

Wisconsin's Strategy for Reducing Global Warming



Governor's Task Force on Global Warming

Final Report to Governor Jim Doyle

July 2008



Task Force on Global Warming

Department of Natural Resources

Public Service Commission of Wisconsin



July 24, 2008

Governor Jim Doyle
115 East State Capitol
Madison, WI 53702

Dear Governor Doyle:

As Co-Chairs of the Governor's Task Force on Global Warming, we are very pleased to present you with the Task Force's Final Report (the Report). This Report was approved today by the diverse Task Force that you convened pursuant to Executive Order 191 (the Order). The Report represents the recommendations of an overwhelming majority of the Task Force.

The Report addresses each of the assignments set forth in Executive Order 191 in ways that will make Wisconsin a leader in addressing the significant challenges presented by climate change, substantially reduce Wisconsin's dependence on fossil fuel and advance the state's energy independence objectives. The Report recommends aggressive short and long-term goals for reductions of greenhouse gas (GHG) emissions that are consistent with Wisconsin's proportionate share of the reductions needed worldwide to minimize the impacts of global warming. The goals are (i) a reduction to 2005 emissions levels no later than 2014, (ii) a reduction of 22% below 2005 GHG emissions levels by 2022, and (iii) a reduction of 75% from 2005 GHG emissions levels by 2050.

The Report makes over 50 viable and actionable policy recommendations in the utility, transportation, agriculture and forestry and industry sectors, as well as a number of recommendations in other areas, including a proposed federal or regional GHG Cap and Trade Program. In accordance with the Order, many of the Task Force's recommendations identify ways to grow the state's economy and create new jobs arising from the opportunities created by addressing climate change. Careful attention also has been paid to mitigating the potential costs of the recommended policies on consumers and Wisconsin's industrial base.

In February of this year, the Task Force issued an Interim Report that included a number of early action recommendations. Those recommendations are incorporated into this Final Report. Early and prompt action to mitigate the impacts of climate change is essential for a number of reasons. They include the fact that greenhouse gases emitted today will affect climate many years into the future and the fact that early action will provide the time necessary for the development and commercial implementation of the new, clean technologies and new low-carbon fuel sources essential for the long term. Aggressive energy conservation and efficiency is the lowest-cost, most

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effective early action strategy available. It will not only reduce emissions, but also reduce utility bills for customers and defer the need for expensive, new power plants.

As Co-Chairs of the Task Force, we are very grateful for the confidence you have placed in us to shepherd this important effort. Addressing the issue of climate change is one of the most significant challenges that confronts Wisconsin, the nation and the world. Your strong leadership in establishing the Task Force, and in moving to implement the Task Force's recommendations, as has already occurred with many of the Interim Report recommendations, is very greatly appreciated. We pledge our support to help in whatever ways we can to enable Wisconsin to achieve the goals recommended and implement the policies set forth in this Report through legislation, regulation and voluntary action.

Finally, we wish to recognize the tremendous amount of work that has gone into this Report by members of the Task Force, staffs of their organizations and others who served on the many Task Force work groups, as well as the excellent state agency staff support, particularly from the Public Service Commission of Wisconsin and the Department of Natural Resources, that has been essential to the success of this effort. We are very pleased to report that throughout the process there has been active public participation in our work through attendance at meetings and the provision of numerous written and oral comments. The Report is the product of the work of a great many individuals. We are particularly pleased to forward it to you with the overwhelming support of Task Force members.

Sincerely,



Tia Nelson, Co-Chair



Roy Thilly, Co-Chair

FINAL REPORT BY THE GOVERNOR'S TASK FORCE ON GLOBAL WARMING

July 2008

Mission of the Task Force

The Global Warming Task Force was created by Governor Jim Doyle, pursuant to Executive Order 191 on April 5, 2007. The assignments of the Task Force are to:

- Present viable, actionable policy recommendations to the Governor to reduce greenhouse gas (GHG) emissions in Wisconsin and make Wisconsin a leader in implementation of global warming solutions.
- Advise the Governor on the ongoing opportunities to address global warming locally, while growing our state's economy, creating new jobs, and utilizing an appropriate mix of fuels and technologies in Wisconsin's energy and transportation portfolios.
- Identify specific short- and long-term goals for reductions in GHG emissions in Wisconsin that are, at a minimum, consistent with Wisconsin's proportionate share of reductions that are needed to occur worldwide to minimize the impacts of global warming.

This Final Report of the Task Force fulfills these duties.

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Executive Summary

In February 2008, the Task Force issued an Interim Report to the Governor describing its work to date and making eleven important early action recommendations. The Interim Report was approved unanimously by the Task Force. As a result of these recommendations, the Public Service Commission of Wisconsin (PSC) and the Department of Natural Resources (DNR) have initiated five proceedings to begin to implement recommendations in the Interim Report.

This Final Report incorporates the recommendations in the Interim Report. This Final Report has been approved by the 29-member Task Force with three dissenting votes, as discussed later in this Report. Thus, it represents the recommendations of the very substantial majority of Task Force members.

Like the Interim Report, many of the policies in the Final Report were developed by work groups on a consensus basis, with no objections from any Task Force members. However, there were several important policies as to which divergent views existed. These policies, among others, included changes to the state's renewable portfolio standard for electric utilities, early action requirements for utilities, modifications to the state's moratorium on the construction of new nuclear power plants, a proposed cap and trade system to regulate GHG emissions as well as vehicle GHG emission standards. In order to resolve differences on these issues, the Co-Chairs of the Task Force developed a comprehensive compromise proposal (the Strawman Proposal). The Strawman Proposal was commented upon and discussed by the Task Force, modified by the Co-Chairs and voted on to complete the Task Force's work. Those members of the Task Force voting in favor of the Strawman Proposal are the same members who have approved this Final Report. In doing so, despite concerns by some related to one or more individual

recommendations, they have recognized the importance of achieving broad consensus on policies to address the serious issues raised by climate change, effectively and promptly. The three dissenting members of the Task Force are unable to accept certain elements of the compromise.

Goals

The Task Force recommends the following short-term and long-term goals for reductions of GHG emissions to achieve Wisconsin's proportionate share of reductions needed worldwide to minimize the impacts of global warming:

- A return to 2005 levels no later than 2014
- A 22% reduction from 2005 levels by 2022
- A 75% reduction from 2005 levels by 2050

The Task Force believes that these goals are challenging, but achievable, provided that there is the political will to act promptly on recommended policies and individuals and businesses, recognizing the gravity of the challenge faced, take responsibility for voluntarily reducing their GHG emissions.

Recommended Policies to Reduce GHG Emissions and Make Wisconsin a National Leader

The many policies recommended by the Task Force are listed in Appendix A and set forth in detail in Appendix E, including the policies in the Interim Report. This report also contains a brief summary of each policy, indicating whether the policy is voluntary or requires regulatory or legislative action. Key elements of the Task Force's recommendations are highlighted below.

Overarching Policies

Improved Data Collection and Ongoing GHG Reduction Strategy, Evaluation, Development and Oversight

As a result of the Task Force's work, a number of lessons have been learned related to the data needed to accurately determine the state's GHG emissions by sector, measure progress and model the probable impacts of actions to reduce emissions. Appendix D to this Report is a Summary Report from the Task Force's Technical Advisory Group (TAG) on its work. A more detailed report will be posted on the Task Force's web site. These lessons need to be retained and used to inform future work on climate change in the state, the region and nationally.

As a result of the TAG's work and the Strawman Proposal, the Task Force's recommendations include steps the state should take to improve GHG emissions and terrestrial sequestration data and analyses in the future. To succeed, the state will need to continuously evaluate additional ways to reduce emissions. The recommendation proposes that a single agency be designated to take the lead in (i) continuing the work begun by the Task Force, evaluating the effectiveness, costs and benefits of existing policies and of proposed new policies in order to meet the state's goals, (ii) overseeing improved data collection and (iii) reporting on a regular basis to policymakers and the public in a clear, understandable and highly credible fashion on the state's progress in meeting goals. In addition, the net emission reduction goals proposed in this Report should be re-evaluated regularly based on current science, progress and technology.

Comprehensive Initiative to Support Voluntary Long-Term Greenhouse Gas Emissions Reductions

An important recommendation entitled "Comprehensive Initiative to Support Voluntary Long-Term Greenhouse Gas Emissions Reductions in Wisconsin," first made in the Interim Report, recognizes that for the state to be successful, substantial changes in consumer and business

behavior and choices will need to be made. It advocates a broad-based marketing campaign to educate the public and inspire behavioral change. The policy notes that many individuals, communities and businesses have a strong desire to understand their GHG footprints and the actions they can take to reduce those footprints. The Initiative would provide expertise, training and funding to enable effective action to be taken. This policy also proposes that the Initiative focus on job training and development, and assistance to businesses, to take advantage of opportunities provided by the need to transition to a carbon-constrained economy.

Research and Development

The Task Force recommends substantial increases in federal and state research and development (R&D) for GHG reduction technologies and climate change adaptation. In particular, this recommendation addresses making Wisconsin a leader in renewable resource R&D, as well as focusing on carbon capture and sequestration for new electric generation and other low or zero carbon emitting resources.

Utility-Related Policies, Including Residential and Commercial Emissions

The utility sector, including emissions in the residential and commercial sectors (primarily driven by heating and other uses of natural gas, oil and propane), is the largest contributor to GHG emissions in Wisconsin. The policies recommended for this sector will result in a substantial reduction over time in the state's dependence on fossil fuels and, in particular, on coal-fired generation that does not include carbon capture and sequestration technology.

The Task Force's proposed utility-related policies fall into two areas. The first set is recommendations to substantially increase energy conservation and efficiency (C&E) to minimize waste and help achieve energy independence. C&E is the most effective, least-costly early action that can be taken to

reduce GHG emissions. These policies propose aggressive, new C&E targets and funding, state-of-the-art building codes, state leadership and many other policies to save energy.

The second set of utility policies addresses the need for research, development and deployment of much cleaner electric generation technologies in the future to meet the state's electric needs on a highly reliable basis. They include recommendations to (i) substantially enhance and accelerate deployment of renewable resources, (ii) increase R&D related to renewable resources and clean coal technologies, and (iii) modify Wisconsin's existing moratorium on new nuclear power plants, once the Task Force's C&E and renewable policies are in place, so that this option may be considered, among others, in the effort to meet the state's emissions reduction goals over the long term, subject to a Public Service Commission determination that such a plant is safe, economic and in the public interest. In addition, a number of enabling policies are included, such as (i) a PSC proceeding to examine current utility GHG reduction plans, review alternatives and promote voluntary action, (ii) transmission expansion to access renewable and other resources, (iii) wind siting reform, (iv) studies of the feasibility of Great Lakes wind development and carbon capture and sequestration, and (v) development of Wisconsin's biomass and biofuels potential.

Transportation

The transportation sector is the second highest contributor to Wisconsin's GHG emissions. The policies in this area are directed at three strategies to reduce sector emissions. The first focuses on reducing GHG emissions through vehicle technologies. These policies address vehicle emission standards, as well as truck idling, promotion of plug-in and hybrid electric vehicles and other matters.

The second set of policies focuses on reducing the carbon content of the fuel used for

transportation, including development of the infrastructure necessary for use of biofuels and growth of biofuel feedstocks, with a particular focus on non-food sources.

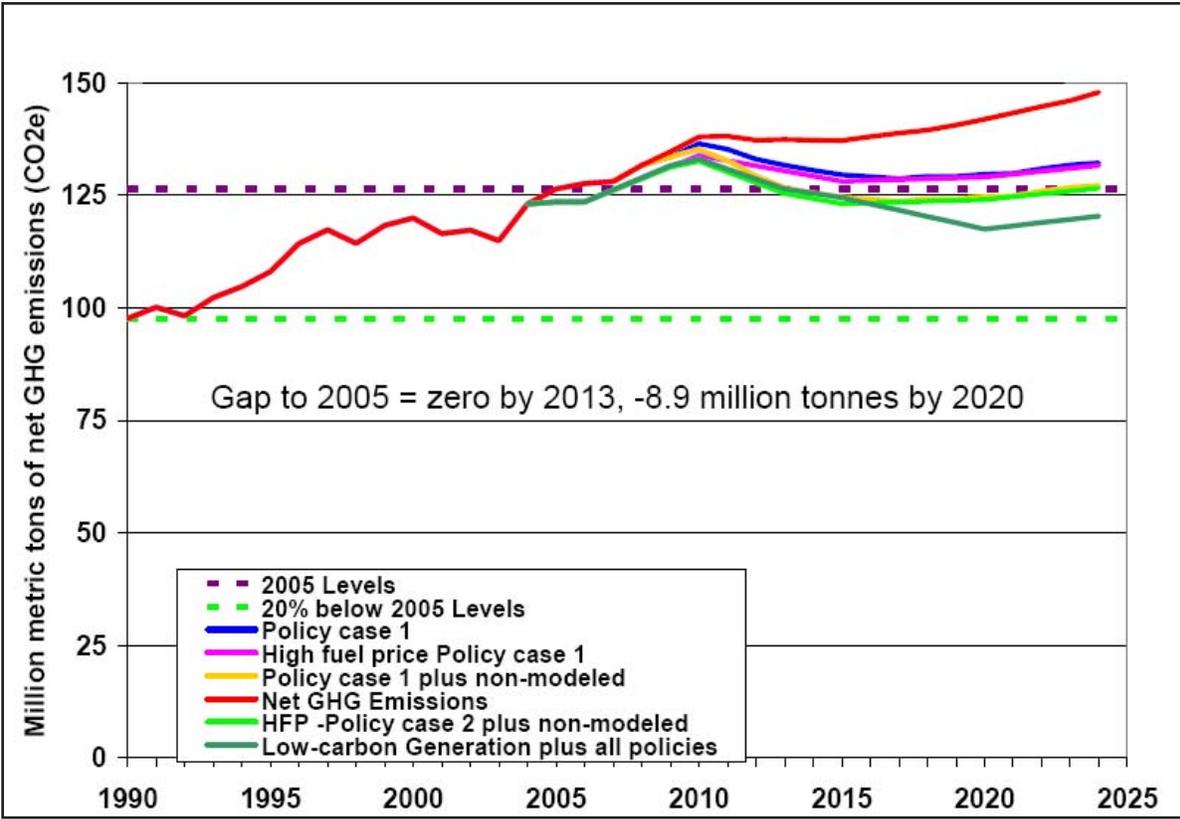
The third set is directed at mass transit funding and community development to reduce vehicle miles driven, including options such as local mass transit, intercity rail, walking and biking. These policies seek to diversify mobility options for individuals and businesses, thereby reducing fuel use, emissions, and transportation costs.

Agriculture/Forestry

These sectors are unique in that they not only produce GHG emissions, but also provide terrestrial sinks to absorb and sequester carbon dioxide (CO₂), thus reducing Wisconsin's net GHG emissions. The policies proposed advocate a number of voluntary programs, with incentives, designed to decrease sector emissions, particularly of methane, and to increase the state's terrestrial sequestration capacity. Since the policies proposed are voluntary and rely on financial incentives, the Task Force also recommends that the state review success in these sectors in 2012 and, if voluntary measures are not producing needed results, mandatory measures with appropriate funding be considered.

Industry

As in the Agriculture and Forestry sectors, the policies recommended by the Task Force consist of a series of voluntary programs, supported by incentives, to reduce direct emissions from industrial activities. In contrast to other sectors, GHG emissions in the industrial sector have been declining. Given this fact, cost competitive concerns and recognition that industry will experience an increase in energy prices as a result of Task Force recommendations, voluntary policies were viewed as appropriate. However, as with Agriculture and Forestry sectors, the Task Force recommends that in 2012 the state



review the success of voluntary programs and, if additional progress in reducing emissions is not being made, consider mandatory measures, with appropriate funding, to the extent that industrial sources are not included in a Cap and Trade Program by that time.

Carbon Tax/Cap and Trade Program

The technical analysis (modeling) done for the Task Force indicates that, absent a Cap and Trade Program, adoption of policies analyzed by the Task Force would enable the state to achieve only approximately half of its 2022 emissions reduction goal. This indicates that the state will not be able to reach that goal without a CO₂ regulatory program to cap GHG emissions.

The options are a carbon tax or a Cap and Trade Program. While many economists support a carbon tax, that alternative was not viewed as politically viable and is opposed by a number of members of the Task Force because it would not provide emission reductions certainty. The

result could be that emitters pay the tax, continue to emit and reductions are not achieved. Under a Cap and Trade Program, a firm limit on emissions is set (the cap) that declines over time, and allowances are issued for sources to emit up to the cap. The details of a Cap and Trade Program are controversial and complex. Such a program provides significantly more emissions reduction certainty than a tax, but greater cost uncertainty. This uncertainty was made clear by the great difficulty experienced by the Task Force’s consultants in modeling a regional Cap and Trade Program and predicting allowance prices. Modeling difficulties arose because of the many assumptions that had to be made as to the design of the program and what might occur in nearby states as a result of emissions leakage.

This Report expresses a strong preference in favor of a broad-based, multi-sector, federal Cap and Trade Program that is fair to Wisconsin as a state highly dependent on fossil fuels today, with an energy-intensive industrial base. Wisconsin should actively participate in the design of

any federal program, seeking to maintain the environmental integrity of the program, while protecting the state's economy and mitigating costs for its consumers. The cap and trade recommendation made in this Report addresses these issues.

At the same time, the Task Force recommends that Wisconsin continue to actively participate and provide leadership in the effort to develop a regional Cap and Trade Program under the umbrella of the Midwestern Governors Association (MGA). The Task Force cannot predict whether a federal or regional program will be developed first. When a regional agreement and a model rule are adopted through the MGA process, the state should move promptly to review, consider and take such action as it deems appropriate on that agreement and rule.

Regardless of whether a Cap and Trade Program is instituted at the federal or regional level, the Task Force recommendations propose a number of elements for such a program in order to mitigate costs and protect the interests of the state, while achieving the emission reductions goals. The Task Force recommends a unique design for the Cap and Trade Program during a transition period to mitigate what may be substantial initial costs for regulated utilities and their customers and large industry as a result of uncertain GHG emission allowance prices, particularly while low-carbon technologies are under development. The recommendation supports distribution of a substantial majority of allowances during the transition at a fixed per ton fee, rather than at no cost, to industry and utilities to keep the initial price of allowances affordable while simultaneously providing substantial funding, when combined with revenues from the auctioning of remaining allowances, for a variety of other GHG reduction programs, as well as climate change adaptation strategies.

It should be noted that Task Force members hold strong and divergent views on the auction versus free allocation issue for allowances. The

recommendation recognizes that members may take different positions in federal and regional forums on this matter based on a variety of factors. The Task Force's recommendation is made to recognize and emphasize the importance of cost mitigation and certainty of initial allowance costs for Wisconsin regulated utilities and industries, to stimulate debate on ways to achieve the environmental certainty of a cap and trade regime, and to provide funding for other programs needed to meet emissions reduction goals with greater certainty of initial allowance prices. Policies are also proposed on use of offsets and other cost containment measures in a Cap and Trade Program as well as on participation in voluntary GHG reduction programs.

Other Areas

Low-Income Cost Mitigation

A group was appointed to recommend ways to mitigate potential adverse impacts for lower-income individuals and families (in urban and rural areas), associated with implementation of Task Force policies. Mitigation measures identified by this group have been incorporated into a variety of the policies recommended. The report to the Task Force of the low-income group can be found on the Task Force's web site <http://www.dnr.wi.gov/environmentprotect/gtfgw/>. The recommendations of this group were proposed on a consensus basis.

Co-generation

Because of the importance of the development of highly efficient, combined heat and power plants to provide steam to communities and/or industries, as well as producing electricity, a group was appointed to analyze technical and other barriers to increasing such generation within the state. The policy recommendations of this group were developed on a consensus basis.

Water Conservation

Recognizing the connection between water and energy conservation, a group was appointed to propose policies to substantially increase

water conservation in a variety of ways. The recommendations of this group were proposed on a consensus basis.

Waste Materials Recovery and Disposal

Another group was formed to recommend policies to address waste recovery and disposal issues. It identified significant GHG reduction opportunities associated with recycling and other alternatives to traditional waste disposal.

