic National Fuel Efficiency Program that would dramatically reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the United States. The proposed standards would cut CO_2 emissions by an estimated 950 MMT and would save 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016).

Vehicle GHG standards. At the state level, Maine has adopted rules to follow California's vehicle GHG standards, aimed at reducing GHG emissions from passenger vehicles: the Pavley Rule. Maine and other states, in the absence of a national program, adopted the California passenger vehicle standards. In June 2009, EPA granted California the waiver necessary to implement their GHG emission standards for new vehicles beginning with 2009 model year and fully phased in at 2016. At that time, both the federal Corporate Average Fuel Economy (CAFE) standard and the Pavley Rule will have the same emission benefits of 30% reduction of GHG emissions. A total of 14 states representing 37% of the U.S. car market, including California, are using California's GHG standards.

Federal Clean Vehicle Incentives. Another approach to reducing transportation-related GHG emissions has been incentives to encourage the purchase of vehicles that operate on cleaner fuels. The federal incentive programs established under the 2005 Energy Policy Act will sunset in 2010 unless they are extended.

- Hybrids and some diesels purchased or placed into service after December 31, 2005 may be eligible for a federal income tax credit up to $3,400. There is a limit on the number of eligible units a manufacturer may sell and some have already sold out this credit (e.g., Honda and Toyota hybrids). This credit sunsets on December 31, 2010, unless extended.
- Qualifying alternative fuel vehicles (AFVs) purchased or placed into service between January 1, 2005 and December 31, 2010 may be eligible for a federal income tax credit up to $4,000. Vehicles placed into service before January 1, 2005 may be eligible for a $2,000 clean-fuel vehicle tax deduction.
- Plug-in hybrids and electric vehicles (EVs) purchased in 2009 may be eligible for a federal income tax credit up to $7,500. The amount will vary based on the capacity of the battery used to help power the vehicle. This credit will be replaced with a similar credit

for plug-in hybrids purchased *after* 2009.

- The 2009 cash-for-clunkers incentive promoted the replacement of older, less fuel-efficient vehicles with new fuel-efficient ones. In Maine, over 1,500 new vehicles were purchased.

Corporate and personal decisions to switch energy sources

As noted previously, petroleum usage has declined since 2003 in most economic sectors, with the greatest reductions in the electric power and residential sectors. Although some portion of these reductions is likely related to the increasing price of petroleum fuels over recent years, reductions in usage are also likely to have resulted from changes in fuels available in Maine, technology advances, and personal decisions based on increasing awareness.

Introduction of Natural Gas. With the shutdown of Maine's nuclear power plant (Maine Yankee) in 1998 and the construction of natural gas pipelines in the State, the early 2000's saw the construction of five natural gas-fired turbine facilities in Maine. Three of these facilities were constructed as stand alone electric power generating plants while two were constructed to be integrated with existing pulp and paper facilities, taking advantage of the need for steam in the generation of electricity and for heating and process needs. These types of units that provide energy for generating electricity and for generating steam for heating or process needs are known as combined heat and power (CHP) units and are more efficient than traditional electric generating units. In the case of the units located at the pulp and paper facilities, natural gas replaced the use of higher carbon containing fuels such as coal and residual oil, thus reducing carbon dioxide emissions.

Rising and Fluctuating Oil Prices. Rising oil prices and the desire to reduce dependence on foreign fossil fuels have also driven some businesses and residences to replace oil-fired units either with newer, more efficient units or with wood or pellet-fired units. The efficiencies of residential oil-fired furnaces in the last twenty years have gone from being in the range of 56% to 70% efficient to being in the range of 83% to 95% efficient. Some smaller facilities such as schools and commercial buildings are beginning to install commercial size, biomass-fired boilers for heating purposes. High efficiency wood-burning technology developed in Europe is beginning to penetrate the U.S. market, including Maine.

Increased Use of Wood. A portion of the decline in emissions in the residential sector is likely associated with an increase in the use of wood-burning appliances in Maine households. Cordwood is a renewable, sustainable and home-grown source of energy for home heating, and it has long been a traditional supplemental heat source for Maine households. Unfortunately, much of the equipment presently in use in Maine does not meet current standards of efficiency.

- New EPA-certified woodstoves are 50 to 100% more efficient than older woodstoves. This means they burn one-third to half as much wood to achieve the same heat output as older woodstoves.
- New EPA-certified woodstoves emit about 70% less particulate and toxic pollutants than stoves manufactured before 1988. EPA certification limits particulate emission rates (at manufacture) to no more than 7.5 grams per hour (g/hr). Old woodstoves can emit up to 40 g/hr.