Development of Jobs and Business Opportunities to Enhance Wisconsin's Economy

In developing its recommendations, each Task Force work group was asked to identify the business and job creation opportunities presented by its proposed policies. The recommendations in this Report deal with this important objective in a variety of ways. For instance, jobs and business opportunities will be created through substantially increased conservation and efficiency programs, including housing retrofits and rehabilitation in lower-income areas. Opportunities also will be created through increased reliance on clean and renewable energy resources, including (i) development of the state's biofuel and biomass potential, (ii) manufacturing, construction and maintenance needs related to new, clean generation and (iii) R&D programs. To meet these needs, job training and business development programs will be required, as recommended by the Task Force.

Task Force Membership and Process

The Task Force consists of a diverse membership representing a cross-section of Wisconsin's economy and its communities appointed pursuant to Executive Order 191. A list of Task Force members and their affiliations is set forth in Appendix B, together with the individuals from state agencies that support the Task Force.

In addition to Task Force members, a large number of additional individuals contributed substantially to the work of the Task Force. To develop its policy recommendations, the Task Force created six work groups to develop policy recommendations for the Task Force in the following areas:

- Energy Conservation and Efficiency
- Electric Generation and Supply
- Transportation
- Industry
- Agriculture/Forestry
- Carbon Tax and Cap and Trade

In addition, the following ad hoc work groups were appointed during the Task Force process to develop additional policies:

- Sustainable communities and behavioral change marketing
- Low-income concerns
- Co-generation
- Waste materials recovery and disposal
- Water conservation

The Task Force also created a Technical Advisory Group (TAG) to work with staff from the Department of Natural Resources (DNR), the Public Service Commission of Wisconsin (PSC) and other state agencies, as well as the consultants retained by the Task Force to assist it. The TAG worked tirelessly to be sure the data used for Task Force purposes was reasonable and as Wisconsin-specific as possible. The modeling done for the Task Force was carefully reviewed by the TAG so that only reasonable results would be used by the Task Force for the purpose of making policy recommendations.

The consultants employed on behalf of the Task Force included Jonathan Pershing and John

Larsen of the World Resource Institute (WRI). WRI has broad experience working with other states, major corporations, other entities in the United States, as well as internationally on climate change issues, analyses and strategies. ICF Consulting was retained to prepare a Reference Case to project Wisconsin emissions without the policies recommended by the Task Force and to model groups of proposed policies to obtain indications of achievable emission reductions and cost impacts.

Winrock International was engaged to evaluate GHG emissions sources and sinks in the Forestry/Agriculture sectors, a very important potential for Wisconsin, given its substantial agricultural and forest industries. Winrock is a leading authority on methods for evaluating and quantifying GHG benefits resulting from improvements in land management practices.

Attached as Appendix C is a list of the Task Force work group co-chairs and the formally-appointed members of each work group, and the agency staff that supported each work group. All meetings of the Task Force and the work groups were open to the public. Work group meetings were attended by a number of additional individuals from the public and on behalf of interested Task Force members.

Two public input sessions were held at four locations around the state to receive comments and suggestions from the public. Many members of the public commented on the Task Force's work at these sessions and throughout the process using the Task Force's web site <http://www.dnr.wi.gov/environmentprotect/gtfgw/>. This web site contains a great deal of information concerning the Task Force's work, including its agendas, meetings notes, work group agendas, proposed policy drafts, public comments and many documents and studies provided to the Task Force members during this process. The Task Force process has been open, transparent and inclusive throughout.

Principles & Premises Guiding the Recommendations

This section provides context for the policies and goals recommended by the Task Force in this Report.

The charge of the Task Force in Executive Order 191 is to recommend policies that will enable Wisconsin to do its part in reducing GHG emissions to meet goals that are commensurate with Wisconsin's responsibility. The Task Force was not asked by the Governor to debate the science of climate change. Executive Order 191 accepts the substantial scientific consensus that exists that climate change is occurring and human activity, particularly the burning of fossil fuels, is a major contributor to such change. The Task Force also was not asked to evaluate whether the costs of addressing climate change will be greater or less than the benefits achieved. Many members of the Task Force believe that the costs of not addressing climate change substantially outweigh the costs of reducing GHG emissions. Several members of the Task Force disagree or would proceed on a slower track. Under Executive Order 191, the Task Force is not charged with resolving this debate. The issue before the Task Force is how to reduce Wisconsin's GHG emissions to meet challenging goals in ways that best mitigate costs, protect and enhance Wisconsin's economy and result in all sectors doing their share to achieve the objectives of the Executive Order.

This Report is a first step only. It will not solve the climate change problem. The issues the Task Force has addressed will be revisited and new policies proposed on an almost continuous basis. The Task Force's objective is to propose a series of meaningful policies that can promptly begin the process of achieving GHG emission reductions. This means developing policies that have the broad support necessary for adoption and implementation.

In order for Wisconsin to be successful, it will be essential that (i) the Task Force's recommendations be acted upon promptly and required funding pursued, and (ii) the proposed,

statewide campaign be launched as soon as possible to raise public awareness of the need for action, foster significant behavioral change and provide individuals, farmers and businesses with the expertise and tools necessary to reduce their GHG footprints.

In order to be sure that its recommendations are viable and actionable, the Task Force has placed strong emphasis on cost mitigation. Given current pressures on consumers, utilities and industries because of significant increases in fuel, commodity, construction and other environmental compliance costs, and the economic downturn that the country is experiencing, the state needs to pay particular attention to measures that will lessen the burden of addressing climate change on consumers, and on energy-intensive industries like paper production that operate in highly competitive, global environments, while providing essential jobs and other benefits to their communities.

Substantially increased, cost-effective energy conservation and efficiency (C&E), including state-of-the-art energy efficiency building codes and appliance efficiency standards are proposed because these measures are the least-cost and most effective early action strategies available in the utility sector and provide the foundation for the success of many other Task Force recommendations. Evidence indicates that substantial gains in C&E remain to be achieved and can be captured. C&E programs can be ramped up quickly, with proven, available technologies. They will not only reduce emissions, but also reduce utility bills for customers in a rising rate environment, defer the need for expensive, new power plants and transmission lines and create new "green collar" jobs.

Similarly, the Task Force's recommendations recognize that development of a diverse portfolio of renewable energy resources, including distributed generation, provides the most environmentally benign supply-side (generation)

option for the state and accordingly should be a high priority.

At the same time, the Task Force recognizes it cannot predict with certainty the degree of success that will be achieved by new C&E measures and the deployment of additional renewable resources, or the future growth in electric demand that may result from changes in the economy and other factors, such as widespread deployment of plug-in hybrid vehicles and electric vehicles. This is particularly true as older, less efficient fossil fuel plants are retired. For these reasons, recognizing that aggressive C&E and increased reliance on renewable resources should be the state's top priorities, other recommendations are aimed at providing utilities with low-carbon, future baseload generation options, with fuel diversity, to meet the utilities' ongoing legal obligation to maintain an adequate and reliable electric system essential for health and safety as well as Wisconsin's economy.

For the long-term, substantial R&D of low-carbon technologies will be essential. The Task Force's recommendations do not try to pick future technology winners, which would be difficult and risky. Instead, increased R&D, at the federal and state levels, are recommended for renewable technologies, clean coal technologies such as capture and sequestration of CO₂, and other strategies to reduce GHG emissions, including demand-side measures. Funding for R&D related to climate change adaptation also is recommended.

The Task Force's recommendations emphasize the importance of early action to reduce emissions for a number of reasons, as reflected in the Interim Report. Early reductions are crucial to the successful mitigation of climate change and to meeting the emissions reduction goals recommended by the Task Force, particularly the 2014 stabilization goal. Early action should provide flexibility for, and lower the costs and burdens of, achieving additional emissions

reductions over the long term, reduce energy costs for consumers and businesses, and provide other environmental benefits. Some members of the Task Force strongly believe that the goals recommended in this Final Report will not be met without more aggressive, mandatory early action policies not recommended by this Report. Other members disagree.

Dissents

While unanimity was achieved in the Interim Report, three members of the Task Force dissented as to the Final Report, either through the vote of the Task Force member or his or her alternate.

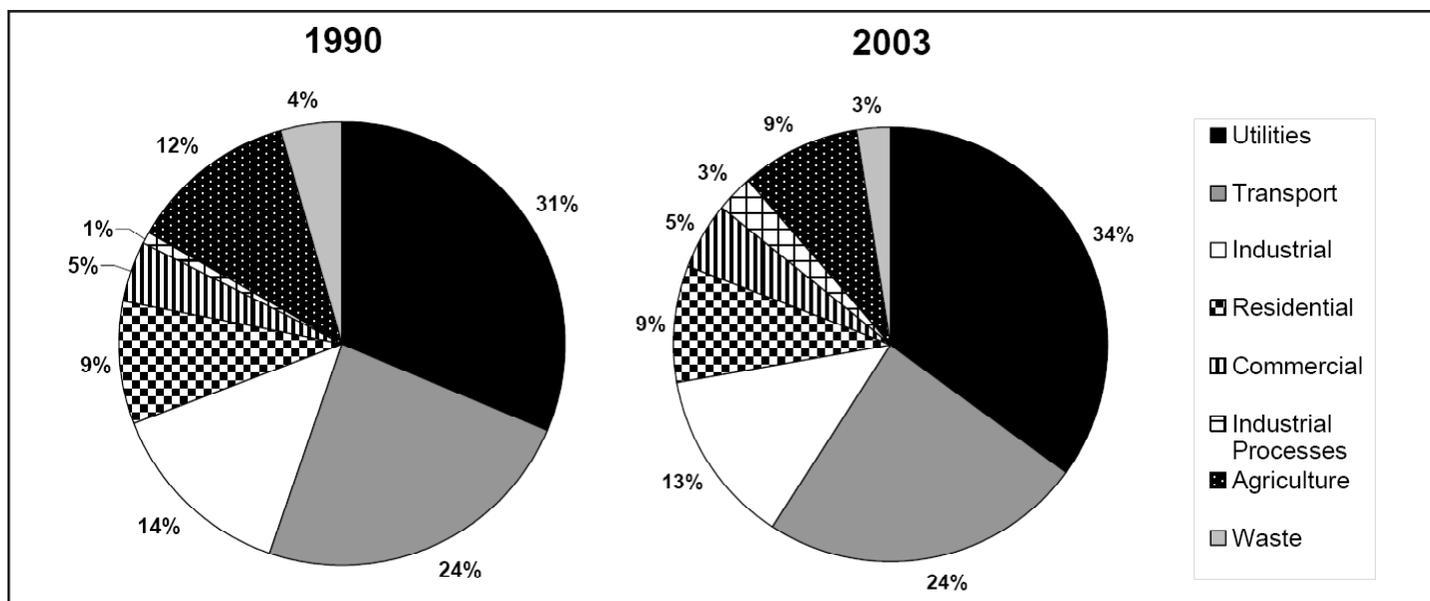
The Task Force was informed by the General Motors representative that his dissent was based on the Task Force recommendation that Wisconsin adopt California's vehicle emission standards to reduce GHG emissions to a greater degree than the current federal Corporate Average Fuel Economy (CAFE) standards. Opposition to the California standards is a national policy of General Motors. Representatives of General Motors were very active and productive participants on the Task Force and co-chaired the Transportation Work Group. GM indicated support for the remainder of the Task Force's recommendations.

The representative of NewPage Corporation, one of the state's largest paper companies, also dissented. He explained that his company, and the Wisconsin paper industry, is generally opposed to a cap and trade system of regulation and was concerned with certain details in the Task Force's cap and trade recommendations. He explained that the Wisconsin paper industry is experiencing a substantial contraction and is in a fragile economic condition. For this reason, he could not support policies that would directly, or indirectly through higher energy prices, increase costs for the industry. Unfortunately, the Task Force was unable to determine a means to meet the requirements of Order 191 without some increase in energy prices and other costs. As acknowledged by the representative of NewPage and others in the industrial sector, the Task Force has made a concerted effort in its recommendations to mitigate costs for energy-intensive industry, but these efforts proved insufficient to garner NewPage's support. NewPage representatives participated actively and constructively on the Task Force and its work groups.

The representative for Ariens, a lawn equipment manufacturer, also dissented based on cost impacts, focusing on the Cap and Trade Program and enhanced renewable portfolio standard recommendations.

Wisconsin GHG Inventory

Wisconsin GHG Emissions by Sector, 1990 and 2003



Source: WI DNR Inventory as compiled by WRI, 2007

The Wisconsin GHG Inventory (the Inventory) is the responsibility of the DNR under Executive Order 191. It has been prepared by WRI under the direction of the DNR and is being reported directly to the Governor by the DNR at this time. A copy of the Inventory is posted on the Task Force's web site.

In accordance with Executive Order 191, the Inventory contains a comprehensive assessment of GHG emissions across the entire economy of Wisconsin from 1990 through 2003¹. This time frame reflects the broadest availability of complete and comparable data for the state. Total state emissions during this period increased at an annual average rate of 1.2 percent from 105.9 million metric tons of CO₂

equivalent (MtCO₂e) in 1990 to 123.1 MtCO₂e in 2003. Wisconsin's emissions grew slightly faster than national emissions over the same period (1.1 percent). Emissions increased in nearly all sectors led by electric power generation (2 percent per year), the commercial sector (1.8 percent per year), and transportation (1.3 percent per year). In contrast, industrial emissions peaked in 2000 and have declined substantially in recent years². The relative contributions of each sector's GHG emissions in 1990 and 2003 are summarized above by sector.

In 2003, Wisconsin's 123 million metric tons of GHGs made the state the 21st largest emitter slightly behind Oklahoma and ahead of Minnesota (Table 1). Wisconsin generated just less than 2 percent of total U.S. emissions in 2003,

1. For a more detailed assessment of GHG emissions in Wisconsin please see the full Inventory Report available at: <http://dnr.wi.gov/environmentprotect/gtfgw/documents.html>

2. For additional in-depth analysis of Wisconsin GHG emissions with comparisons to other states in the Midwest region see the WRI report *Charting the Midwest* available free at: <http://www.wri.org/publication/charting-the-midwest.html>

relatively less than most other Midwest states (shown in bold in Table 1). Globally, if Wisconsin were a country, it would rank as the 42nd largest emitter in the world, just behind Romania. Per capita GHG emissions in Wisconsin were approximately equal to 23 metric tons of CO₂ per person in 2003 (23 MtCO₂e). This figure is roughly equal to the national average.

To supplement the Inventory, Winrock International conducted an assessment of net carbon emissions and removals in Wisconsin forests for the Task Force's consideration³. Using the most comprehensive data and methods available Winrock found that Wisconsin forest cover increased by between 210,000 and 980,000 acres from 1992 to 2001. Winrock estimated annual average net carbon sequestration (net removal of CO₂ from the atmosphere) of approximately 8.2 million metric tons over the same time period. The majority of carbon sequestration took place in Wisconsin's northern forests while some areas of Southern Wisconsin were net sources of CO₂ resulting from land use change.

To determine Wisconsin's net contribution of GHG emissions to the atmosphere WRI's estimates of GHG emissions were combined with Winrock's assessment of forest carbon sequestration. Using this method net GHG emissions from Wisconsin were approximately 98 million metric tons in 1990 and 115 million metric tons in 2003.

3. <http://dnr.wi.gov/environmentprotect/gtfwg/documents.html>.

4. For free access to GHG data for all 50 states as well as international data and background resources contained in the Climate Analysis Indicators Tool please visit: <http://cait.wri.org/>

Rank	State	MtCO₂e	% of US
1	Texas	782.3	11.6%
2	California	452.9	6.7%
3	Pennsylvania	301.0	4.5%
4	Ohio	298.9	4.4%
5	Florida	271.3	4.0%
6	Indiana	269.3	4.0%
7	Illinois	268.5	4.0%
8	New York	243.7	3.6%
9	Michigan	211.7	3.1%
10	Louisiana	209.5	3.1%
20	Oklahoma	123.9	1.8%
21	Wisconsin	123.1	1.8%
22	Minnesota	120.0	1.8%
23	Iowa	108.2	1.6%
24	Colorado	106.7	1.6%
25	Kansas	100.7	1.5%

It is important to understand the nature of this Inventory. It is a top-down survey of emissions by sector using the U.S. module of WRI's Climate Analysis Indicators Tool, which is based on federal data primarily from the U.S. Energy Information Agency and tools developed by the U.S. Environmental Protection Agency (EPA)⁴. For energy sectors (Electric Generation, Transportation, Industrial, Residential and Commercial) fossil fuel use data for each sector is multiplied by an appropriate emission factor to generate GHG emissions estimates. A similar approach incorporating other relevant activity data and emission factors is used for remaining sectors. These estimates yield a broad view of emissions and trends across the state of Wisconsin similar to previous efforts undertaken by DNR, and the efforts of other states and the EPA's national inventory. The Inventory does not provide detailed facility or subsector emissions data. This makes it fundamentally different from data sources such as Wisconsin DNR's Air Emissions Inventory, the California Climate Action Registry and the recently established Climate

Registry. These databases provide facility-level emissions data based on reporting (whether voluntary or mandatory) by individual entities. The Inventory developed by WRI for DNR is useful for informing climate strategy and planning exercises such as those being undertaken by the Task Force as well as for tracking overall state GHG emissions performance. In fact, in no case has a state taken action to address climate change without first constructing an inventory to understand the general state of emissions and subsequently gathered data of far higher resolution for sectors and activities targeted by specific policies. However, it is very important to recognize that the Inventory is not sufficient, and should not be used, for any future regulatory purpose.

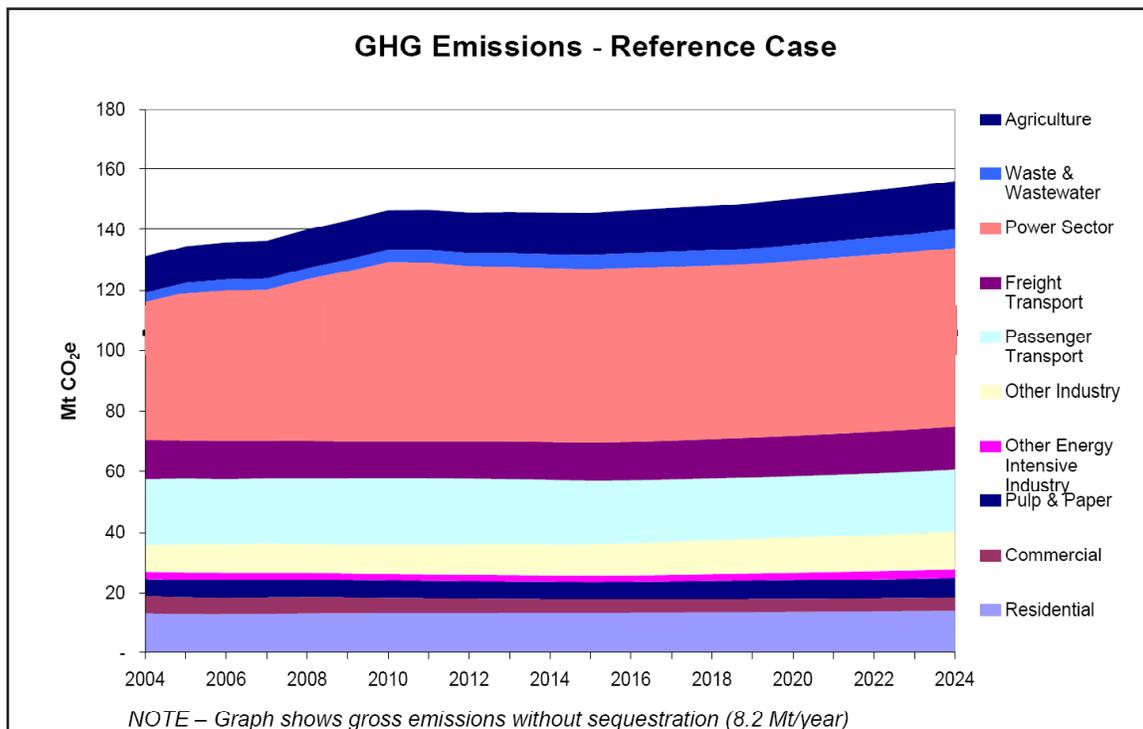
The Reference Case

The Reference Case is a modeled projection of how Wisconsin's economy, energy use and GHG emissions may develop in the future absent any new GHG reduction policies. It is based on existing sources, current policies and trends, approved new generation facilities within the state, and the projected effects of the federal Energy Independence and Security Act of 2007 (Energy Act). The Reference Case incorporates a macroeconomic forecast of the state, supplied by the Wisconsin Department of Transportation using the REMI (Regional Economics Models, Inc.) model to project the economic growth in various sectors⁵.

The Reference Case was used by the Task Force to estimate and evaluate the combined impacts of the policies developed by the workgroups on GHG emissions, jobs and Wisconsin's economy, including energy costs. The Reference Case is very sensitive to the assumptions used and is not presented as an accurate prediction of the future. Instead, it is presented as a reasonable projected

scenario to be used in evaluating and recommending policies to meet the requirements of Executive Order 191.

It is essential to recognize the limits of the Reference Case. It has been prepared exclusively for the use of the Task Force to evaluate potential policies and recommendations in exercising its informed judgment based upon the modeling results, qualitative considerations and the expertise of Task Force members and consultants. The Reference Case provides an underlying structure against which to model proposed policies in order to determine directionality and cause and effect relationships of alternative policies. The TAG worked very hard to be able to recommend unanimously that the Reference Case is satisfactory for this purpose. The TAG also made it very clear that, given imperfections and concerns related to input data, the sensitivity of the results to the many assumptions used and the complexity of the model itself, the Reference Case should



5. For a full assessment of methods, data and assumptions used in the Reference Case please see the TAG report in Appendix D and the Assumptions Book available on the Task Force Modeling Page at <http://www.dnr.gov/environmentprotect/gtfgw/modeling.html>

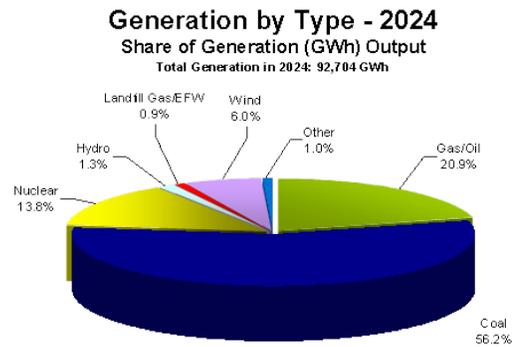
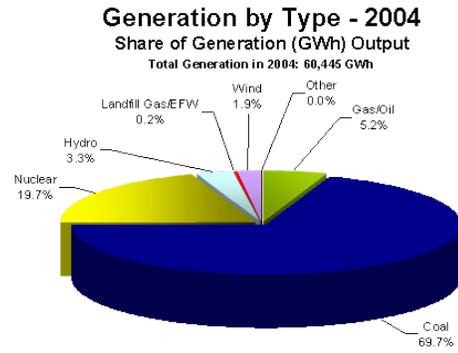
not be used for any purpose other than the Task Force’s evaluation of the relative estimated costs, benefits and emissions, energy and economic impacts of potential policies. In particular, the Reference Case should not be used for any regulatory purpose.

The Reference Case and a detailed accounting of all underlying data sources and assumptions are posted on the Task Force web site. The following paragraphs provide a brief summary of the Reference Case. More detailed information can be found in the Summary Report of the TAG in Appendix D and in the final report of the TAG’s work to be posted on the Task Force’s web site.

The Reference Case projects statewide greenhouse gas emissions by sector from 2004 through 2024. Total statewide emissions during the period are projected to increase at an annual average rate of just under 1.0 percent, from 131.3 million MtCO₂e in 2004 to 156.1 MtCO₂e in 2024⁶. This is lower than the 1.2% annual average rate of increase between 1990 and 2003 in the Wisconsin GHG Inventory.

GHG emissions are projected to increase in all sectors, except in the passenger transport sector.

- Total GHG emissions in the electric power sector are projected to increase by 1.4 percent per year, from 45.6 MtCO₂e in 2004 to 60.6 MtCO₂e in 2024. As shown in the pie charts which follow, the relative shares of generation output shift, with natural gas and wind becoming relatively larger shares and coal and nuclear, relatively smaller.



- Emissions from passenger transportation are projected to decline over the period from 21.6 MtCO₂e in 2004 to 20.1 MtCO₂e in 2024, due to increased choices for transportation modes, increased vehicle efficiency and increased use of bio-fuels as mandated under the Energy Act.
- Industrial emissions are projected to grow at an annual average rate of 0.9 percent in the pulp and paper and other energy intensive industry sectors and by 1.8 percent in the other industry sector. The most rapid growth occurs in the out-years, which is largely driven by the macroeconomic data supplied by the REMI model.

6. Note that values presented in this report are slightly different than those reported in the Interim Report. This is due to additional analysis and refinement to the Reference Case undertaken by the TAG.

- The Reference Case includes an estimated level of carbon sequestration from forested lands of an average 8.2 MtCO₂e per year, based on work prepared for the Task Force by Winrock International. This results in net emissions of 123.1 MtCO₂e in 2004 and 147.9 MtCO₂e in 2024
- The Reference Case does not include estimates of carbon sequestration from agricultural and other land types because there is no historic data on the carbon impact of these land uses and land use changes.

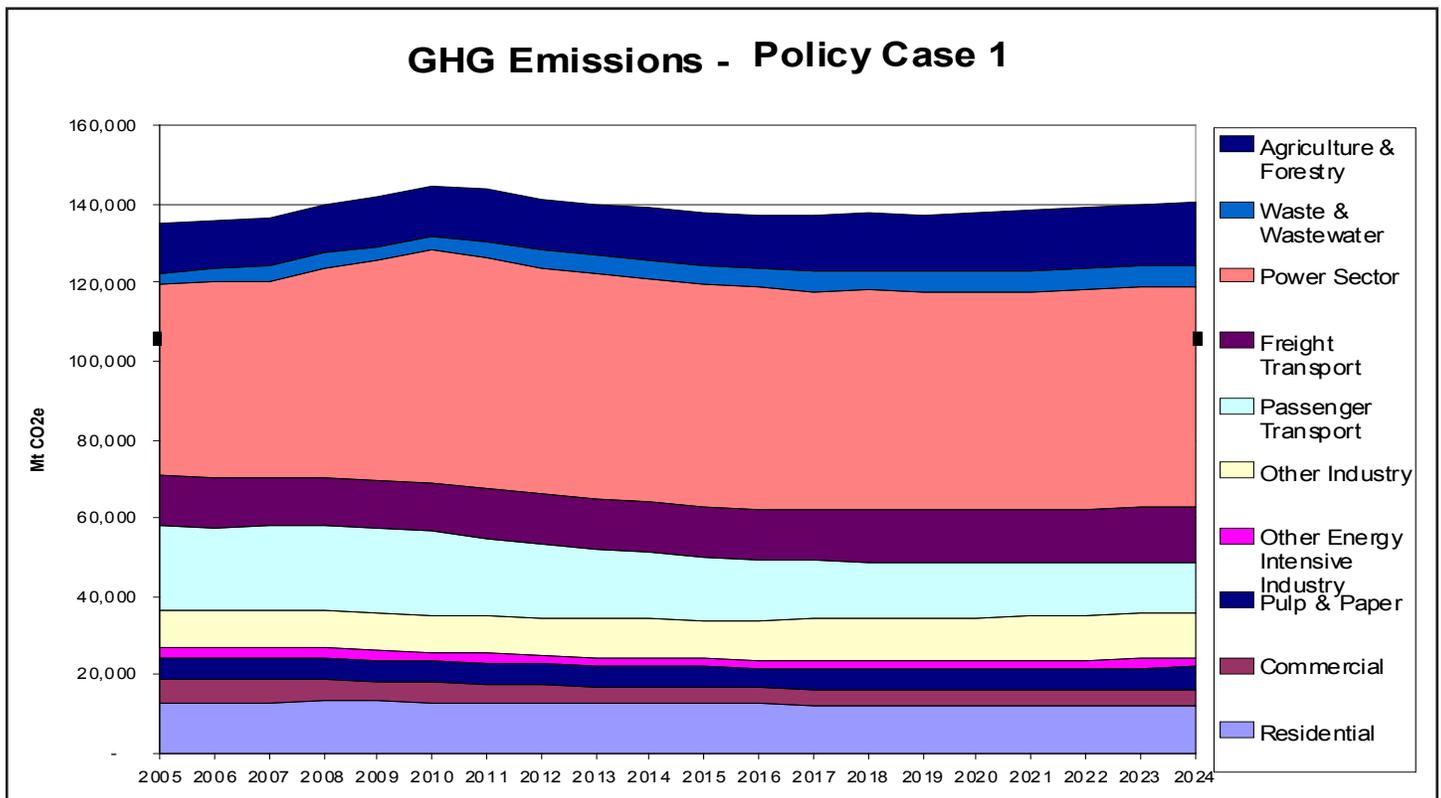
Modeling

The TAG analyzed several potential policy recommendations in multiple scenarios to assess their impact on GHG emissions, energy use, energy costs and the overall Wisconsin economy. Two primary policy cases were modeled. One case included most policies under consideration by the Task Force while a second identical scenario assumed higher energy prices. Other scenarios were modeled to provide input to Task Force deliberations, but are not reported here due to considerable overlap with the primary scenarios. In addition to the modeled policies, estimates of additional reductions that could be achieved by policies not characterized in the model were compiled. For a complete list of which policies were included in each policy case please see the TAG report.

The same cautions and caveats apply to the results of the modeling of policy scenarios as apply to the Reference Case. The scenarios represent projections of what may happen in

the future under a certain set of assumptions. As such, results are highly sensitive to these assumptions. The results are indicative of what could be achieved if all of the policies were adopted and implemented promptly in Wisconsin, but they do not guarantee the predicted outcome. All results reported below should be viewed with these points in mind.

In Policy Case 1, total statewide emissions during the period are projected to increase at an annual average rate of 0.4 percent, from 131.3 million MtCO₂e in 2004 to 140.4 MtCO₂e in 2024, excluding carbon sequestration. This is significantly lower than the 1.0 percent annual average rate of increase projected in the Reference Case. When a conservative estimate of the reductions that could be achieved through the non-modeled policies is incorporated, net emissions in 2014 could be as low as 127 MtCO₂e or roughly 2005 levels. The higher energy price scenario (Policy Case 2) results in greater



emission reductions in early years, but by 2024 emissions are less than 1 MtCO₂e lower than Policy Case 1. In all cases, the model projects that emissions drop lower than this level in the middle of the period but begin to increase again around 2020, when the macroeconomic model forecasts more robust economic growth.

The detailed Assumption Book developed by the TAG and used for modeling is available on the Task Force's web site, as are the Policy Cases described above. The TAG Summary Report (Appendix D) discusses the modeling undertaken for the Task Force. A more detailed final report of the TAG's work will be posted on the Task Force's web site.

Despite considerable effort, no modeling cases including a Cap and Trade Program were completed on a satisfactory basis for use by the Task Force. This was largely due to the complexities involved with modeling a regional cap and trade policy in the timeframe available. After reviewing preliminary results, the TAG recommended that the Task Force not rely on the cap and trade modeling, but instead take into account the TAG's observations and lessons learned. The observations and lessons learned are discussed in the TAG Summary Report (Appendix D) and the more detailed final TAG report to be posted on the Task Force's web site.

Emission Reduction Goals

The emission reduction goals recommended by the Task Force should apply to net GHG emissions within the state of Wisconsin. Net GHG emissions consist of total direct emissions of all six Kyoto GHGs from all activities that take place within the geographic boundaries of the state less net carbon sequestration from Wisconsin's forests, prairies, soils and other activities. Consistent with the Order, emissions that result from the use within Wisconsin of electricity and other products produced outside the state are not included in the goals because of difficulties in accounting for such emissions accurately and the fact that such emissions should be covered by the goals and regulations applicable in the state where a source is located. 2005 Wisconsin net emissions levels should serve as the baseline from which goals and progress towards them will be compared. In accordance with Executive Order 191 the goals recommended below are consistent with Wisconsin's proportional share of the global emission reductions necessary to stabilize atmospheric concentrations of GHGs at safe levels.

The Task Force recommends that Wisconsin net GHG emissions should result in:

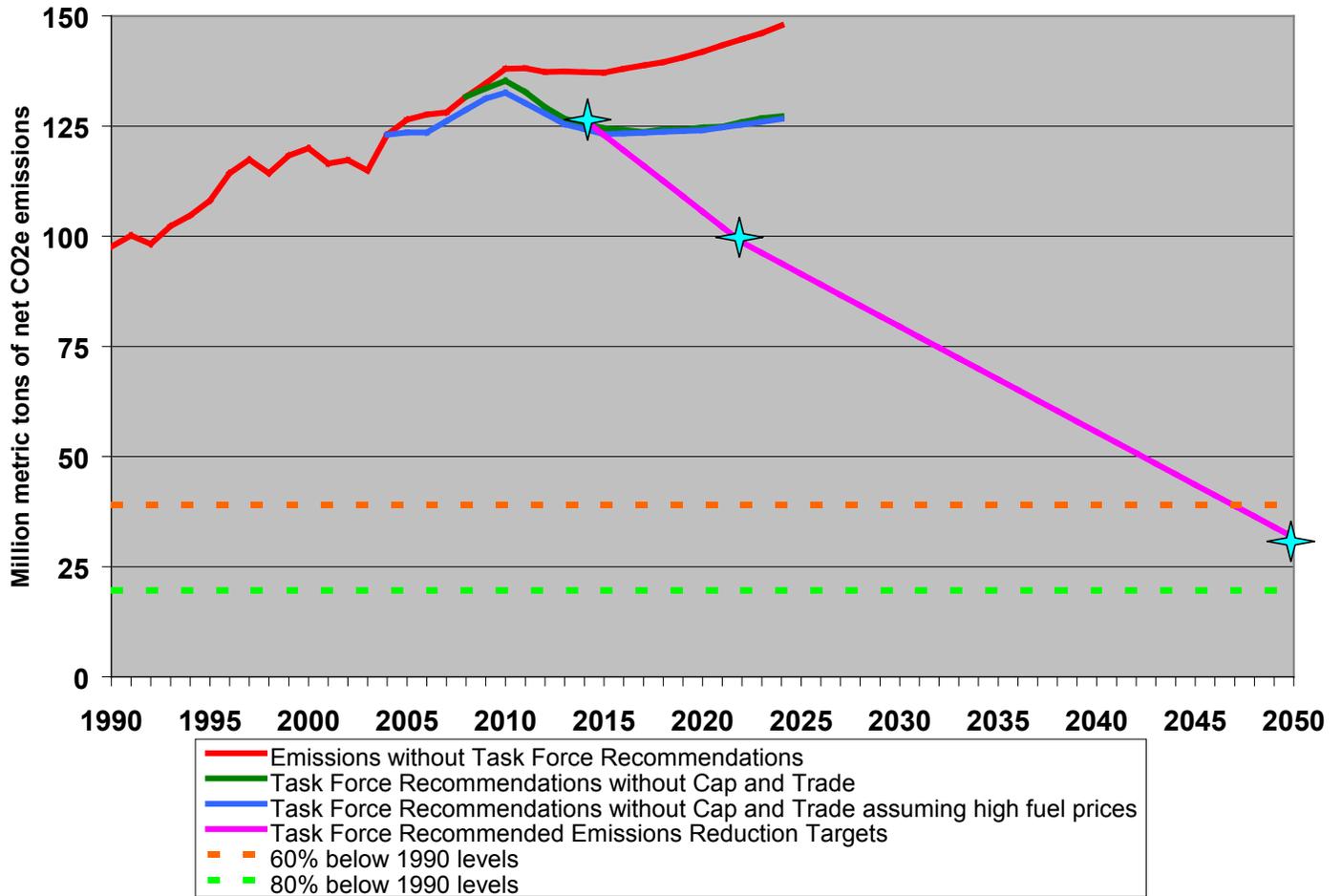
- A return to 2005 levels not later than 2014, consistent with the range of information provided by the TAG related to the higher energy price scenario.
- A 22% reduction from 2005 levels (roughly equivalent to 1990 levels) by 2022. This recommendation allows 10 years after the assumed implementation of a Cap and Trade Program, as advocated in this Report.
- A 75% reduction from 2005 levels by 2050 (roughly equivalent to 70% below 1990 levels, the mid-point of the range set forth in Order 191).

Establishing the 2005 baseline and measuring progress in achieving emission reduction goals will require robust, frequent and comprehensive inventories and assessments of GHG emissions

and sinks in Wisconsin. These needs are especially critical for areas where data are currently sparse such as net sequestration from soils and forests. All GHG data should be made available and easily accessible to the public.

In recommending these goals for Wisconsin, the Task Force recognizes that its members have diverse and strongly held views on the both the adequacy and the achievability of the proposed goals, and that positions taken by members related to goals in the federal and MGA debates will depend on a variety of factors. The goals recommended by the Task Force are comparable to those proposed in federal legislation as well as commitments taken by other states both in the Midwest and around the country. The Task Force believes these goals present a significant challenge for Wisconsin in meeting the requirements of the Order, and are necessary to address the seriousness of the problems presented by climate change. These goals should be regularly re-evaluated based on current science, progress and technology. The objective of members of the Task Force, the public and the state should be to translate the Task Force's recommendations into action promptly to meet or exceed the goals.

Wisconsin Greenhouse Gas Emissions With and Without Recommendations



Notes: Emissions without Task Force recommendations are net GHG emissions from within Wisconsin. Data sourced from DNR Inventory, Winrock International and ICF International. Task Force recommendations without cap and trade include all policies modeled by ICF International plus estimates of reductions achieved from other policies that were not modeled (up to 5 million metric tons). Emission reduction target recommendations are: 2005 levels by 2014 (126 million metric tons), 22% below 2005 levels by 2022 (98 million metric tons) and 75% below 2005 levels by 2050 (32 million metric tons). 60 to 80% below 1990 levels bounds the range of emission reductions articulated in Executive Order 191.

Summaries of Recommended Policies

Set forth below are summaries of each of the policies recommended by the Task Force, including those policies in the Interim Report. The summaries are very brief and do not capture many important details of the policies recommended. Each policy template is included in Appendix E. To understand these policies and the agreements reached by the Task Force members in making these recommendations, it is critical that the policies themselves be read and analyzed.

Overarching Policies

Ensuring on-going GHG emission reduction effectiveness

The Task Force recommends that a formal mechanism be established to: (i) continuously gather data and monitor progress toward reaching the state's emission reduction goals, (ii) evaluate the effectiveness, costs and benefits of existing policies and review and evaluate potential new policies to reduce or sequester GHG emissions in order to meet the state's goals, and (iii) provide clear, understandable, credible and easily accessible information to the public and policy makers about emissions and the state's progress in reaching its goals. Responsibility for these tasks should be assigned to a single agency that is granted the appropriate authority to obtain specific data in a timely manner from other state agencies and has dedicated staff and adequate funding to support its work on a permanent basis.

Comprehensive initiative to support voluntary long term greenhouse gas emissions reductions (included in Interim Report)

This policy recommends that the state implement the Wisconsin Voluntary Greenhouse Gas Reduction Initiative under the auspices of the Office of Energy Independence. The Initiative's purpose would be to motivate and enable individuals, communities, farms and other

businesses to reduce their GHG emissions through a variety of strategies, as well as to assist Wisconsin in growing its economy through the business opportunities arising out of the need to address climate change. The proposed policy advocates efforts funded by both the public and private sectors (including seeking major foundation grants) to achieve long-term reductions of emissions and promote energy independence through voluntary action. The Initiative would develop and implement programs to: (i) encourage and enable individuals to reduce their GHG emissions contributions, (ii) provide expert assistance and support for community-wide programs to achieve energy independence and reduce emissions and costs, (iii) provide expertise and support to the state's small and medium-sized businesses, including farms, in their voluntary efforts to reduce their carbon footprints, and (iv) provide workforce training and business development assistance to take advantage of the opportunities arising out of the need to transition to a low carbon economy.

Many businesses, individuals and communities desire to reduce their GHG emissions footprint promptly. The proposed Initiative would provide the support for them to do so and mount a statewide campaign to motivate broad-based changes in consumer and business behavior and choices necessary to make effective many of the policies the Task Force proposes.

Research and development funding

This policy recommends that Wisconsin advocate for a dramatic increase in federal R&D spending related to achieving substantial reductions in GHG emissions. At the state level, R&D funding for demand-side, renewable and other low carbon technologies should be significantly increased to enable Wisconsin to become a leader in these areas. In addition, the state should support R&D of carbon capture and storage technologies in order to achieve, if feasible, rapid development

and deployment on a commercial basis of coal plants with this technology. Finally, R&D funding should be provided to enhance Wisconsin's ability to adapt to climate change, including funding for the Wisconsin Initiative on Climate Change Impacts, a partnership between the UW-Madison and the Department of Natural Resources. The PSC should permit reasonable spending on GHG emission reduction-related R&D by utilities to be recovered in rates.