In response to this situation, the DEP is developing a program to assist homeowners in the replacement of older woodstoves with less polluting, more efficient EPA-certified woodstoves. The program will reduce fossil fuel combustion in the residential sector, increase energy efficiency, and result in lower CO_2 emissions due to reduced combustion of both wood and fossil fuels.

Direct reductions of GHG emissions at their source

Several programs initiated at the State and Federal levels have established policies and programs aimed at meeting and exceeding greenhouse gas reduction goals by addressing emissions at the source. In addition to the Regional Greenhouse Gas Initiative discussed earlier, these include emerging federal initiatives, other regional initiatives and DEP internal programs.

Federal Legislation and Leadership. At the federal level, Executive leadership and Congressional actions have resulted in significant movement toward GHG reductions and a national cap and trade program. Following his 2009 Executive Order on Federal Sustainability, President Obama recently announced that the federal government will "lead by example", reducing GHG emissions 28% by 2020. In June the House of Representatives passed The American Clean Energy and Security Act (H.R.2454, commonly referred to as ACESA). Included in its comprehensive provisions are the details of an economy-wide cap and trade program with greenhouse gas reduction goals, compared to 2005 levels, of 3% by 2012, 17% by 2020, 42% by 2030, and 83% by 2050. Similar legislation is still under consideration in the U.S. Senate and would provide for a 20% reduction by 2020. Estimated gross emissions of GHG in Maine declined 16% from 2005 to 2008, indicating that Maine should easily exceed proposed near-term national emission reduction goals.

Using national auction proceeds, ACESA also makes funding provisions to the states for several energy efficiency and climate change adaptation programs. Because ACESA would replace RGGI for at least seven years, these federal funds would enable Maine initiatives currently funded through RGGI-auction proceeds to continue. Coupled with federal initiatives such as the National Fuel Efficiency Policy and the National Renewable Fuel Standard established under the 2005 Energy Policy Act, a national cap and trade program holds promise to enable Maine to make even greater gains in GHG emission reductions than are already possible through RGGI.

Regional Policy Initiatives. Along with over 20 other states, Maine's voice is consistently heard at national and regional levels on a variety of climate change matters. For example, Maine has been instrumental at both staff and agency head levels in designing and implementing RGGI among the Northeastern and Mid-Atlantic states. Maine is a member of the **State Voice Collaborative** which engages directly with EPA in communicating states' positions and advocating for continued strong state-federal partnership. Maine also has a leadership role in transportation GHG emission reduction efforts with New England states, Canadian provinces, and the RGGI region. Maine is also an active and respected member of **The Climate Registry** - a GHG registration collaborative of over 41 states, all Canadian provinces, and all of the Mexican border states – that is developing GHG calculation and accounting standards and protocols. In the forestry sector, Maine is a recognized leader in evaluating **forest offset**

protocols that will be essential to a successful national cap and trade program, providing financial opportunities for Maine's forest landowners.

Governor's Carbon Challenge. Recognizing the critical importance of educating and engaging all Mainers, the Department has been the lead agency in designing and implementing the Governor's Carbon Challenge. The Challenge program provides education and technical assistance to businesses, schools, municipalities, and organizations that make a commitment to reducing their carbon emissions from both direct and indirect sources. To date, over 80 participants have enrolled, representing 240 facilities, and have eliminated over 0.35 million metric tons (MMT) of CO_2 emissions. Outreach programming now under development will focus on adding energy and environmental components to the Lean process of the Manufacturing Extension Partnership.

Landfill Gas Management. Another important state-federal partnership is addressing emissions of methane, a greenhouse gas with more than 20 times the atmospheric warming potential of CO_2. Historically, one of the principal sources in Maine of methane emissions has been landfills without gas management programs. Under the direction of the Department's Bureau of Remediation and Waste Management, more than 350 landfills with uncontrolled gas releases have been closed in Maine since 1990, and current regulations require all new facilities to incorporate gas management technology.

In recent years, several active Maine landfills have installed and operated technologies to capture and destroy methane through flaring, and in some cases to use the captured gas for energy production, replacing higher-carbon imported fuels. In 2003 there were three facilities that destroyed a total of approximately 0.2 MMT of methane; by 2009 there were seven such facilities destroying an estimated 0.5 MMT annually. These levels are expected to continue into the foreseeable future. Additional potential for both destruction and energy production exists in Maine, including Hatch Hill in Augusta and Presque Isle (scheduled to begin flaring in 2010). Technical support for these voluntary projects, which under current policy are eligible for carbon reduction credits, is provided by the Department and by the EPA Landfill Methane Outreach Program (LMOP).

V. Conclusions

This Third Biennial Report on Maine's progress toward statutory GHG reduction targets has included a preliminary analysis of total emissions for the period of 1990-2008. Based on that analysis, the Department offers the following conclusions.

- Maine is firmly on track to reach the first reduction target of 1990 levels by 2010. Total emissions for 2008 were only 0.5 MMT above the target, and reduction initiatives already underway should result in meeting the goal.

- A more detailed analysis that includes projections to 2020, as the Department intends for the 2012 *Fourth Biennial Report*, will provide additional insights into how Maine's emissions respond to shifts in various factors: e.g., economic fluctuations. More analysis

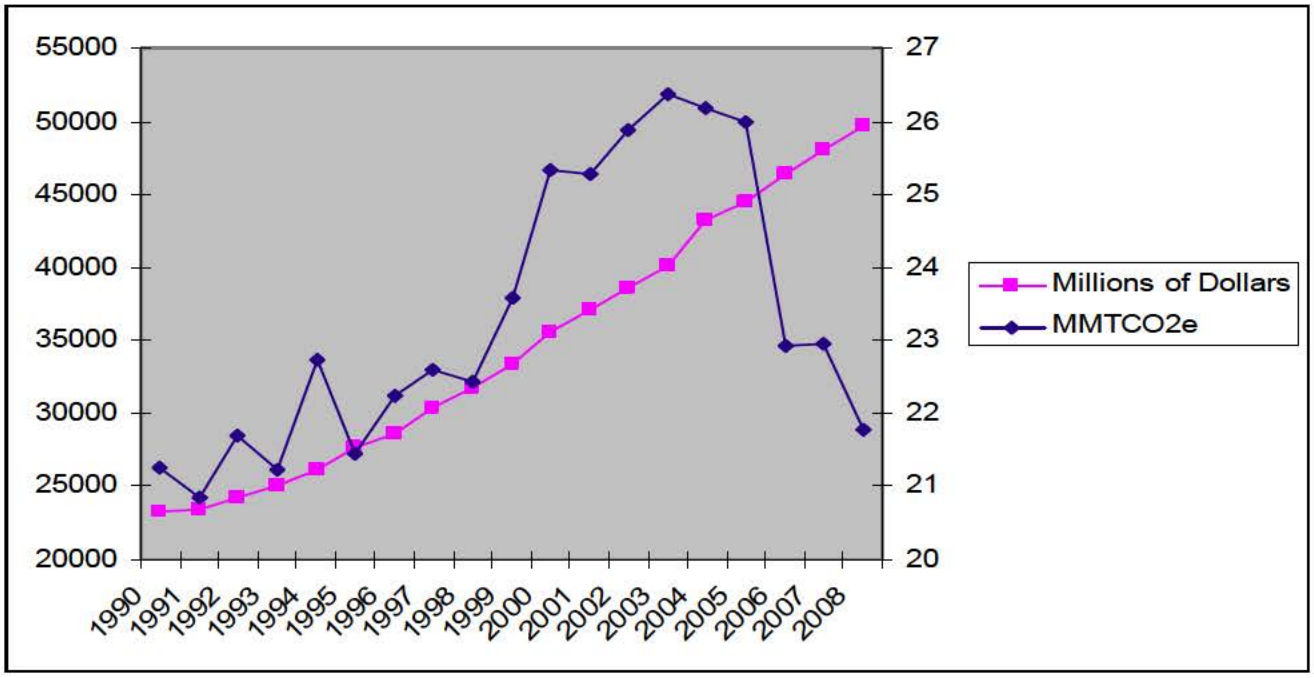
is also needed concerning electrical generation and consumption, black carbon, biomass combustion, and the critical role of Maine's forests in GHG accounting.

- Since the passage of the 2003 Climate Change Act, Maine has established a solid foundation of policies and programs that will result in continuing reductions in GHG emissions. Of particular note are initiatives in energy efficiency, renewable energy, and transportation efficiencies. These and other initiatives that are in development should be our continuing focus.