Conservation And Energy Efficiency

Enhanced conservation and energy efficiency program (included in Interim Report)

This policy proposes a major increase in the state's energy efficiency and conservation programs undertaken pursuant to Act 141. Rather than focusing on a spending cap, the policy recommends that the state adopt annual targets for reducing electric load and natural gas use through energy efficiency. The targets for 2009 would be to reduce electric load by 0.75% and natural gas use by 0.5% from what they would otherwise be without the energy efficiency and conservation measures. The annual reduction targets would increase gradually until they reach 2% for electric load and 1% for natural gas use in 2015 and each subsequent year. This policy sets forth a number of actions to be considered by the PSC in implementing the proposed increase in programs under Act 141 in order to mitigate cost impacts on customers, including energy intensive industries, and maximize long-term cost benefits. The Task Force believes that converting to a savings goal rather than a spending target is critical and that the recommended ramp-up in programs will create substantial new job opportunities in the state. On April 3, 2008 the PSC opened Docket 5-UI-115 to consider and pursue this recommendation.

Aligning public and private interests for conservation and energy efficiency (included in Interim Report)

In order to meet aggressive conservation and efficiency goals, this policy recommends that the PSC investigate and adopt innovative utility ratemaking approaches that promote conservation and efficiency programs by removing the disincentives that exist under current ratemaking policies for utilities to implement their own programs and support statewide programs, and provide in their place positive incentives for utilities to aggressively pursue conservation and efficiency opportunities. The objective of these changes is to provide long-term customer benefits and maintain a healthy economy. On April 3, 2008 the PSC opened Docket 5-UI-114 to pursue this recommendation.

Improved and innovative rate designs (included in Interim Report)

This policy recommends that the PSC investigate and adopt innovative rate designs that provide more accurate price signals to customers to incent reductions of GHG emissions associated with their energy consumption. On April 3, 2008 the PSC opened Docket 5-UI-116 to pursue this recommendation.

Demand response and load management (included in Interim Report)

This policy recommends a number of programs by the PSC to encourage and enable customers to reduce their contributions to utility peak demand and to respond to price signals in ways that will help shape utility load for a more efficient electric system that reduces GHG emissions. On April 3, 2008 the PSC opened Docket 5-UI-116 to pursue this recommendation.

Residential and commercial building codes (included in Interim Report)

This policy recommends that Wisconsin pass legislation to incorporate the latest International

Energy Conservation Code (IECC) into Wisconsin's residential/multi-family and commercial energy code within eighteen months of promulgation, unless affirmative action is taken to customize code provisions for Wisconsin needs within that period. The policy is intended to ensure that Wisconsin remains a national leader in this area, given the very significant impact increasing building efficiency will play in reducing long-term GHG emissions.

An objective of this effort would be to achieve net zero energy commercial buildings by 2030 and residential buildings by 2040. Building energy efficient structures is much less costly than retrofitting buildings. The policy contains a second recommendation to establish a near-term, voluntary, high performance, green building code, with incentives, to help the state and others achieve even greater GHG reductions from new buildings.

**State government as leader
(included in Interim Report)**

This policy recommends that the state set a strong example by taking a number of steps to reduce its GHG emissions through energy conservation, energy production, building efficiency, transportation use, and purchasing policies. The state as a whole, and its agencies and universities, should track their GHG emissions, establish specific reduction goals, implement plans to meet those goals, and demonstrate leadership across the state.

**Energy efficiency and safety through lighting for rental properties
(included in Interim Report)**

This policy recommends that the state adopt legislation that requires rental properties to install energy efficient lighting in common areas and all mounted fixtures (other than fixtures controlled by dimmer switches and fixtures in appliances). It also would require exit signs to use light emitting diode bulbs (LEDs).

State appliance efficiency standards

This policy proposes legislation to create state appliance/equipment efficiency standards based on a model bill developed by the Appliance Standards Awareness Project and the American Council for an Energy-Efficient Economy. The legislation would encompass the following products not covered by recently adopted federal standards: new commercial and industrial boilers, new residential furnaces and furnace fans, and compact audio equipment. The state should request a waiver of the existing federal standard for commercial boilers and residential furnaces in order to adopt higher standards.

Energy efficiency in schools

This policy calls for legislation changing the school funding mechanisms to create incentives for schools to implement energy efficiency programs by enabling local schools to retain the savings they achieve and by exempting energy efficiency projects from the school spending cap. Local school districts should be encouraged and provided the resources and expertise to: (i) identify the current GHG emission footprint of the school district, (ii) establish GHG emission reduction targets and develop plans to reduce GHG emissions, (iii) utilize reduction actions as an educational tool that benefits the students and the community, and (iv) facilitate information and resources for educational efforts through the Department of Public Instruction.

Non-regulated fuels efficiency and conservation

Liquid propane gas (LPG) and fuel oil make up 17% of fossil fuel use in Wisconsin's residential sector and are also used in large quantities in the commercial, industrial, and agricultural sectors, but these fuels are not covered by the existing Focus on Energy program. This policy recommends legislation to provide for a fee on non-regulated fuels to fund Focus on Energy conservation and energy efficiency programs for consumers of these fuels for heating,

production and other non-transportation uses and the establishment of an audit and tracking mechanism to ensure that such funding is used to the benefit of the consumers of such fuels.

Study of retrofit codes for mandatory upgrades of existing single and multi-family units

This policy calls for a legislative study committee to consider the need for, and nature of, potential mandatory, minimum energy efficiency standards triggered by specific events (e.g. point of sale) for existing single-family home and multi-family rental units to complement voluntary energy efficiency programs for these sectors.

Residential energy efficiency retrofit and rehabilitation

This policy calls for a major state-sponsored energy efficient housing retrofit and rehabilitation program for existing housing stock in lower income areas (urban and rural), funded in large part by allowance fees and auction revenues from a Cap and Trade Program.

Electric Generation And Supply

Wisconsin geologic carbon sequestration study (included in Interim Report)

This policy recommends that the PSC and the DNR convene a special commission to explore the potential for geologic carbon sequestration for CO₂ produced by Wisconsin's electricity generation fleet. While it appears unlikely that Wisconsin has suitable geologic repositories available for CO₂ injection, this option should be explored, as should the more likely possibility of piping CO₂ to underground injection sites in an adjacent state, or the importation of low carbon gaseous fuels produced in connection with geologic carbon sequestration in an adjacent state. Planning for a future that may rely upon geologic sequestration cannot get started too early. The economic, legal, geologic,

and engineering hurdles are daunting. This special commission should report back to the Governor before year-end 2008. On April 3, 2008 the PSC opened Docket 5-EI-145 to pursue this recommendation.

Wind siting reform (included in Interim Report)

This policy recommends that legislation be adopted to have the PSC establish uniform standards for the siting of large and small wind systems. Uniformity in the standards and process will ensure equity to developers and local communities, and enable needed wind projects to be built safely in Wisconsin to support the state's renewable portfolio standard.

Great Lakes wind study (included in Interim Report)

This policy recommends that the state, through the relevant state agencies, convene a study group to look at the technical and economic potential for developing wind energy on Lake Michigan and Lake Superior. The group, where appropriate, should work with other Great Lakes states. Wisconsin should examine the significant potential for renewable energy development that may lie only a few miles off its shores. This study should be completed by December 31, 2008. On April 3, 2008 the PSC opened Docket 5-EI-144 to pursue this recommendation.

PSC Amended Strategic Energy Assessment (SEA)

This policy recommends that the PSC reopen the current Strategic Energy Assessment, with all utilities subject to the SEA required by October 15, 2008 to file comprehensive GHG emissions inventories using recognized standards. In conjunction with these filings, each utility would: (i) identify the actions currently being taken or planned to be taken during the next three years that will reduce its GHG emissions, showing estimated reductions, costs and other relevant information; and, (ii) identify other actions that

are not included in its current actions or plans that could be undertaken by it during this period to further reduce its GHG emissions, and identify the potential emissions reductions available, the associated costs and any other relevant information.

After review of this information by PSC and the public, each utility would be asked to set voluntary, near-term (prior to implementation of a Cap and Trade Program) GHG emission reduction goals for its systems and to report regularly on progress. Future rate filings would identify any reduction measures included in utility cost of service and recovery of reasonable and prudently incurred costs to meet goals consistent with the PSC's Assessment should be permitted.

Enhanced Renewable Portfolio Standard (RPS)

This proposal would increase the state's RPS in current law to 10% by 2013, 20% by 2020 and 25% by 2025. Of the required 20% by 2020 and 25% by 2025, minimums of 6% by 2020 and 10% by 2025 would have to come from Wisconsin-based renewable resources. To encourage early action the time limit for banking renewable generation credits in excess of RPS requirements would be removed. There would be no limit on the use of renewable energy credits to meet the revised standards, but only credits arising from Wisconsin sources may be used to meet Wisconsin minimum source requirements.

The definitions of renewable energy and renewable resources in the existing RPS law would be expanded to include the thermal portion of Wisconsin co-generation projects fired with biomass, as well as biogas produced in Wisconsin that is put in the natural gas pipeline system, solar water heating and other verifiable renewable applications that displace fossil fuel use. The revised definitions would also remove the existing 60 MW size restriction on new hydroelectric facilities, but only for the purposes

of meeting the non-Wisconsin portion of the standards after 2013. This recommendation is based on the premise that the concerns of the First Nations regarding Manitoba's existing hydro system and new proposed projects, including issuance of final licenses, will be resolved before new projects are built. Finally, to incent the conversion of existing Wisconsin coal-fired boilers to biomass prior to implementation of a Cap and Trade Program, electric providers should be permitted to purchase renewable energy credits for conversions by customers or install and own a replacement boiler, supplying process steam and heat to the industry on a contract basis and utilizing the equivalency credits directly.

To enable electric providers to meet the new, more aggressive RPS recommended in this Proposal in a timely manner and to avoid the need for compliance deadline extensions, the revised RPS would: (i) streamline the regulatory approval and siting process; (ii) encourage proposals that encompass multiple projects, with multi-project, integrative plans for acquisition of sites, equipment and contractors; (iii) allow for PSC approval of multi-year commitments for acquisition of necessary equipment in a timely manner, with appropriate recovery of development costs; (iv) provide additional resources for the PSC to process applications; (v) encourage larger electric providers to partner on projects with smaller electric providers; and (vi) remove existing siting and equipment transportation barriers.

All other provisions of the existing RPS law would continue to apply, including the existing "off ramp" provisions for compliance deadline extensions. In the event that a compliance deadline is extended with respect to the in-state RPS minimum, the remedy may be to waive the in-state source requirement, while maintaining the integrity of the overall RPS.

Electric transmission and distribution improvements

This recommendation calls upon the state to initiate a study group and/or open a PSC docket to evaluate changes to the statewide and regional electric transmission system that would facilitate increased electric generation by renewable and/or low-GHG resources. The effort would also focus on evaluation and/or participation by Wisconsin in negotiations with other states, the Midwest Independent Transmission System Operator (MISO) and the Federal Energy Regulatory Commission (FERC) regarding regional transmission system expansion and cost allocation. The PSC should determine the scope of work needed to implement this policy within one month after the final Task Force report is accepted by the Governor and implement as soon as possible after that date.

Tax incentives for renewable energy development

This policy recommends legislation to create incentives for customers to enroll in utility service options by making the amounts that customers contribute to renewable programs for schools and other public purposes tax deductible. Efficiencies could be gained by establishing a statewide 501(c)(3) organization for this purpose. As is the current practice, renewable energy that resulted from the implementation of this policy would not count toward Renewable Portfolio Standard requirements of utilities.

Advanced renewable tariff development

This policy recommends that the PSC establish tariffs to stimulate the deployment of renewable generation projects smaller than 15 MW. Utilities would be required to enter into long term, fixed price contracts to purchase all of the electricity produced by customer-owned renewable generation systems at favorable rates. The policy recommends that these advanced renewable tariffs should be based upon the specific production costs of each particular generation

technology, include a return comparable to the utilities' allowed returns, and be fixed over a period of time that allows for full recovery of capital costs. If PSC does not currently have authority to establish these tariffs through rate-making, the policy recommends legislation to grant such authority.

Modify moratorium on construction of new nuclear plants

Under Wisconsin's current "nuclear moratorium" law (§ 196.493, Wis. Stats.), the PSC may not authorize the construction of a nuclear plant unless it finds that a federal facility or a facility outside the country will be available for the disposal of high-level waste from all Wisconsin nuclear plants and that the proposed plant is economically advantageous to ratepayers based on specified factors.

The proposed policy would not mandate or encourage new nuclear plant construction, but would modify the current requirements as follows: (i) A new Certificate of Public Convenience and Necessity (CPCN) provision would be added requiring that the proposed nuclear plant must be built to meet Wisconsin needs at a cost that is reasonable and advantageous to customers in comparison with available alternatives, taking account of emission reductions benefits. If such a nuclear plant is a plant to be built and owned by a party other than a Wisconsin utility, the output would need to be sold to Wisconsin utilities to meet the needs requirement. In any event, any new nuclear plant, regardless of any changes in ownership or operational responsibility during the life of the plant, would be subject to regulation by the PSC on a basis that is comparable to the regulation that would apply to such a plant if owned and operated by a Wisconsin public utility. (ii) The current requirement of a federally licensed or foreign nuclear waste disposal facility would be replaced with a requirement that to obtain a CPCN the PSC must find the nuclear waste plan

for the plant is economic, reasonable, stringent, and in the public interest, given the safety and other risks presented by such waste. (iii) The proposed CPCN requirements for a nuclear plant would apply to any proposed nuclear unit regardless of size and include any replacement of any existing nuclear unit. (iv) In addition to the existing right of the PSC to apply for extension of the 180-day time limit to act on a CPCN, an additional extension could be sought by the PSC in the case of a nuclear plant for a reasonable, but defined period.

The proposed modifications to the moratorium would not take effect until a 25% by 2025 renewable portfolio standard consistent with the enhanced RPS policy recommended by the Task Force is enacted into law and a revised energy efficiency program consistent with the Task Force's Enhanced Conservation and Energy Efficiency Program recommendations is approved by the PSC and, where required, the legislature's Joint Committee on Finance. This recommendation is not a recommendation by the Task Force that a new nuclear plant be built. However, it would allow utilities to prudently plan and propose that alternative if they believe it is the most cost-effective and beneficial means to meet GHG reduction goals and their obligations to serve over the long term.

Green tariff option for customers- feasibility study

The development of a green tariff option for customers is an enabling policy to further encourage the development of renewable energy in the state. This policy requests the PSC to study the feasibility of market-based pricing options for customers. Tariff proposals would be designed to accommodate individual contracts between retail customers and renewable energy providers through their utilities that are longer-term, fixed price contracts for energy and capacity. Renewable energy that resulted from the implementation of these tariff proposals would not count toward RPS requirements of utilities.

Rate mitigation strategies

This policy calls for the PSC to investigate rate mitigation strategies designed to incent utility investments in high fixed cost, low carbon and GHG reduction projects while lowering total costs for customers. This investigation should consider levelization of cost recovery in rates, voluntary securitization of related debt to lower interest costs, and other strategies.

Transportation

California vehicle emission standards

This policy recommends that Wisconsin join with other states that have adopted California rules that set mandatory minimum GHG emission standards for passenger vehicles, light trucks and SUVs, in order to help move those standards forward as the single, consistent set of vehicle emission standards to be applied nationally. The standards would apply to new motor vehicles starting within three years of legislative approval and would affect cars, pickups, minivans, SUVs and any other vehicle whose primary use is non-commercial personal transportation.

More than a dozen states have adopted the California standards because they are more stringent in terms of GHG emissions than the federal Corporate Average Fuel Economy (CAFE) standards. The Task Force recognizes that this issue will not be decided in Wisconsin. Instead, it will depend upon the outcome of current litigation, whether a future federal administration accepts California's rules, or whether the federal CAFE standards are increased to match or exceed California's standards. The purpose of the recommendation is to demonstrate support for highly efficient vehicles and a single national standard.

The Task Force also recommends that the state, with the Janesville community and other affected parties, work diligently with General Motors on a plan of action to convert its Janesville facility

to manufacture highly efficient vehicles in order to take advantage of the skilled labor force in Janesville and the supply chain that exists, instead of closing the plant. Furthermore, the state should develop a comprehensive consumer transportation education and marketing program to aid automakers in the sale of highly efficient vehicles.

Off-road equipment greenhouse gas emission reductions

This policy recommends adopting voluntary and mandatory emission reduction measures to reduce GHG emissions from off-road sources related to construction, agricultural, lawn/garden care, recreational and industrial/commercial sectors. Voluntary measures would entail allowing market forces to improve fuel efficiency or use alternate power sources (e.g., biofuels, electricity, etc.), promoting public/private sector reductions (e.g., voluntary relationships), increasing availability of low carbon fuels, promoting idling reductions, adopting use of low global warming potential (GWP) refrigerant gases, creating tax/fiscal incentives to adopt low GHG emitting equipment and providing educational material to increase understanding of the options and opportunities to reduce both GHGs and criteria pollutants. Mandatory measures are directed at the public sector only and include: purchase of low GHG emitting/fuel efficient equipment, development and implementation of mandatory idling reduction language for contracts and state activities, use of low GWP refrigerant gases, and purchase of low carbon fuels.

Freight idle reduction

The task force recommends regulation to limit truck idling at depots, overnight rest areas and other long-term parking locations. The rule would limit idling to a maximum five minutes except when trucks are on the roadway during traffic, there are temperature extremes, medical needs require engine power, powering equipment is

needed to unload freight, engines are required to idle to regenerate emission filtration devices or required maintenance procedures are conducted. Efficient trucks with 2007 or newer engines will be exempt.

Government fleet adoption of plug-in hybrid electric vehicles

This policy recommends legislation to reduce consumption of non-renewable motor fuels. This legislation would require that by 2012, 25% of the delivery vehicles, light trucks, and passenger vehicles operated by the state and its largest cities have Plug-in Hybrid Electric Vehicle (PHEV) drive trains. The state would provide grants to the affected municipalities to offset 50% of the incremental cost of purchasing PHEV vehicles compared to conventional vehicles of the same make and model. In addition, the state would make grants to private company partnerships that include vehicle manufacturers and/or vehicle systems integrators to accelerate the introduction of PHEV drive train vehicle types. Preference will be given to proposals that include companies that are either headquartered in Wisconsin or whose employment ranks include a majority of Wisconsin residents.

Speed of travel reduction

This policy recommends strict enforcement of the existing 65 mph highway speed limit, a study of potential future speed limit reductions, and support and recognition for voluntary speed reduction policies by businesses and other organizations.

Incentives for electric, hybrid and plug-in hybrid electric vehicles

This policy recommends education and incentives for the purchase of hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs) and electric vehicles (EVs) including encouraging businesses to allocate favorable parking for these vehicles and by providing rebates or state-

tax credits. Policies to increase the market for these vehicles should be tied to developing a cleaner electric generation mix and to technology advances.

E85 infrastructure development and pricing incentives

This policy recommends legislation to support development of Wisconsin's E85 infrastructure and creation of retail E85 pricing incentives to make E85 competitive with regular unleaded fuel on a MPG-adjusted basis until the E85 infrastructure goal is met. The infrastructure goal is to increase availability from the current 61 outlets to 500 by 2015, and 50% of all outlets by 2020, at which time the pricing incentives will have expired.

Low carbon fuel standard

This policy suggests legislation with regulatory implementation and enforcement to develop a low carbon fuel standard (LCFS) for fuel providers on a sales-weighted average. The standard would be developed by measuring CO₂-equivalent grams per unit of fuel energy, include all emissions from fuel consumption and production, and be regulated on an annual basis. Providers of fuel that exceed the standard for the compliance period would generate credits that can be banked or sold. Penalties for noncompliance would be applied. Providers could meet the standard by blending ethanol (corn/cellulosic) with gasoline, blending biodiesel with diesel, purchasing credits from electric utilities providing renewable electricity for plug-in hybrid electric vehicles, improved efficiency in the exploration, processing and distribution of petroleum fuels or other strategies.

Carbon-audited transportation investment

This policy is intended to inform and promote energy-effective transportation infrastructure choices by requiring a carbon audit for state funded transportation projects, including carbon footprints for all Wisconsin Department

of Transportation (DOT) Environmental Impact Statements (EISs). A carbon audit would estimate GHG emissions through forecasts of added/reduced vehicle miles traveled resulting from the proposed project, increased/reduced emissions associated with congestion or its alleviation and life cycle GHG emissions required for the construction and maintenance of the facilities/infrastructure. The carbon audit would be reported by DOT through project related EIS evaluations or permit analyses.

Energy efficient communities

This policy recommends regulatory action and state funding to reduce vehicle miles traveled (VMT) by individuals. The recommendations include: (i) providing special transportation funding for areas zoned for traditional neighborhood design, (ii) including safety provisions for pedestrians, bicyclists, and transit vehicles in road projects along and across corridors being improved, (iii) requiring a VMT and GHG analysis for new developments that will receive state economic development assistance and for projects to expand state roadway capacity, (iv) developing a model parking ordinance that reconsiders mandatory minimum requirements for retailers and uses the market to price street parking, incorporating parking standards based on technology and market changes, such as small parking spaces for microcars, (v) establishing multimodal accessibility as the highest goal for the state to ensure walking and biking accessibility, (vi) considering VMT generated by applicant facilities as a major factor in state economic development funding decisions, giving projects with low levels of VMT per employee preference over those that increase VMT, (vii) considering VMT generated by Wisconsin to be a higher priority on rehabilitation of existing infrastructure over adding new lane-miles (fix-it-first) for funding purposes, and (viii) encouraging the Wisconsin Department of Commerce to develop incentives for local governments to promote compact development

and redevelopment.

Transit enhancement and travel demand management

This policy recommends legislation to reduce GHG emissions through establishing three programs for public and private transit alternatives: Intercity Rail, Transit Trust Fund and a Regional Transit Authority. The policy also recommends a voluntary Travel Demand Management (TDM) policy for employers with more than 100 employees. The Intercity Rail initiative would advance the proposed Chicago-Milwaukee-Madison high speed rail improvements to Eau Claire and the Twin Cities by increasing the non-federal share to a level that will provide greater leverage to access limited federal funding, up to \$120 million. The Transit Trust Fund would provide local units of government with up to a 50% state match for local rail projects, such as the Kenosha-Racine-Milwaukee and Dane 2020 rail options.

The Regional Transit Authority initiative would allow local units of government to fund transit operations through a local sales tax of up to one half cent to help transit systems account for inflation. The voluntary TDM policy would promote commute trip reduction programs for employees to reduce single-occupant vehicle use for workplace travel. Key elements of the TDM program would include providing incentives for alternate modes, considering parking supply constrictions, tailoring support and incentives suited for specific work sites, combining programs that inform employees of commuting options and making a range of commuting alternatives available.

Agriculture and Forestry

Advanced biomass and biofuel commercialization and utilization

This policy recommends legislation to increase the availability and use of renewable biomass and

biofuels for electricity, heat and transportation by (i) creating an Energy Crop Reserve Program that would provide incentive payments to landowners for growing perennial grasses and energy crops, targeting land previously enrolled in the federal Conservation Reserve Program (CRP), (ii) providing financial support to biomass producers for the purchase of new equipment and technology needed to harvest, process and transport biomass feedstocks, and to replace older equipment or introduce more energy efficient equipment, resulting in further reduction of carbon emissions, (iii) providing financial support to reduce risk and uncertainty for biomass producers and (iv) providing support for biomass aggregators and infrastructure such as transportation, storage and processing. Such support may include development of biomass harvesting and classification deadlines, pilot projects, promotion of commodity markets and exchanges, outreach to producers and users and grants to cooperatives.

To establish the state as a leader in the use of biomass, the policy recommends: (i) utilizing solid/liquid/gaseous fuels derived from biomass to provide 25% of the energy needs for state owned or occupied facilities by 2025, (ii) providing incentives to school districts that use biomass for heat or electricity by excluding the capital cost of biomass systems, fuel, maintenance, and any purchase cost of heat or electricity from revenue limits under the school aid formula and (iii) excluding the cost of biomass systems, fuel, maintenance and any purchase cost of heat or energy from biomass from municipal and county levy limits.

In addition, the policy recommends: (i) developing procedures to facilitate regulatory certainty, environmental safety and rapid evaluation of new bioenergy technologies, (ii) promoting outreach and education programs to educate about bioenergy, (iii) supporting the development of advanced biomass, biofuel and

related renewable energy degree programs by the University of Wisconsin System, UW campuses and technical colleges and (iv) developing awards and prizes for bioenergy innovations.

Afforestation and reforestation

This policy recommends enhancement of existing state programs, and increased education and assistance, to encourage afforestation and reforestation to decrease GHG emissions through terrestrial carbon sequestration. Enhancement of state programs will provide additional incentives for landowners. These changes may require legislative rule changes, fiscal measures, or manual code adjustments. First, Wisconsin's Managed Forest Law (MFL) would be improved. Currently, MFL allows landowners to enter a land parcel into this program that has less than 80% forest cover as long as 80% forest cover is achieved within a certain period of time. This policy change would allow landowners the ability to enroll non-forested lands into MFL with a longer term requirement for mandatory afforestation practices within the first five years.

Additionally, the Wisconsin Forest Landowner Grant Program would be enhanced by increasing the funding available to private landowners for a variety of management actions. In addition, specific policies should be designed to ensure incentives are provided for all eligible entities with consideration of the tax liabilities each faces. For entities that have different structures, grants could be considered or tax incentives could be designed with the ability to transfer the incentive to a third party.

Increased education and assistance activities would include: (i) developing a statewide communication strategy for terrestrial carbon sequestration efforts and opportunities, (ii) increasing the amount of technical forestry assistance available to non-industrial private landowners, (iii) enhancing existing programs, or creating new programs, that provide education,

outreach and promotion of climate change programs and options to private landowners and (iv) developing standards and protocols for monitoring and measurement of carbon sequestration on forests.

Forest loss prevention

This policy recommends legislation establishing a state program to prevent loss of forest land through parcelization or conversion out of forestry. Legislation is recommended to require changes to local zoning and related requirements that discourage or prevent the conversion or parcelization of forested land. A state Forest Legacy Program that would mirror the Federal Forest Legacy Program is recommended to provide: (i) matching funds to land trusts and local communities to allow the voluntary placement of conservation easements for forest lands, (ii) obtain federal grants to purchase conservation easements, (iii) identify of sites that are most important to protect from conversion or parcelization and (iv) assist to local governments to ensure that planned growth maintains or increases forests.

Sustainable forest management

This policy recommends legislation to create incentives for private landowners to engage in sustainable forest management techniques and practices that increase the carbon storage potential of their forests. The state would: (i) Identify opportunities within existing programs, such as the Wisconsin Forest Landowner Grant program, where incentives can be added. (ii) create a new shorter-term incentive program called the Carbon Sequestration Tax Incentive Program (CSTIP) that would provide property tax relief involving a "carbon lease" to the state while requiring that the landowner develop a forest management plan and commit to sustainable forest management practices that increase the carbon sequestration potential of the forest; and (iii) enable property owners to take part in multiple programs by developing rules and

guidance for landowners and the state.

The policy also recommends the following outreach and technical assistance efforts: (i) developing systems to contact private forest landowners with information about eligible programs, technical assistance and other resources; (ii) reducing transaction costs of marketing carbon credits through the development of statewide standards and protocols for carbon monitoring and measurement; and (iii) increasing technical resource availability to landowners through additional staff and grant funding.

Urban forestry

This policy recommends a statewide private-public collaborative tree planting and management initiative, an increase in the Urban Forestry Grant Program, and additional state support resources to decrease GHG emissions in urban environments through increased tree planting. The statewide initiative would engage all sectors to plant and manage urban trees on private and public property to maximize urban forest contributions to GHG reduction. Increased Urban Forestry Grants and state level resources would facilitate and provide incentives for partnerships needed by local governments and urban property owners; foster integrated efforts between the Wisconsin Urban Forestry Council, UW Extension, teachers, professional associations, private sector, non-profit organizations, universities/tech colleges, nature centers and local governments; monitor urban forest impact on carbon and energy reduction; and expand research on improving urban forest contribution to reducing GHG emissions.

Methane reduction through ruminant nutrition

This policy recommends improvement of animal health through better nutrition. For example, healthier cows stay in the herd longer and fewer replacements are needed, resulting in lower

methane emissions. The task force recommends promoting management intensive grazing at existing grazed animal operations to increase soil fertility, plant vigor and quality, and providing financial incentives to producers to increase use of animal nutritionists to promote a high level of livestock health and productivity.

Production, capture and use of animal methane

This policy recommendation seeks to increase the capture and use of animal methane for electricity or heat and to reduce current methane emissions. Several policy options are suggested: (i) establish a cap-and-trade program to increase demand for electricity and biogas from digesters, (ii) establish a voluntary consumer payment program for electricity or biogas produced from manure, (iii) grant a tax credit for production of electricity or biogas from manure, (iv) grant a tax credit for investments in manure digesters or lagoon covers, (v) provide a state subsidy for digester capital costs, interest costs, or to cover risk incurred by private lenders for digester projects, (vi) create a state fund for incentives for utilities to pay a higher rate for electricity or biogas supplied from manure digesters, and (vii) fund research to increase the economic viability of manure digesters and other waste-to-energy systems and efficiently bring waste-to-energy systems to market through farmer-owned cooperatives.

Nutrient and manure management

The goal of this policy is to reduce application of nitrogen and overall use of chemical fertilizers through state incentives and mandated adoption of nutrient management practices, thereby reducing nitrous oxide and CO₂ emissions. The task force recommends increasing state cost-sharing for nutrient management planning to increase adoption of nutrient management plans by farmers, requiring the adoption and implementation of nutrient management plans, and increasing funding for education on manure

handling, nutrient management, use of nitrogen inhibitors, and other practices that reduce nitrogen emissions.

Encourage prairie plantings

This policy recommends providing research dollars to investigate carbon storage in prairie systems and cost-share funding for prairie restoration and creation by providing state tax credits.

Soil management practices

The goal of this policy is to increase carbon stores in agricultural soils by 10% over the next 25 years. To do so, a significant number of farmers must adopt agricultural practices such as reduced tillage, no-tillage, cover cropping, incorporation of organic matter, and other practices demonstrated to be effective by research. This proposal recommends advancing these practices by: (i) increasing government payments to farmers for adoption of these practices, (ii) establishing a carbon cap-and-trade system to increase market demand for carbon-sequestering soil management practices, or (iii) making compliance with the practices mandatory while offering adequate cost-share funding. In addition, this policy also recommends the state increase funding for research on the most effective soil management practices for sequestering carbon and negotiate with the Chicago Climate Exchange to allow credits for increasing organic matter in soils.

Preservation of existing vegetative cover carbon sinks on CRP lands

This policy recommends four incentives to reward private landowners for growing energy crops or sequestering carbon by maintaining vegetative cover. The first calls upon the state to create an Energy Crop Reserve Program that would provide incentive payments to landowners for growing perennial grasses and energy crops on land previously enrolled in the federal Conservation Reserve Program (CRP). The second would

provide state income tax credits (similar to the existing farmland preservation tax credits) to landowners who maintain existing vegetative cover. The third would make grasslands eligible for lowered tax assessments under a revised use-value assessment law, even if they are no longer enrolled in CRP. The fourth would establish a Carbon Conservation Easement program to purchase easements on private lands that would restrict disturbances of existing vegetative cover.

Industry

Incentives for industrial boiler efficiency improvements

This policy recommends a combination of regulatory incentives and targeted financial incentives to encourage the owners of industrial boilers to implement energy efficiency improvement measures. Boiler efficiency improvement projects would be afforded permitting relief and/or expedited permit approvals. Annual funding of \$5 million for grants and loans would be provided through the Focus on Energy Program specifically for technical assistance, equipment purchases and installation costs related to such projects. Alternatively, a larger one-time revolving low-interest loan program could be established.

Industrial efficiency incentives

This recommendation consists of a package of incentives, with an emphasis on funding for industrial projects that are not feasible within the constraints of existing programs such as Focus on Energy. They include: (i) cash grants for conducting comprehensive energy audits, implementing corresponding conservation and efficiency measures, or purchasing replacement or retrofit equipment that is more energy efficient; (ii) refundable tax credits for the purchase of equipment or other capital expenditures that will result in quantifiable energy savings and manufacturing transition tax credits to assist companies that redesign

production facilities to produce new, cutting-age technologies with fewer GHG emissions; (iii) low-interest or no-interest loans for large capital expenditures intended to reduce energy consumption; (iv) fast track permitting for retrofit and/or equipment replacement projects that would otherwise proceed on a traditional permitting path, if the equipment will result in energy efficiency or conservation savings; and (v) industrial development bonds targeted to businesses that do any of the following: begin manufacturing energy efficient fixtures, metering equipment or appliances; begin manufacturing renewable energy products or components; install renewable power generators in their facilities; begin manufacturing component parts for renewable fuel or hybrid/flex-fuel vehicle operations; or transition from manufacturing traditional vehicles to manufacturing hybrids, advanced diesel, flex-fuel and other advanced drive train vehicles and related components.

Incentives for industrial boiler fuel switching

This policy recommends supply and demand side incentives to increase the amount of non-wood biomass and noncommercial forest residue used as fuel in industrial boilers.

On the supply side, a goal of 50% recovery and use of forest residue for biofuels is recommended. Financial assistance could be provided via the Focus on Energy program in the form of targeted grants and low-interest loans to loggers for the purchase of equipment to collect and transport forest residues to market and for other technical assistance. The recommended funding level is \$1 million per year for three years, with future funding determined by the Focus on Energy program based on demand. It is also recommended that best management practices for the recovery of forest residues be developed between DNR and the forest products industry.

On the demand side, grants and low-interest

loans would be provided to owners of wood-fired industrial boilers for physical plant changes necessary to increase the utilization of forest residues or non-wood biomass as fuel. A fuel cost subsidy could also be provided. This proposal recommends targeted funding from the Focus on Energy program of \$1.5 million annually in grants for three years and \$1.5 million in low interest loans for three years. Future funding levels should be determined by the Focus on Energy program based on demand.

It is important that market supply and demand balance be maintained in order to avoid driving up the price of commercial stem wood used as raw material in the pulp, paper, and wood products industries. In addition, to the extent allowed under federal regulations, permit streamlining incentives should be provided to offset the regulatory barriers that could be associated with boiler projects.

Energy intensity reduction with feebates

This policy recommends that the DNR explore a feebate proposal as part of the existing Green Tier program. The proposal would encourage and enable industry sectors to voluntarily commit to a sector-wide 2% annual energy intensity reduction. If a sector chooses to make this commitment, each participating business or entity in that sector will be required to reduce its energy intensity/electricity/natural gas use per unit of output by at least 2.0% per year on a continuing basis. Within the sector, below average performers would pay a fee while above average performers would receive a rebate. The total amount of all fees would equal the total amount of all rebates – an arrangement that is sometimes called a “feebate.”

Training for green jobs

This policy calls for the Department of Workforce Development (DWD) to convene a group to assess future training needs for the emerging green jobs sector and to report back to the Governor with

recommendations by January 2009. DWD would also be expected to assess a federal Green Jobs bill, or similar proposed legislation, to determine whether the Wisconsin Congressional delegation should be asked to support the bill. Finally, the Department of Commerce should expand the focus of the existing Customized Labor Training Program to expend at least 10% of its funds for “green jobs” training and to support conversion of manufacturing operations to the production of renewable and efficiency components.

Carbon Tax/Cap And Trade

Broad-based, multi-sector Cap and Trade program

A broad-based Cap and Trade Program that establishes a price for greenhouse gas emissions is essential to meet the emission goals recommended by the Task Force. Because the program should cover the largest possible market, the Task Force specifically recommends against a Wisconsin-only Cap and Trade Program.

The Task Force strongly supports, as the most preferable alternative, development of a broad, multi-sector, federal Cap and Trade Program with a target effective date of 2012. The State of Wisconsin’s position in negotiating the design of a federal Cap and Trade Program should be to ensure that due consideration is given to the fact that states such as Wisconsin, which are highly dependent on coal for electricity and have energy intensive industries like paper production, are likely to be disproportionately affected by the costs of a Cap and Trade Program, particularly during the transition period to a low-carbon economy.

The Task Force also recommends that the State of Wisconsin continue to participate and provide leadership in the development of a Midwest Regional Cap and Trade Program while at the same time advocating for a federal program that protects Midwestern and Wisconsin interests.

When the regional cap and trade agreement and model rule are completed, Wisconsin should promptly initiate the process for the state to review, consider and take such action on the agreement and rule as are required and determined to be appropriate.

In order to mitigate costs and maintain the environmental integrity of a Cap and Trade Program, the Task Force’s recommendation addresses a number of the design features of such a program, including points related to the scope of the program, basis for setting the cap, program structure, allowance distribution, use of program revenues, offsets, and cost containment measures. The recommendation recognizes that Cap and Trade Program design features are complex, interrelated, and will remain controversial. Positions taken on these issues by members of the Task Force in the federal and regional debates will depend on a variety of factors.

Recommended design elements for an offset program as part of Cap and Trade regulatory framework

This is the first of two policies designed to achieve near-term GHG reductions in an interim period before implementation of any federal or regional Cap and Trade Program begins. This policy recommends rapid establishment of a formal program for voluntary registration and verification of GHG offset projects, relying perhaps on existing protocols such as Wisconsin’s Voluntary Emission Reduction Registry or The Climate Registry. If and when Wisconsin participates in a mandatory Cap and Trade Program that credits offsets, this voluntary program could be modified as necessary to meet the needs of a mandatory program.

Incentives for voluntary programs

This is the second of two policies designed to achieve near-term GHG reductions in an interim period before implementation of any federal

or regional Cap and Trade Program begins. This policy recommends that the State: (i) implement financial incentives (such as tax incentives) to encourage organizations to participate in certain voluntary programs to track and reduce GHG emissions, (ii) participate in the Chicago Climate Exchange for emissions from state owned and operated facilities and activities, retiring any credits obtained, (iii) create a fund that could be used to purchase and retire GHG emissions, with money coming from voluntary contributions by citizens via a check off box on state tax forms and/or on gas and electric utility bills, and (iv) request an IRS ruling on whether an entity that generates GHG credits (e.g. emission credits and offset credits) and permanently retires these allowances instead of selling the allowances is eligible for a federal tax deduction.

Other Policies

Co-generation incentives and/or mandates

This policy recommends that the state establish policies, incentives and information to identify and install new combined heat and power (CHP) systems and facilitate the decommissioning of older, high emission sources and the replacement of these units with CHP systems to reduce GHG emissions. Specific components of the policy proposal include: (i) conducting a review of applicable statutes and regulations that may inhibit the sale of electricity and steam from CHP systems; (ii) funding site specific feasibility studies and consider incentive programs through Focus on Energy; (iii) providing information for utilities and developers on CHP systems, including a statewide survey of large users of thermal energy and a database where industries can report thermal needs; (iv) conducting an evaluation of regulatory obstacles to the installation of CHP systems; (v) establishing tax incentives to utilize thermal energy; (vi) expanding the definition of renewable resources as part of an enhanced renewable portfolio standard; and (vii) conducting a study to identify which existing steam facilities can be replaced with CHP plants.

Enhanced water efficiency and conservation

Water conservation reduces GHG emissions by limiting energy inputs to power motors, pumps and other infrastructure needed to produce, distribute, use, collect, treat and dispose of water. This policy recommends coordinating water conservation and efficiency with energy efficiency programs through state agency efforts. Either through statutory changes or implementation of current efforts, water efficiency and conservation programs should be enhanced by creating a statewide Focus on Water division through Focus on Energy in order to establish a regional program in areas of water supply concern and/or promote pilot projects at individual water or wastewater utilities. These efforts may include incentives for utility customers to purchase, install and use water-efficient products and services; technical and financial assistance for water utilities, large water users and wastewater utilities to identify solutions for reducing their water and energy use; and research, education and outreach materials on water efficient technologies and practices.