- Maine's government, businesses, and citizens have demonstrated a strong commitment to reducing Maine's dependence on imported fossil fuels. This commitment has been aided by a combination of economic factors (e.g., fuel prices and availability) and by government incentives that have assisted in this transition.

- Maine has worked diligently to develop strong regional and national partnerships on GHG initiatives, to demonstrate leadership in those arenas, and to strengthen GHG mitigation strategies. These partnerships help Maine to address issues that extend beyond its borders, and Maine's programs at home are stronger as a result.

Appendix A. Gross Domestic Product and Total GHG Emissions



Source: U.S. Bureau of Economic Analysis. Regional Economic Accounts, Gross Domestic Product by State. www.bea.gov/regional/gsp/

Appendix B. Energy-related CO_2e Emissions

MMTCO2e

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Energy	19.77	19.34	20.16	19.73	21.16	19.80	20.46	20.72	20.35	21.46
CO_2 from Fossil Fuel Combustion	19.10	18.65	19.43	19.00	20.42	19.05	19.71	19.98	19.63	20.66
Stationary Combustion (CH_4 & N_2O)	0.27	0.29	0.30	0.30	0.30	0.31	0.31	0.30	0.28	0.29
Mobile Combustion (CH_4 & N_2O)	0.39	0.39	0.41	0.42	0.43	0.42	0.43	0.43	0.44	0.42
Natural Gas and Oil Systems	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.09

MMTCO2e

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Energy	23.31	23.17	23.67	24.13	23.91	23.55	20.61	20.64	19.47
CO_2 from Fossil Fuel Combustion	22.51	22.41	22.96	23.46	23.26	22.91	20.00	20.05	18.92
Stationary Combustion (CH_4 & N_2O)	0.30	0.27	0.26	0.24	0.25	0.26	0.23	0.25	0.25
Mobile Combustion (CH_4 & N_2O)	0.41	0.40	0.36	0.34	0.31	0.30	0.28	0.24	0.20
Natural Gas and Oil Systems	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09