Increased paper recycling

This policy recommends legislation to increase recovery of recyclable scrap paper in Wisconsin. This policy would reduce emissions by diverting more recyclable paper from Wisconsin landfills through a graduated expansion of existing landfill paper bans in conjunction with increased outreach, enforcement and incentives. More specifically, forest carbon sequestration should be increased as forests are left intact rather than harvested for paper production. The policy adds mixed recyclable paper to the list of paper categories required by Wisconsin statutes to be recovered by effective recycling programs, removes the existing exception for office paper from households, increases education and outreach on paper recycling to households and businesses, improves collection services in areas or business sectors that are underserved, and creates incentives and enforcement strategies for paper recycling. After implementing the above

measures, if a new waste characterization study shows that significant amounts of paper are still being landfilled, the task force suggests the state develop stronger measures to recover paper, such as prohibiting landfill disposal of more than incidental quantities of recyclable paper.

Recovery of untreated wood wastes

This policy recommends legislation to increase recovery of untreated wood wastes through a combination of local ordinances, financial incentives and reduced regulatory barriers. By combusting the wood to recover energy (displacing generation by fossil fuels) or recycling/reusing it in products such as landscape mulch or engineered wood (i.e., chipboard and particle board), the need to harvest new trees is reduced, allowing forests to grow and sequester more carbon. Local ordinances would require wood waste generated in new construction to be recycled as part of the building permit process unless compliance would increase GHG emissions due to transporting discarded wood or other local factors. State financial incentives would encourage development of the wood waste recycling/reuse infrastructure. By reducing regulatory barriers, recycling and reuse will be increased. If a significant amount of untreated wood continues to enter landfills, regulators should consider imposing a landfill ban. In addition, the task force also recommends that the state promote reusing wood and other materials recovered during demolition of existing structures.

Enhanced recycling

Recycling provides substantial reductions in GHG emissions by reducing the consumption of energy and resources, such as forests, to obtain raw materials for manufacturing. This policy recommends legislation to enhance current recycling programs through four initiatives: education and outreach, grants to local governmental units and others to increase recycling, more effective deployment of recycling

programs, and research regarding further recycling opportunities.

This policy also recommends using a portion of the funds from the Recycling and Renewable Energy Fund to research further recycling opportunities, including studies on the performance of recycling programs, gaps in collection, the feasibility of incentive-based programs, identification of the greatest potential for recovery, and the best practices to enhance recovery.

Electronics reuse and recycling

This policy recommends legislation to divert electronics for reuse and recycling through a landfill ban and a state program requiring manufacturers to assume responsibility for collecting and recycling certain discarded household electronic products.

Reduced landfilling of food waste

This policy recommends studies be conducted on food waste diversion. These studies should examine reducing landfill methane emissions by diverting materials that decompose anaerobically. Currently, there is little infrastructure in Wisconsin for large-scale composting of materials other than yard trimmings. Therefore, the task force recommends actions to enhance knowledge rather than policies to legislate action. The research should include identification of contributors of pre- and post- consumer food waste currently entering the solid waste stream, investigations of public health issues, examination of the practicality and costs of food waste composting from commercial properties, development of a hierarchy for the recovery of source-separated food waste, and identification of strategies to reduce barriers to increased diversion of food wastes.

Additional Policies for Consideration

In the process of the Task Force's work (including in comments on this Proposal provided by the public at the end of our process), a number of ideas have been proposed that the Task Force has not been able to analyze and recommend due to the time constraints. Some of these possible additional recommendations could lead to significant GHG emissions reductions.

Given the magnitude of the challenges climate change presents, the Task Force recognizes the need to take all cost-effective, feasible emissions mitigation actions, but we also must come to closure. For illustrative purposes, the list below identifies some, but not all, of the ideas that have been raised but have not been analyzed by the Task Force.

- Food supply chain emissions reduction and strategies
- Food consumption emissions impacts and related behavioral change strategies
- Freight hauling emissions reduction measures
- Measures such as the Massachusetts law requiring new, large scale developments to offset emission impacts
- Providing basis point reductions in WHEDA loans for "green" projects
- A SF6 (sulferhexafluoride) emissions reduction requirement
- Anaerobic digesters at food processing facilities and wastewater treatment plants, and increased use of landfill gas
- Increased use of video conferencing
- Urban gardens
- Wave and underwater turbines
- Reductions in the use of plastic bags.

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Appendix B

Task Force Members and their Affiliations

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Gary Malkus, General Motors - Janesville
C. David Myers, Johnson Controls
Representative Phil Montgomery
Bill Oemichen, Wisconsin Federation of Cooperatives
Senator Jeff Plale
Keith Reopelle, Clean Wisconsin
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Susan Stratton, Energy Center of Wisconsin
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Michael Swenson, Xcel Energy - NSP Wisconsin
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Appendix C

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Dennis Derricks, Wisconsin Public Service Corp.
Barbara Freese, Union of Concerned Scientists
Joe Kramer, Energy Center of Wisconsin
Nina Plaushin, Wisconsin Public Power Inc.
Annabeth Reitter, NewPage
Kris McKinney, We Energies
Phil Molién, Gen-Sys / Dairyland Power Cooperative
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Forrest Ceel, IBEW 2150
John Clancy, Forest County Potawatomi Community
Tim Clay, Wisconsin Federation of Cooperatives
Charlie Higley, Citizens Utility Board
Andy Kellen, Wisconsin Public Power Inc.
Charles Matthews, We Energies

Rep. Phil Montgomery, Wisconsin Assembly
Adam Raschka, Rep. Montgomery's Office
Scott Neitzel, Madison Gas & Electric
Tom Smies, Wisconsin Public Service Corp.
Todd Stuart, Wisconsin Industrial Energy Group
Jim Turnure, Xcel Energy
Michael Vickerman, RENEW Wisconsin
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Senator Jeff Plale, Wisconsin Senate
Jennifer Oechsner, Sen. Plale's Office
Tom Scharff, NewPage
Susan Stratton, Energy Center of Wisconsin
Bruce Nilles, Sierra Club
Janet Brandt, Wisconsin Energy Conservation Corp.
Bruce Caucutt, Alliant Energy
Jean Derfus, Xcel Energy
Roman Draba, We Energies
Nicholas Hall, Consultant
Beata Kalies, Wisconsin Electric Cooperative Association
Katie Nekola, Clean Wisconsin
Clay Nesler, Johnson Controls
Barb Nick, Wisconsin Public Service Corp.
Mike Stuart, Wisconsin Public Power Inc.
Mike Thompson, Trane Commercial Systems
Peter Vogel, Vogel Builders
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Jeff Crawford, Forest County Potawatomi Community
David Donovan, Xcel Energy
Dennis Frame, Discovery Farms
Earl Gustafson, Wisconsin Paper Council
Dr. Chris Kucharik, UW-Madison, Nelson Institute
George Meyer, Wisconsin Wildlife Federation
David Mladenoff, UW-Madison
Pam Porter, Consultant
Gene Roark, Wisconsin Woodland Owners Association
Alice Thompson, Thompson & Assoc. Wetlands Services
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Dave Oughton, Mercury Marine
John Piotrowski, Packaging Corporation of America
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Clare Stapleton-Concord, Office of the Commissioner of Insurance
Steve Steinpreis, Plymouth Foam, Inc.
Dave Stringham, AH West Group
Ed Wilusz, Wisconsin Paper Council
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Appendix D

Summary Report Of The Technical Advisory Group

Modeling

The Technical Advisory Group (TAG) was responsible for identifying an appropriate approach to modeling greenhouse gas (GHG) reduction policies for Wisconsin. The TAG identified five criteria that were used to guide the selection of a modeling approach for the Task Force. These were:

- The model should be able to recognize the likely interactions between policies across sectors. It should have a multi-sector analysis feature.
- The model should be comparable to models being used elsewhere in the U.S. so that Wisconsin results could be compared to those in other areas.
- The model and the assumptions and inputs used should be transparent and understandable in order for policy makers and the public to have reasonable confidence in the outputs.
- The modeling effort should be relatively easy to roll into a regional modeling effort. With the Midwestern Governors Association (MGA) process just getting underway, this was thought to be important.
- The model should be able to model energy efficiency in a way that considers price and non-price factors, rather than just economic factors.

The TAG interviewed several consultants and, based on the above criteria, recommended that the consulting firm of ICF International in partnership with Systematic Solutions Inc. (SSI) be retained.

The ICF/SSI partnership uses the ENERGY 2020 model which is an integrated multi-sector, multi-region energy model that provides state specific output data on energy and emissions. It is a causal and descriptive model which dynamically describes the behavior of both energy suppliers and consumers for all fuels and for all end uses. It simulates how users and suppliers make decisions

and how these decisions causally translate to energy-use and emissions.

ENERGY 2020 can be linked to a macroeconomic model to provide economic impact data at the state, regional and national levels. By running iteratively with the macroeconomic model, it can capture the feedback among energy consumers and suppliers and the economy. A change in price affects demand which then affects future supply and price. The Wisconsin Department of Transportation operates a macroeconomic model, REMI, and this was used in this project.

Limitations of Modeling

The Technical Advisory Group has made certain observations from the modeling process. While great effort was made to keep the modeling a technically respectable process, it is always important that modeling observations be viewed with attentive skepticism. Modeling will not provide a definitive indication of the future. Modeling can provide a consistent framework for evaluating the implications of different policies that can not be replicated by intuitive reasoning. Due to the inherent uncertainties in assessing the future, however, models should be viewed as a means to inform good judgment and not as predictive tools.

The Modeling Process

The first step in the modeling process was to construct the Reference Case, which is a projection of economic and emission trends, in the absence of climate change policies, against which the alternative policies would be compared. The TAG thoroughly reviewed the input data to ensure that the data describing Wisconsin's infrastructure was accurate and current, and that future projections (e.g., fuel prices and construction costs) were reasonable and based on the best information available. The TAG also spent considerable time in reviewing the model's assumptions and recommending changes in certain areas.

The Reference Case projected emissions from all 6 Kyoto gases by sector from 2006 through 2024. Emissions associated with carbon sequestration were not projected but were added exogenously to the modeled gross emissions to provide an estimate of net emissions. These sequestration estimates were developed by Winrock International, the consulting firm retained by the Task Force to evaluate GHG sinks in the Forestry/Agriculture Sectors. In addition, no climate forcing CO₂ emissions were assumed to result from the combustion of biomass.

The Reference Case was modeled iteratively with REMI to establish an economic baseline for comparing the impact of future policies. In mid-process, the federal Energy Independence and Security Act (EISA) was adopted, which resulted in a number of changes that affected the emissions and costs of vehicles, buildings, equipment and fuels. In order to isolate these impacts and create a new economic baseline, the ENERGY 2020 and REMI models were re-run to calculate the effect of these changes. This then became the point of reference for comparing the emissions, energy and economic impacts of policy scenarios. The TAG had some concerns about the REMI model and the inability to adjust assumptions and inputs to the model. However, it was felt to be adequate for comparing the direction and magnitude of economic impacts of alternative policy scenarios.

Once the reference case had been established, attention turned to the policy templates that the Work Groups had recommended be modeled. ICF consulted with the Work Group co-chairs, the TAG and World Resources Institute (WRI) to make sure policies were accurately characterized and assumptions clarified.

The TAG developed the following strategy for modeling alternative policy scenarios, or packages. The TAG had a “dream list” of policies scenarios it would have liked to model, however those listed below are all that there was time for.

Policy Case 01:

All Policies Except Cap and Trade. These included:

- Enhanced Conservation and Energy Efficiency Program
- Residential and Commercial Building Codes
- State Appliance Efficiency Standards
- Rental Lighting Standards
- Urban Forestry
- Biomass and Biofuel (State Bioenergy Use)
- California Vehicle Emission Standards
- Low Carbon Fuel Standard
- Energy Efficient Communities
- Enhanced Renewable Portfolio Standard

Policy Case 02:

Same as above except without the California Vehicle Emission Standards.

Cap and Trade (CT):

All Policies (PC01) Including Cap and Trade with 100% Free Allocation of Allowances and:

- CT 01: Assumes there is no regulatory limit on the use of offsets.
- CT 02: Assumes that offsets are capped at 10% of the allowances needed in any given year.

Cap and Trade (CT):

All Policies (PC01) Including Cap and Trade with 100% Auction of Allowances and:

- CT 03: Assumes there is no regulatory limit on the use of offsets.
- CT 04: Assumes that offsets are capped at 10% of the allowances needed in any given year.

Higher Energy Price Scenarios:

(50% higher prices for coal, natural gas, oil and biomass than in the original reference or policy cases) This was a sensitivity run to test the effects of higher energy prices. These higher prices were closer to the July 2008 prices than the prices in the original reference case that was completed in February 2008. This sensitivity run was modeled for both the Reference Case and the All Policies Except Cap and Trade Case (Policy Case 01).

*Policy Case 10:

Deep Carbon Reduction Scenario. This was another sensitivity run that modeled:

- 2,000 Mw of zero carbon electric resources being added to the state's power sector
- All existing coal units with a capacity of less than 150 Mw being retired (about 1,400 Mw)
- Effective January 2020
- This scenario also included the All Policies Except Cap and Trade (Policy Case 01)

*Please note that policy cases 3 - 9 are not discussed here.

Due to the complexities of modeling the cap and trade policy scenarios, the TAG recommended that the Task Force not rely on the modeling results associated with these specific runs. However, the effort provided important lessons and observations, which the TAG shared with the Task Force. Some of these are summarized in the Key Findings below.

The TAG also reviewed the non-modeled policy templates and developed a conservative estimate of the emission reductions that they might provide. These policies were primarily in the Forestry and Agriculture sectors. The contribution of emission reductions from the modeled and unmodeled policies were used in the analysis of potential short and mid-term statewide emission reduction targets.

Key Input Parameters

It is important to understand the underlying assumptions in order to put the modeling results in context. The "Assumptions Book" contains the details, but the following parameters are particularly important to keep in mind as they have considerable influence on the modeling results and findings:

Fuel price: The price of three carbon based fuels; oil, natural gas and coal were inputs to the model. See attachment for graphs showing the fuel price inputs to the Reference Case. Fuel price impacts virtually all sectors considered.

Transmission Capability: The transmission system capability impacts the amount of electricity that can be imported into or exported out of Wisconsin. The current system is not adequate to handle free flow of electricity under all conditions. In other words, the state is "transmission constrained". The WUMS/MAPP (transfer capability between eastern Wisconsin and the west) and WUMS/COMD (transfer capability between southern Wisconsin and Illinois) interfaces were adjusted to increase transfer capabilities to reflect the new transmission projects completed and underway by American Transmission Company to improve transmission infrastructure in Wisconsin. It was assumed that adequate additional transmission resources would continue to be built to serve the Midwest, and that the cost to do this would be shared among other states including Wisconsin, so this constraint was not included in the modeling.

Capital Cost: Capital costs for new power plant construction is highly uncertain and undergoing a period of rapid real price escalation. This results in extreme volatility in reported construction costs for individual technologies, due to underlying commodity prices and other inputs to capital cost. Therefore efforts were focused to identify a single set of internally consistent data describing capital costs across all technologies, as opposed to identifying the most current estimates for individual technologies with the resulting potential for inconsistent assumptions between technologies.

Economic Forecast: The REMI model was used to determine economic impacts. One of the inputs to the model is electric demand growth rate. Data was available from the Public Service Commission's Strategic Energy Assessment on state utility projections through 2015, and this data was input into the REMI model. The REMI model's base data projected a higher growth rate, and this ultimately created a "knee in the curve" of growth rate in 2016. The more

aggressive economic growth rate in REMI starting in 2016 and continuing through the end of the modeling period (2024) was viewed by the TAG as overly optimistic, especially for energy intensive industries.

Key Findings

Keeping the modeling limitations noted above in mind, the following findings were observed from the modeling:

“Leakage”: Reducing Wisconsin’s energy demand may result in “freeing up” in-state fossil fueled power plant capacity to sell electricity to out-of-state customers. The result could be that Wisconsin customers would be using less energy, but emissions from Wisconsin power plants would remain the same or decrease less than what would be expected.

Alternatively, if coal-fired generation is reduced in Wisconsin but the demand for electricity is met through imports, Wisconsin customers may be using the same or more energy, but emissions from Wisconsin power plants would decrease and depending on the out of state source, total emissions may increase.

Another example occurs if some of the renewable energy required for the enhanced renewable portfolio standard in Wisconsin was purchased from out of state. The reduction in GHG emissions would occur, but not within the state boundaries.

Adding new zero emitting resources and retiring carbon emitting resources in Wisconsin will show globally large reductions in emissions. However, the benefit will be understated if the analysis is restricted to within the state boundaries.

All of these examples highlight the need to consider the effects of electricity imports and exports on Wisconsin GHG emissions.

Economic Impacts: Under all of the policy scenario modeling runs, both those with and those without cap and trade policies, the state’s

economy, employment and personal disposable income increased over the 2006 to 2024 time period, but at a slightly lower rate of increase than projected under the Reference Case. The TAG had concerns that the REMI runs, including the robust economic forecast, may have been somewhat insensitive in assessing economic impacts.

Energy Independence and Security Act: EISA was passed during the development of the Reference Case. It was noted that there was a reduction in GHG emissions when the EISA provisions that would apply to Wisconsin were added to the model. Most of the reduction came from passenger cars because of the new CAFÉ standard.

Electricity Demand Growth: Annual electricity demand growth rate is cut in half from two percent in the Reference Case to one percent in under Policy Case 1. This can be attributed to a number of factors including the enhanced energy efficiency policy, and to higher energy prices resulting from the enhanced renewable portfolio standard policy. This reduction in electricity demand results in lower electricity bills in 2024. While the rates that utilities charge customers increase an average of 8 percent above Reference Case in 2024, electricity bills are reduced by between 12 and 15 percent depending on the rate class. The experience of individuals and particular businesses may vary significantly from these projections.

Transportation Impacts: The commercial, residential and transportation sectors all experience absolute GHG emission reductions from 2005 due to increased efficiency and reduction in vehicle miles traveled. All other sectors experience increases in GHG emissions though slower than under the Reference Case. Wisconsin adoption of the California vehicle emission standards results in an additional reduction of approximately 2 MtCO₂e when compared to a scenario where they are not adopted.

Cap and Trade: Several attempts were made to model the Cap and Trade templates. For a variety of reasons, the effort was cut short prior to any definitive results. However, a number of observations were made in the process. These are fairly obvious, but will be noted here as follows:

- Allowance costs are dependent on policy design, and there is a relationship between stringency of policy and resulting costs.
- The availability of offsets affects allowance prices. Lower allowance prices were observed when offsets were available in sufficient quantity and higher allowance prices when they were not. The modeling did not address the policy issue of the desired balance between the impact of offset availability on allowance prices and the impact on the pace of development of future technologies and practices.
- The starting point matters. Prior implementation of energy efficiency, California Car requirements, etc. affects relative position in the market as well as cost of the next level of reductions.
- Ideally all jurisdictions participating in a market should implement similar complementary policies.

It should be noted that Wisconsin is a lead in the Cap and Trade and modeling effort under the Midwest Governor's Association Midwest Greenhouse Gas Accord. The modeling undertaken as a part of the Wisconsin Governor's process is providing valuable input into the MGA process.

For More Information

The TAG is preparing a stand-alone report that will provide an overview of the modeling results and attach documentation, including the Assumptions Book, the Policy Memos, spreadsheets and other materials, that may prove useful to others doing this type of analysis and to the on-going efforts in Wisconsin to monitor and evaluate progress toward achieving the state's emission reduction goals.

Attachment 1: Review of Wisconsin's Greenhouse Gas Emissions Inventory

One of the first tasks assigned to the TAG by the Task Force was to review the Wisconsin 2003 GHG Emissions Inventory prepared by World Resources Institute (WRI) and to report back on any improvements that should be made in order to make the inventory more useful for Task Force purposes. The Task Force Co-Chairs also asked the TAG to determine whether a 2006 inventory was feasible.

The TAG evaluated the methodology and data used to prepare the inventory. The data is federal data that is disaggregated to the state level. The TAG determined that this "top-down" approach provided a broad view of emissions and trends across sectors in the state and that this was adequate for Task Force purposes. The Task Force used the inventory to provide benchmarks to the sector workgroups as they developed emission reduction policies for their sector and for high level policy analysis purposes. The TAG evaluated the option of updating the inventory to 2006 and concluded that the improvements to the data were not sufficient to warrant the additional expenditure of time and resources.

One area where the TAG noted that data was inadequate was in the Land Use, Forestry and Agriculture sectors and that additional work was needed to bring it up to the same level of quality as the other sectors. Subsequently, the consulting firm of Winrock International was retained to provide data for this sector. The TAG also recommended that an estimate of the greenhouse gas emissions associated with electricity imports be developed and included as an additional and separate emissions number. An important point emphasized by the TAG is that the inventory, while useful for policy purposes, is not adequate for regulatory purposes.

Attachment 2: Recommendation for improved data collection and on-going oversight

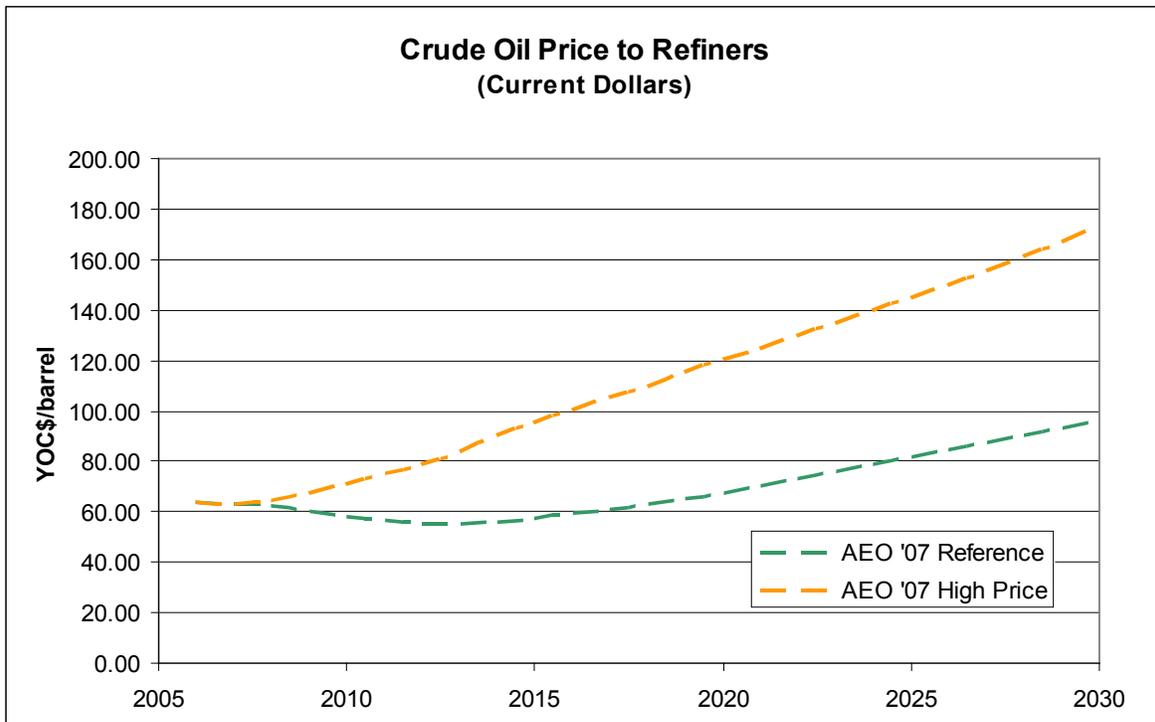
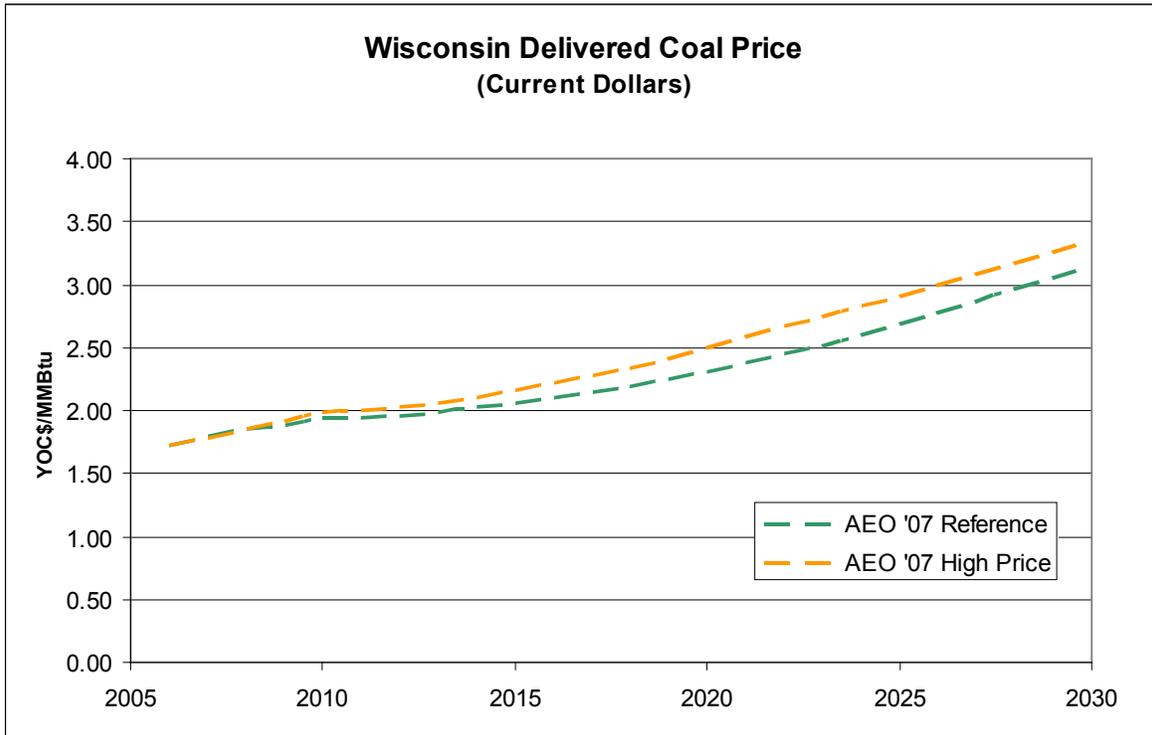
While the great breadth of experience and knowledge that the Governor's Global Warming Task Force (GWTF) and its portfolio of working groups have brought to bear on our charge gives us confidence that the recommendations of the Task Force will advance us decisively toward our goals, the difficulty of prediction ensures that the details of our progress will contain both welcome and unwelcome surprises. To ensure that Wisconsin comes as close to its goals as possible in as efficient a manner as possible requires adaptive management that allows for mid-course corrections, or even changes, along the way. Adaptive management requires ongoing monitoring of our GHG sources and sinks and a comparison of projected results of specific policies with what actually happens, in terms of both economic impact as well as emission reductions. In that light, the TAG submitted a recommendation on how we might implement the needed monitoring. This recommendation has been included in the Final Report as the *"Ensuring On-going GHG Emission Reduction Effectiveness"* template.

Our recommendation is guided by the need to develop a technically respectable infrastructure that will provide policy- and decision-makers throughout our state with reliable information about how our policies are performing. In particular, it will allow us to recognize early on areas that need attention either because things are not going well as we had hoped or because they are working better than we expected.

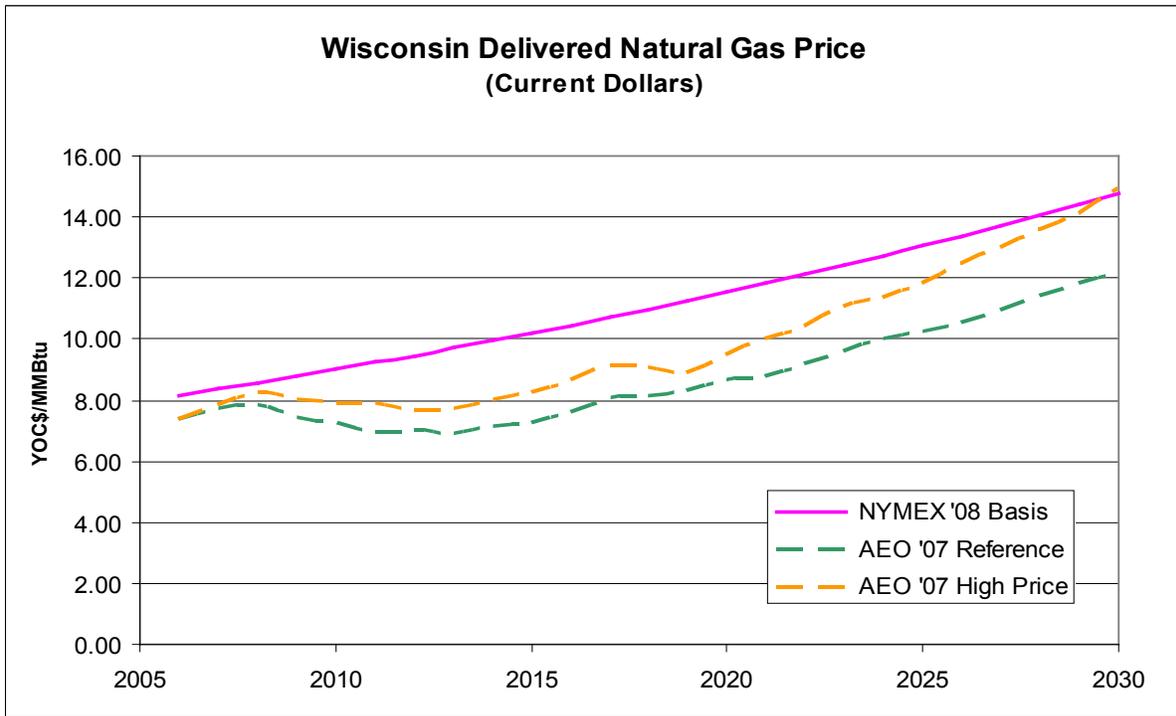
The monitoring infrastructure we are envisioning is not a regulatory body. It is an innovative advisory body that, confidently implemented, could establish Wisconsin as a leader in the adaptive management of its GHG emissions. While there is clear need for a single State agency to have the authority and responsibility for data monitoring, it is likely that the processes

put in place will include partnerships with the UW-System and other knowledge organizations throughout the state. It is our best hope that, through its transparency, the data evaluation mechanism will not only support policy innovation, but also support civic engagement with mitigating our GHG impacts and provide opportunities for economic innovation as well.

Attachment 3: Graphs showing fuel prices



The Annual Energy Outlook (AEO) 2007 High Price was used for both Coal and Crude Oil in the Reference Case. The Annual Energy Outlook is prepared by the US Department of Energy.



The NYMEX '08 Basis was used in the Reference Case.

Appendix E

Task Force Recommended Policies

Ensuring On-going GHG Emission Reduction Effectiveness

1. **Work Group:** Technical Advisory Group and Task Force Co-Chairs
 2. **Policy Name:** Ensuring On-going GHG Emission Reduction Effectiveness
 3. **Policy Type:** Data collection and analysis, policy evaluation and tracking progress
 4. **Affected Sectors, Sub-Sectors and/or Entities:** State government
 5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling template and would not result in any direct emission reduces.
 6. **Estimated Costs:** Costs were not estimated for this template
- Funding Sources:** State budget
7. **Specific Description of Policy Proposal:** It is recommended that a formal mechanism be established (1) to continuously gather data and monitor progress toward reaching the state's emission reduction goals; (2) to evaluate the effectiveness, cost impacts and benefits of existing policies and to review and evaluate potential new policies to reduce or sequester GHG emissions in order to meet the state's goals; and (3) to provide clear, understandable, credible and easily accessible information to the public and policy makers about emissions and the state's progress in reaching its goals.

Responsibility for these tasks should be assigned to a single agency, either a new or an existing agency, that is granted the appropriate authority to obtain specific data in a timely manner from other state agencies and has dedicated staff and adequate funding to support its work on a permanent basis. The agency should be assigned the responsibility of gathering and reporting the data on a regular and timely basis (possibly annual

or biennial) so that the public and decision-makers can easily track progress toward the state emission reduction goal. In addition, the agency should be assigned the responsibility of evaluating the effectiveness of existing policies and of evaluating potential new policies on an established schedule. For example, the Task Force recommends that the effectiveness of voluntary measures in the industry, agriculture and forestry sectors be evaluated in 2012. This evaluation would be a logical task to assign to this agency to lead. The agency should also regularly re-evaluate the state's emission reduction goals based on current science, technology and progress. Regular reports on progress should be issued to government officials and the general public.

- A. **Data Collection Recommendations.** During the process of developing input for modeling current greenhouse gas (GHG) emissions, the Technical Advisory Group (TAG) found that some areas had very robust data while others had little credible data. Based on this experience, the TAG strongly recommended that areas with robust data be maintained and those with data gaps be strengthened. Specific recommendations are:

1. Continue to maintain the Wisconsin Energy Statistics Report. The data in this report proved to be invaluable, and the ability to download parts of the report directly from the internet was a helpful feature.

2. Land use data. Implement the attached recommendation from the Agriculture and Forestry Work Group (Attachment 1). A central source for data regarding land use does not exist, or, if it does, it is not available in a manner that facilitates analysis useful in the process of evaluating sinks and sources of carbon emissions. This data needs to be collected at a frequency that allows for effective tracking of land use changes. Land use changes have a significant impact on many of the policies recommended by the Task Force.

3. Stationary Source emissions data. Implement the attached recommendation to augment the reporting of GHG emissions from stationary sources to include the emissions from small and medium sources and to include methane and nitrous oxide emissions from combustion sources (Attachment 2). Make the data available to the public at a level of detail (such as 4 digit NAICS) so that the data is useful to facilities, industry sectors and the general public for comparing relative performance. This recommendation grew out of a policy template prepared by the Industry Work Group.

4. Mobile Source emissions data. Collect data on mobile sources per the recommendation of the Transportation Work Group in their policy template: *“Energy Efficient Communities.”*

“The appropriate state agencies should calculate appropriate GHG emissions from transportation sources annually. The inventory should discuss the potential impacts of reduction policies (e.g. vehicle efficiency, carbon content of fuels) to assess the effectiveness of these policies and report on progress toward the desired emission reduction targets.”

5. End use data. Opportunities to collect additional data regarding end use should be considered by the PSC. It may be appropriate to utilize the Act 141 EE docket as a forum for this discussion.

B. Evaluation Recommendations. The TAG recommended that a consistent process and framework for monitoring and evaluating the effectiveness of the package of emission reduction policies be established. This recommendation should include an assessment of an appropriate modeling capability to support the analysis and responsibility for maintaining and updating the model. The TAG found that having a cadre of area-specific expertise to delve into the quality of the data, the modeling assumptions and evaluation of model outputs is essential.

C. Public Information. The data that is collected should be made easily and readily accessible to the public, for example, by having it available on the internet. The ability to download parts of the Wisconsin Energy Statistics report directly from

the internet was extremely helpful in developing the modeling framework used to evaluate emission reduction policies for the Task Force.

8. Timetables, Duration and Stringency of the Option: The agency responsible for these tasks should be identified and funded as soon as possible so that the systems can be put in place in a timely manner, missing data can start to be collected and a formal mechanism established to start monitoring and tracking progress. The initial development of the program, including identification of data sources, selection of appropriate models, and program definition will take approximately one year. The first complete statewide assessment should be made available within two years. This will be a continuing effort.

9. Explanation of Rough Estimate of GHG Reductions: See language in section 5

10. Rough Estimate of Costs for Selected Years: Cost estimates have not been developed

11. Barriers to Implementation: Many of these functions are scattered across multiple agencies. Other functions are not being performed now. In any event, there is currently no cohesive, organized or systematic mechanism to pull the data collection and analysis, policy evaluation, and tracking related to climate change together in a manner that can inform the government and the general public about progress made toward achieving the emission reduction targets. One of the major challenges will be to assign the lead responsibility to a single agency that would work with other agencies. The person or agency charged with this responsibility must have the appropriate authority to request specific data in a timely manner from other department of the government. Finally, this effort must be adequately funded.

12. Other Factors: None

13. Related Policies: This policy recommendation is an integral piece of the entire policy package recommended by the Task Force.

Attachment 1: Land-based

Carbon Accounting System

Recommendation: Assign and fund a state agency(ies) or university department the responsibility for developing and managing an on-going and complete land-based carbon accounting system to estimate and track net carbon emissions (sinks and sources) due to land cover and changes in land use or management.

Background: The Task Force identified significant gaps in land cover and land use data. This made it difficult to estimate the magnitude of GHG sources and sinks from current land use, to identify patterns and trends in land use change and to assess the impacts of changes to carbon sinks due to changes in the use or management of lands. A major problem is that there is no systematic and continuing effort to collect statewide land use data in Wisconsin.

The Agriculture/Forestry Work Group coordinated with the Technical Advisory Group to describe these data gaps and to recommend the development of a long-term complete land-based carbon accounting system to address this issue.

Description: The development of a comprehensive land-based GHG accounting system requires detailed information and analysis to accurately depict the carbon stocks on the landscape and how these stocks change with changes in land use and management. Emissions from stationary sources such as power plants can be readily calculated and measured. However, emissions and removals from land use dynamics, land use change and changes in land management require a multi-faceted approach to accurately track them. An important aspect of the system will be the ability to present the current status of GHG inventories, monitor changes in response to policies or practices, and make projections into the future.

System Requirements:

- The program should produce statistically valid time series data, at intervals of not less than every two years, which can be used to estimate the net carbon emissions

Table 1 - Information Components of a Land-Based GHG Accounting System

Information Components	Examples
Land Use and Cover Change	<ul style="list-style-type: none"> • Satellite imagery such as Landsat images collected on an annual basis • GIS analysis to detect changes in cover and use
Agriculture	<ul style="list-style-type: none"> • Crop or pasture type • Estimates of biomass accumulation • Estimates and measurements of appropriate carbon pools • Estimates of rate of carbon loss due to changes in use or management • Tillage practices • Life-cycle carbon analysis of agricultural products
Forestry	<ul style="list-style-type: none"> • Forest type and management • Estimates of biomass carbon accumulation and decomposition rates • Estimates and measurements of appropriate carbon pools • Estimates of rate of carbon loss due to changes in use or management • Carbon content of forest products and rate of retirement or disposal • Life cycle analysis of forest products
Grasslands and Wetlands	<ul style="list-style-type: none"> • Estimates and measurements of appropriate carbon pools • Estimates of rate of carbon loss due to changes in use or management • Estimates of biomass carbon accumulation and decomposition rates
Urban and Suburban areas	<ul style="list-style-type: none"> • Estimates and measurements of the carbon sequestration rates for the urban forest • Estimates of the energy use impacts of the urban forest • Carbon emission and sequestration rates of public open space • Estimates of rate of carbon loss due to changes in use or management

due to land cover throughout the state.

- The data should be provided for the smallest land areas practical, no larger than a county basis, and should be derived both from satellite observations and field sampling.
- The program should stay informed of the scientific literature on land use and carbon emissions in order to obtain the most relevant and valid data sets possible. However, where possible, data should be valid over time to allow long term trend analysis.
- Although the program should focus on carbon emissions, the state should authorize the program to produce and track additional land use data on topics such as forest cover, agricultural land use, urbanization, etc.

The development of a comprehensive land-based GHG accounting system requires detailed information and analysis to accurately depict the carbon stocks on the landscape and how these stocks change with changes in land use and management. Emissions from stationary sources such as power plants can be readily calculated and measured. However, emissions and removals from land use dynamics, land use change and changes in land management require a multi-faceted approach to accurately track them.

Developing a baseline is an important first step in this effort. This baseline should be an appropriate reference year conducive to policy decisions. The assessment of current emissions and removals of GHGs and carbon stores and changes should then be made annually or biannually and compared to both the baseline and the previous years.

To build this system, multiple data sources are needed. Table 1 summarizes the various information components of a land-based accounting system, examples of specific types of information, and the source and availability.

Further discussions about the design and implementation of a GHG accounting system will need to assess the ability of the state to conduct measurements of GHG emissions and removals as compared to modeling of these flows with verification. The resources needed to develop and implement a system have not yet been estimated.

Attachment 2: Air Emissions Inventory Reporting

Recommendation: Amend NR 438, Wis. Adm. Code, to (1) lower the carbon dioxide (CO₂) emissions reporting threshold for all stationary sources from 100,000 tons/year to 10,000 tons/year and (2) add the reporting of methane and nitrous oxide emissions from stationary combustion sources that report CO₂ emissions.