Appendix C. CO_2 from Fossil Fuel Combustion

MMTCO2

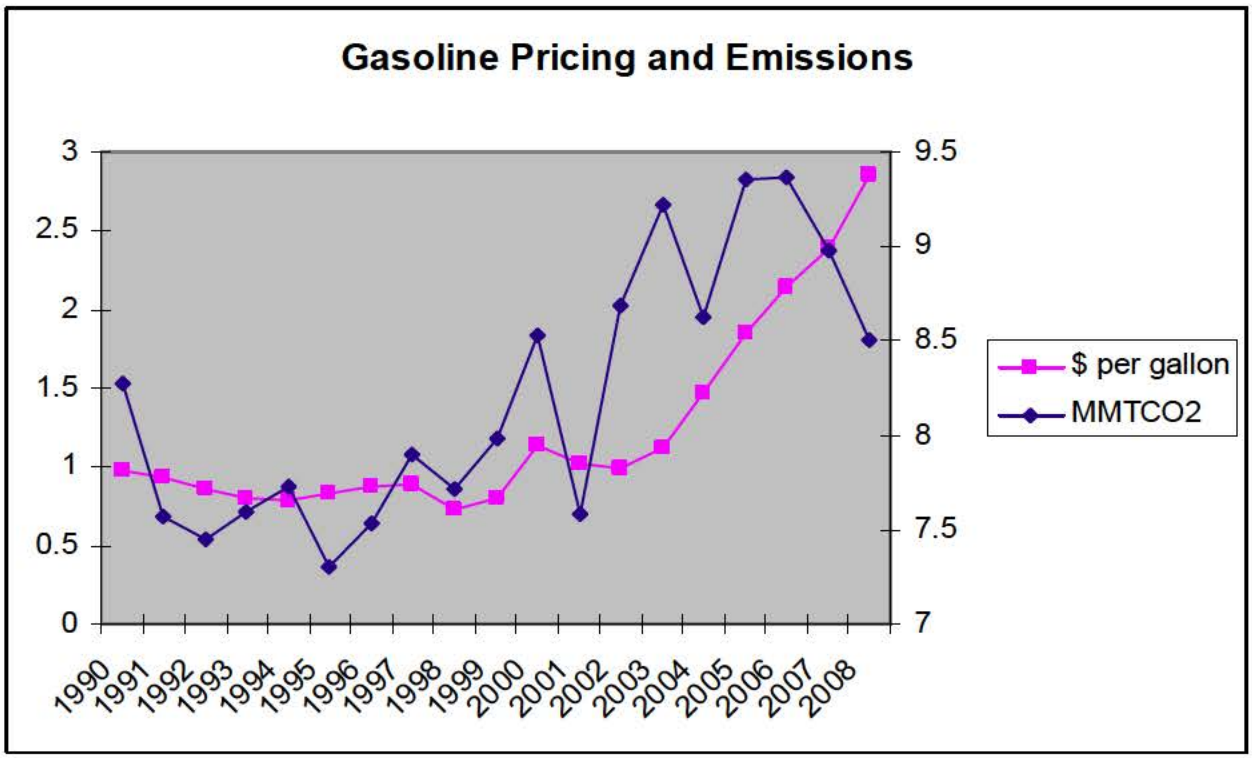
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Residential	3.03	3.04	3.05	3.18	3.26	4.00	4.13	3.97	4.28	4.07
Coal	0.02	0.01	0.02	0.01	0 00	0.00	0.00	0.00	0.00	0.00
Petroleum	2.98	3.00	2.98	3.12	3.21	3.95	4.07	3.91	4.23	4.02
Natural Gas	0.03	0.04	0.05	0.05	0 05	0.05	0.05	0.05	0.05	0.05
Commercial	2.18	2.16	1.73	1.68	1.71	1.41	1.55	1.55	1.60	1.48
Coal	0.08	0.03	0.07	0.05	0.01	0.01	0.01	0.01	0 01	0.01
Petroleum	2.01	2.03	1.54	1.50	1.57	1.27	1.40	1.40	1.46	1.34
Natural Gas	0.09	0.10	0.12	0.12	0.13	0.13	0.14	0.15	0.13	0.14
Industrial	3.47	4.15	5.51	5.21	6.48	5.07	5.39	4.76	4.05	3.75
Coal	0.52	0.84	1.91	0.98	1.06	0.65	0.53	0.44	0.32	0.27
Petroleum	2.85	3.19	3.49	4.14	5.33	4.32	4.74	4.19	3.61	3.35
Natural Gas	0.11	0.12	0.11	0.09	0 09	0.11	0.12	0.13	0.12	0.13
Transportation	8.27	7.57	7.45	7.60	7.73	7.30	7.53	7.90	7.71	7.98
Petroleum	8.27	7.57	7.45	7.60	7.72	7.30	7.53	7.90	7.71	7.98
Natural Gas	0.00	0.00	0.00	0.00	0 00	0.01	0.00	0.01	0.00	0.00
Electric Generation	2.14	1.73	1.70	1.34	1.24	1.27	1.12	1.80	1.99	3.38
Coal	0.36	0.57	0.57	0.58	0.57	0.37	0.38	0.39	0.35	0.36
Petroleum	1.77	1.15	1.12	0.75	0.66	0.89	0.74	1.40	1.63	2.98
Natural Gas	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.03
TOTAL	19.10	18.65	19.43	19.00	20.42	19.05	19.71	19.98	19.63	20.66
Coal	0.98	1.44	2.57	1.63	1.65	1.03	0.92	0.84	0.68	0.64
Petroleum	17.88	16.94	16.58	17.10	18.49	17.72	18.48	18.80	18.64	19.67
Natural Gas	0.24	0.26	0.28	0.27	0.28	0.30	0.31	0.34	0.30	0.35

Appendix C (continued)

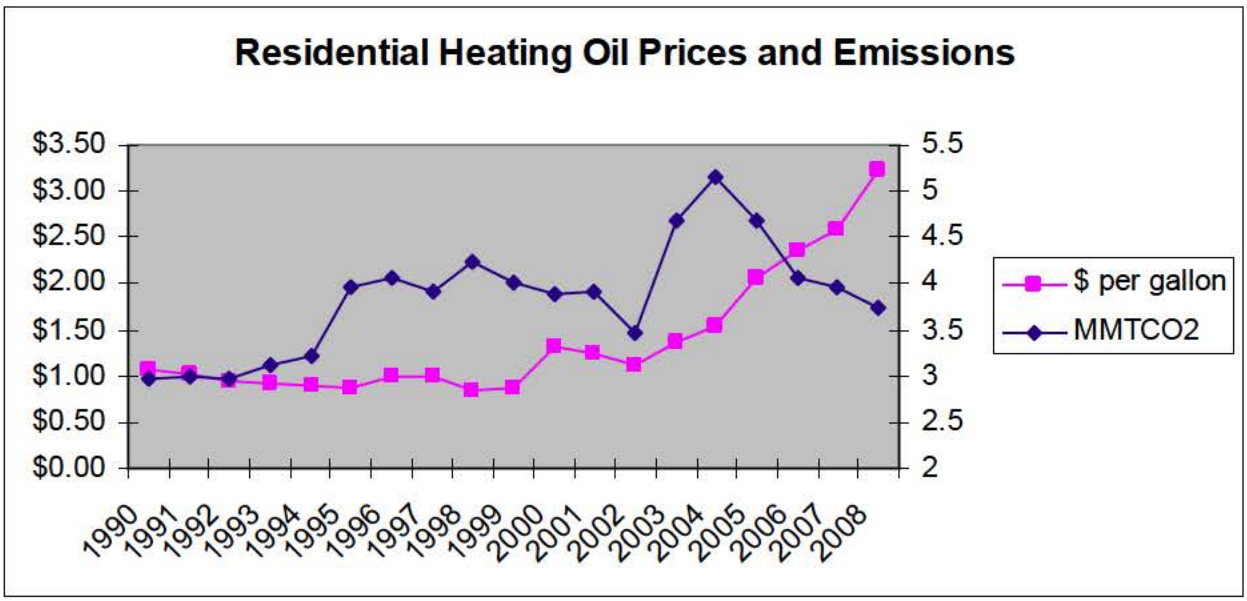
MMTCO2

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Residential	3.95	3.96	3.53	4.74	5.22	4.75	4.13	4.03	3.80
Coal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Petroleum	3.89	3.90	3.46	4.67	5.15	4.68	4.07	3.96	3.73
Natural Gas	0.06	0.06	0.07	0.08	0.07	0.07	0.06	0.07	0.07
Commercial	1.78	1.45	1.79	2.16	2.10	1.92	1.67	1.97	1.89
Coal	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.01	0.01
Petroleum	1.60	1.28	1.44	1.85	1.81	1.64	1.38	1.61	1.52
Natural Gas	0.17	0.16	0.35	0.30	0.29	0.27	0.29	0.34	0.36
Industrial	4.64	3.61	3.00	2.49	2.73	3.02	2.09	2.44	2.25
Coal	0.53	0.30	0.21	0.29	0.28	0.30	0.00	0.27	0.26
Petroleum	3.34	2.65	2.55	2.00	2.30	2.58	1.91	1.99	1.80
Natural Gas	0.77	0.66	0.24	0.21	0.16	0.15	0.18	0.18	0.18
Transportation	8.57	7.65	8.75	9.27	8.67	9.39	9.40	9.02	8.56
Petroleum	8.53	7.58	8.69	9.22	8.63	9.36	9.37	8.98	8.51
Natural Gas	0.05	0.07	0.06	0.05	0.04	0.03	0.03	0.04	0.04
Electric Generation	3.57	5.74	5.89	4.79	4.53	3.83	2.70	2.59	2.43
Coal	0.39	0.43	0.53	0.40	0.40	0.35	0.35	0.33	0.33
Petroleum	1.70	0.92	0.37	1.05	0.65	0.76	0.09	0.36	0.25
Natural Gas	1.47	4.39	4.99	3.33	3.48	2.71	2.26	1.90	1.85
TOTAL	22.51	22.41	22.96	23.46	23.26	22.91	20.00	20.05	18.92
Coal	0.93	0.73	0.74	0.70	0.68	0.66	0.36	0.61	0.60
Petroleum	19.06	16.33	16.51	18.79	18.54	19.02	16.82	16.91	15.82
Natural Gas	2.52	5.34	5.71	3.97	4.04	3.23	2.82	2.53	2.50

Appendix D. Emissions and Pricing



Source: U.S. Energy Information Administration, Petroleum Navigator. Topics for Petroleum Prices: Refiner, Reseller, and Retailer Monthly Prices: Gasoline Prices by Formulation, Grade, Sales Type. Maine Annual: Gasoline, Average: Maine Total Gasoline Retail Sales by All Sellers



Source: U.S. Energy Information Administration, Petroleum Navigator. Topics for Petroleum Prices: Refiner, Reseller, and Retailer Monthly Prices: No. 2 Distillate Prices by Sales Type. Maine Annual: Sales to End Users, Average, Residential: U.S. No 2 Distillate Residential Price by All Sellers