Background: The Wisconsin Air Emissions Inventory (ARS- Annual Reporting System) program, outlined in Ch. NR 438, Wis. Adm. Code, requires facilities to report their annual air emissions and sets reporting thresholds for different pollutants. Currently the reporting threshold for CO₂ is 100,000 tons/year. This provides CO₂ emissions data from utilities and very large industrial combustion sources, but leaves a substantial information gap for emissions from medium and small sources. Macro-level emission estimates for these sources are possible through the use of “top down” inventories (such as the WRI inventory), but these techniques have limitations. Methane is not currently included in ch. NR 438, however it is one of the primary anthropogenic GHGs and thus should be included in an effort to construct an inventory of these emissions. Nitrous oxide is currently included in NR 438, with a reporting threshold of 6,000 lbs. Under this proposal, all nitrous oxide emissions related to combustion would be reported concurrently with the methane and CO₂ emissions.

The lowering of the CO₂ reporting threshold was proposed by the Industry Work Group. It grew out of frustration at the lack of emissions data from all but the largest industrial sources, and the difficulty in developing policy recommendations for emission reductions in the absence of this information. With their proposal the Industry Work Group sought to close this important information gap while minimizing the reporting burden on industry and small businesses. The Work Group’s intent was to provide a reliable macro-measure of statewide industry GHG emissions, as well as a facility-specific micro-measure baseline (for covered facilities) to enable the tracking of progress in reducing GHG emissions. In addition, the Work Group felt that a reporting system would

encourage voluntary reductions by companies by serving as a feedback loop that would make them aware of their facility emissions and emission trends.

As requested by the Task Force Co-Chairs, the Technical Advisory Group (TAG) is considering a number of proposals to address overall statewide data and information needs to better inform future climate change policy decisions. The Industry Work Group proposal was included in this process; the TAG supported their proposal and decided to add the methane and nitrous oxide emissions reporting requirement to the recommendation.

Description: This recommendation would amend an existing regulation. It proposes to adjust the current CO₂ emissions threshold and require the reporting of combustion-related methane and nitrous oxide emissions from these sources. This recommendation would result in a more robust greenhouse gas (GHG) emissions reporting system. This in turn would lead to a more comprehensive, empirical statewide GHG emissions inventory for stationary sources. It would not change the reporting methods or emission estimation methodology.

Who would be affected and how: In developing this proposal, the Industry Work Group performed an analysis to assess the impacts on industry. The analysis assumed natural gas as the fuel source, a CO₂ reporting threshold of 10,000 tons/year and no change in other emission reporting requirements. The analysis concluded that a source that emits 10,000 ton/year CO₂ from fuel combustion should already be reporting to the emissions inventory since their fuel combustion-related nitrogen oxides (NO_x) emissions would exceed the reporting threshold of 5 tons/year of NO_x emissions. Thus, lowering the CO₂ reporting threshold should not pull new sources into the reporting requirements. Furthermore, there are default emission factors for CO₂, methane and nitrous oxide from stationary combustion based on the type and amount of fuel consumed. With fuel data already being reported to the emissions inventory, this proposal should place minimal additional reporting burden on facilities.

In addition, coal and oil fired sources would report their methane emissions, which they currently do not. These sources are not new to emission inventory

reporting and there would be little additional impact to them from this requirement. In addition, CO₂ emissions would be reported from the use of limestone in emission control equipment and from the production of cement or lime.

This policy proposal will help fill the medium to small stationary source information gap and provide more information on large stationary sources. Using ARS data on reported fuel usage and calculating the CO₂ emissions, it is estimated that an additional 150 - 250 facilities would be required to report their emissions. This would yield an estimated 5 - 6% increase in reported facility level CO₂ emissions beyond what is currently reported to ARS. This more comprehensive emissions inventory would include data on the number of sources, industry type and size, location, annual emissions and emission trends. It should be noted that while this recommendation begins to address medium to smaller sources of CO₂ emissions, it doesn't address the very large number of diffuse, small sources – i.e. those with less than 10,000 tons of CO₂ emissions.

Comprehensive Initiative

1. **Work Group:** Conservation and Energy Efficiency, Transportation, and Industry
2. **Policy Name:** Comprehensive initiative to support voluntary long term greenhouse gas (GHG) emissions reductions (Comprehensive initiative)
3. **Policy Type:** Cross-sector, comprehensive marketing, education, technical assistance and funding to facilitate GHG emission reductions, behavioral change and sustainable practices by individuals, local governments, communities, farms and small and medium-sized businesses.
4. **Affected Sectors, Sub-sectors and/or Entities:** All
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Significant potential reduction of CO₂ emissions, but difficult to quantify.
6. **Estimated Costs:** Recommended funding between \$20 and \$30 million per year beginning in 2009. This funding includes meeting required staffing and other administrative costs for the Initiative.

Funding Sources: State government and private donors (including individuals, businesses and major foundations). Source of state funds has not been identified. If a multi-sector cap-and-trade program, and/or a carbon tax is in place in the future, funding may be supplemented by a portion of cap-and-trade auction revenues, if any, and/or carbon tax revenues.

7. **Specific Description of Policy Proposal:** Establish The Wisconsin Voluntary Greenhouse Gas Reduction Initiative as a public/private partnership created under the auspices of the Office of Energy Independence to make Wisconsin a national leader in achieving voluntary GHG emissions reductions by individuals, local governments, community-wide programs, farms and businesses. The Initiative also would support related workforce and business development programs.

The Initiative would be housed in a new, non-profit entity eligible for tax exempt donations. State funding would be held in a trust so that those funds are legally available only for the intended purposes. Investment of the funds would be done with the guidance of the State Investment Board. The Initiative would be managed by an executive director and governed by a Board of Directors, consisting of individuals appointed by the

Governor from state government, the University system, local government, private business and not-for-profit organizations. The budget and programs of the Initiative would be approved by its Board and the state's involvement would be coordinated by the Office of Energy Independence. The Board would be responsible for providing for stakeholder input for, and oversight of, each of the four programs of the Initiative described below so that the Initiative's activities meet the needs of the program's targeted sectors.

This policy complements other cross sector enabling policies that recommend (1) a substantial increase in funding for research and development of commercially viable low carbon technologies; and (2) programs to develop Wisconsin's significant bio-energy and terrestrial sequestration potential.

The Initiative would coordinate with, and support, a wide variety of private and public efforts consistent with its mission in order to leverage the resources of those efforts to meet the Initiative's goals and avoid duplication of programs.

Description of the Program

Large sources of GHG emissions are relatively easy to identify and specific control strategies can then be implemented. The smaller sources of emissions – such as individuals, small and medium-sized businesses, farms and local government operations – are significant in the aggregate, but identifying control strategies is difficult. Much of the state's success in reducing GHG emissions reductions will depend upon the wide variety of choices that the smaller sources make, including individuals in the aggregate. In order to maximize GHG emission reductions, Wisconsin must use a wide variety of strategies to drive significant behavioral and operational changes, including education, public sector leadership and an ongoing state-wide behavioral change marketing campaign. At the same time, the state must make available the tools, expertise and services necessary for smaller sources to understand and reduce their GHG emissions.

Care will need to be taken not to duplicate the extensive energy efficiency and conservation programs of Focus on Energy. The Initiative's mission would be broader (cross-sector and

multi-strategy) than the mission of Focus. It would supplement Focus by promoting greater knowledge and use of Focus programs, as well as addressing and supporting GHG reduction behaviors other than energy conservation and efficiency. In order to build on the strong foundation already created by Focus on Energy, the initial phase of the behavioral marketing campaign program described below should, in tandem with Focus, address energy consumption behaviors, with transportation and other areas added as the campaign matures.

Four Program Areas

The Initiative would be concerned with four primary programs:

- A. **Marketing to Change Behavior.** The Initiative would be responsible for developing, funding and implementing a comprehensive, multi-year, state-wide marketing campaign aimed at all sectors to induce changes in behavior that will substantially reduce GHG emissions over the long term. The campaign would target those behaviors that have significant reduction potential and the greatest likelihood of success in terms of achieving behavioral change. This will require carefully planned and well-researched efforts to identify barriers to change and the motivators necessary to induce change in each targeted audience.

The Initiative, working with other groups including the State Department of Public Instruction, the UW Stevens Point environmental education program and Focus on Energy, also would be responsible for fostering the development and implementation of energy efficiency, conservation and sustainability curriculums at all levels of the state's educational system.

- B. **Support for Community-wide Sustainability and Energy Independence Programs.** There is tremendous interest in developing and implementing comprehensive, community-wide energy independence and sustainability programs to address climate change and lower governmental costs for the long-term. There also is a pressing need to provide assistance to these communities so that this interest can be translated into successful, permanent programs.

Sustainable community development not only focuses on local government practices and decisions, but seeks also to influence the

behaviors and choices of community residents, organizations and businesses. The Initiative would provide a variety of resources to community-wide energy independence and sustainability programs, including materials, training, technical support, services, recognition and grants. The objectives would be (i) to reduce costs for municipalities through energy efficiency, development of local renewable resources, use of sustainable operational practices and implementation of decision-making driven by the goal of reducing GHG emissions and (ii) to provide public leadership, inspiring individual and business behavioral changes throughout the community. Recognizing that the state's communities differ significantly depending on size and location, this task must involve cooperative planning with participating communities to identify those GHG reduction practices and strategies most likely to be successful.

- C. **Support Business GHG Reduction Initiatives.** The Initiative would provide a variety of services, including education, training, technical support, evaluations, recognition programs and funding to Wisconsin businesses (including farms) to assist them in determining, tracking and decreasing their GHG emissions. The objective would be to assist businesses to become more efficient, offsetting costs of reducing their emissions and increasing competitiveness. The Initiative would implement policies to identify, incent, recognize, reward and promote voluntary emission reductions by the state's businesses and related sustainability practices and behaviors in a variety of ways. The primary focus of this program would be on small and medium-sized businesses.
- D. **Support for Development of Wisconsin Business Opportunities Tied to GHG Reductions.** The Initiative would assist in design, implementation and coordination of programs (1) to provide workforce development and training for job opportunities related to GHG reductions strategies; and (2) to assist existing Wisconsin businesses expand, and attract new businesses and jobs to Wisconsin, to provide products and services, including carbon offsets, that support emission reduction strategies and business sustainability practices and operations.

- 8. **Timetables, Duration and Stringency Option:** Beginning January 1, 2009 and ongoing

9. Explanation of Rough Estimate of GHG

Reductions: Difficult to quantify, but potentially significant

10. Rough Estimate of Costs for Selected Years:

Recommended funding of between \$20 and \$30 million per year from a variety of sources beginning in 2009, including money for staffing and other administrative costs for the Initiative. This funding would be divided equitably between the four programs of the Initiative by its Board in a manner designed to enable each program to achieve its objectives as set by the Board, and consistent with donor funding requirements. If a multi-sector cap-and-trade program and/or a carbon tax is in place in the future, additional funding may come from a portion of cap-and-trade auction revenues, if any, and/or carbon tax revenues.

11. Barriers to Implementation: Funding, including access to the state's General Fund, and competition in the future for funds from any cap-and-trade auction revenues and/or carbon tax revenues.

12. Other Factors: The policy proposal will need to be implemented in coordination with other related state initiatives that are underway or planned. It proposes actions and strategies necessary to maximize the effectiveness of many other Task Force policy recommendations. Early facilitation of voluntary emission reductions across sectors is essential to enhance Wisconsin's economic competitiveness and energy independence in a future that will be carbon-constrained.

13. Related Policies:

- Speed of Travel Reductions
- Electric, Hybrid and Plug-in Hybrid Electric Vehicle Incentives
- Enhanced Recycling Programs
- Enhanced Conservation and Energy Efficiency Program

Research and Development Funding

1. **Work Group:** Task Force Co-Chairs
2. **Policy Name:** Research and Development Funding (R&D)
3. **Policy Type:** Research and development
4. **Affected Sectors, Sub-Sectors and/or Entities:** Primarily utility and transportation sectors
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Does not result in direct reductions of greenhouse gas emissions (GHG).
6. **Estimated Costs:** Cost estimates were not developed for this policy

Funding Sources: Federal and state funds

7. **Specific Description of Policy Proposal:** There is a pressing need for additional research and development (R&D) on the federal and state levels to develop new technologies to reduce GHG emissions. This policy recommends that a variety of alternative technologies be explored and developed rather than trying to pick a future technology winner. This will provide options and flexibility for compliance with the challenging emission reduction targets at reasonable cost. At the federal level, Wisconsin should aggressively advocate for a dramatic increase in federal R&D spending related to achieving substantial reductions in GHG emissions.

At the state level, the state should support significantly increased R&D funding for renewable and other low carbon technologies to enable Wisconsin to become a leader in these areas. In addition, the state should support R&D of carbon capture and storage technologies in order to achieve, if feasible, rapid development and deployment on a commercial basis of coal plants with this technology. This effort is needed to ensure that alternatives are available to meet future base load needs.

In addition, R&D funding should be provided to enhance Wisconsin's ability to adopt to climate

change, including funding for the Wisconsin Initiative on Climate Change Impacts, a partnership between UW-Madison and the DNR. The PSC should permit reasonable increased spending on GHG emission reduction-related R&D by utilities that will benefit Wisconsin, including conservation and efficiency technologies, to be recovered in rates.

8. **Timetables, Duration and Stringency Option:** This policy should begin immediately and continue indefinitely.
9. **Explanation of Rough Estimate of GHG Reductions:** There are no direct emission reductions through this policy.
10. **Rough Estimate of Costs for Selected Years:** Cost estimates were not developed for this policy
11. **Barriers to Implementation:** Securing and allocating the additional funding at both the federal and state levels.
12. **Other Factors:** None
13. **Related Policies:** A variety of utility and transportation policies, including but not limited to those dealing with conservation and efficiency, renewable energy, bio-fuels and biomass, carbon capture and sequestration, and Great Lakes wind.

Enhanced Conservation and Energy Efficiency Program

1. **Work Group:** Conservation and Energy Efficiency
2. **Policy Name:** Enhanced Conservation and Energy Efficiency Program (ECEE Program)¹ – included in the Interim Report
3. **Policy Type:** Regulation
4. **Affected Sectors, Sub-Sectors and/or Entities:** This policy affects all retail sales by electric and natural gas providers, including municipal utilities and electric cooperatives.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** 14 million metric tons of greenhouse gases (GHGs) by 2020
6. **Estimated Costs:** By 2012 costs are estimated to be about \$285 million per year, by 2020 costs will reach about \$380 million per year. Benefits from the proposal will exceed the costs because the program will only target cost-effective savings.²
Funding Sources: All program administration costs

1. Wisconsin currently has two distinct energy efficiency program efforts: (1) a program funded by federal grants and a state fee on Wisconsin electric usage for energy efficiency and bill assistance efforts for low-income families/persons administered by the Department of Administration; and (2) the Focus on Energy (“Focus”) program targeted primarily to conservation and energy efficiency efforts for utility consumers above the federal low-income income line. This template proposes revising the Focus program. To avoid confusion this template will use the “Focus” label when speaking to the past and/or current program; it will use the “Enhanced Conservation and Energy Efficiency (ECEE) Program” label when speaking to the future, revised Focus program, as improved by the suggestions here-in (recognizing that, in the future, even after the implementation of these proposals, the conservation and energy efficiency program will remain named Focus on Energy).

2. Since the inception of the Focus program, independent evaluation has indicated that it has produced energy dollar savings of more than twice the program’s costs. These direct energy savings reduce future utility costs and, compared to the use of more expensive resources to service customers, result in lower future utility bills. If direct economic and environmental benefits were included, even more savings would be generated on a dollar for dollar basis. In addition to these reasons, the proposed ECEE Program, based on independent evaluations of the current Focus program, is also likely to result in net positive benefits due to a substantial number of jobs created in the state.

3. This is consistent with the Midwestern Governor’s agreement to reduce electric load by 2% per year and the Governor’s Midwest Gas Initiative which has proposed a reduction of 1.0% of natural gas load starting in 2009.

are funded through program revenues collected from utility customers in the rates of regulated electric and natural gas utilities

7. Specific Description of Policy Proposal: Background

This template proposes a significant change in the direction of the current Focus program from one of a spending cap (as a percent of revenue) to one of a savings goal (as a percent of usage).

The Focus program utilizes a given amount of funding (1.2% of utilities’ revenue) and then attempts to save as much energy as possible. The proposed ECEE Program would establish a given energy savings goal and then be funded appropriately to achieve that goal.

This template proposes savings targets of an annual 2.0 % reduction of the electric load and an annual 1.0% reduction to the natural gas load³ by 2015 after a ramp-up period. Currently, the Focus program expends approximately 1.2% of annual utility electric and natural gas sales revenue to achieve appropriately a 0.4 - 0.5% annual reduction in electric usage and a 0.3% annual reduction in natural gas usage (i.e. usage by end-use customers not including usage for electric generation). Thus, this shift to higher energy savings goals will lead to new and expanded programs which may include the following: introduction of new efficient technologies, promotion of current appropriate technologies, technical assistance, education, outreach and research, elimination of wasteful use, and customer-sited renewable technologies.

The proposed increased GHG emission and energy savings reductions can be achieved from cost-effective conservation and energy efficiency. The effectiveness of this effort will be enhanced and facilitated by complementary policies such as innovative rate tariffs, improved demand response/load management efforts, and improved consumer education and outreach. These complementary policies are described in other policy templates crafted by this work group.

The overall annual targets also include GHG emission reductions and energy savings from other templates proposed by the Industry and Agriculture & Forestry work groups. (See section 13 for further reference to these interactions.) The templates from these other groups call for increases in, or additional targets for, expenditures of the current Focus program in order to reduce the use of regulated energy sources in those sectors. (Providing adequate funding for energy efficiency efforts for non-regulated energy sources is addressed in a separate template crafted by this work group.)

Utilities, the PSC and the Focus Administrator should be given flexibility to be innovative in reaching these goals. Actual budgets and program/sector priorities should be determined periodically by the PSC as defined in Act 141 in a contested case proceeding, in order to provide opportunities for public input. In particular, the ramp-up to the 2% electric and 1% natural gas annual reduction goals in 2015 should be supported by a new efficiency potential study prior to 2015 to determine whether benefits are likely to exceed the costs of the ramp-up by a reasonable margin and whether higher energy savings goals and budgets are appropriate prior to that date. Capturing all available cost-effective energy savings should be Wisconsin's first resource priority to achieve GHG emissions reductions as well as achieve energy savings that can mitigate future energy costs and energy infrastructure needs.

Annual savings targets should be established over a program period (e.g. 3 - 4 years) as the "average" annual savings to be achieved during that period to allow program flexibility to recognize that conditions may change during that period. Several states have adopted a similar energy savings goal of 2% of annual usage, after a ramp-up period. It is widely believed that this is an achievable and perhaps conservative goal, given the cost of carbon reduction alternatives and the opportunity to improve program effectiveness including the use of approaches such as that set forth in the Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions

Reductions.⁴ For purposes of the estimates in this template, it was assumed that the underlying growth rate for electricity is 1.8%. No growth for natural gas usage by end-use customers is assumed.

Other than specifically recommended for change here, the intent of this template is to preserve all substantive and procedural provisions of Act 141.

Recommended Action

In order to enhance the ability to achieve and maximize the result of this effort, the following steps should be undertaken during the ramp-up period:

- Continue to study best practices in other states/regions to help identify programs and strategies that provide the greatest system benefits at the least-cost. Adopt these practices in Wisconsin as appropriate while continuing to develop new cutting-edge initiatives and designs.
- Ensure the utilities and the PSC, with the opportunity for effective public involvement, provide leadership in determining the best portfolio of approaches to reach 2.0% and 1.0% in annual usage reduction for electric utilities and natural gas respectively by viewing energy efficiency as Wisconsin's first resource priority.
- Continue to research the gap between the achievable, and economic potential of energy efficiency, and how consumers and businesses make energy decisions. Broaden the existing Potential Study to inform whether higher targets of usage reduction would be appropriate and cost effective, compared to the expected cost of energy.
- Create programs and pursue initiatives that will increase awareness, understanding and participation through public campaigns, education, and outreach. Such efforts to affect customer behavior are essential and valuable elements in the overall ECEE Program and should be implemented as soon as possible. The desirability of a Focus based initiative in this area was approved by this

4. For example see the most recent McKinsey study at: http://www.mckinsey.com/clientervice/ccsi/pdf/US_ghg_final_report.pdf

work group and should be implemented as part of the Focus program as soon as possible. When a broader multi-sector public campaign to reduce carbon footprints through changing customer behavior is established (such as the proposed, separate Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emission Reductions template - which also contains a description of the Focus based initiative) these efforts should be coordinated. The work group strongly believes that such a multi-sector campaign is necessary and appropriate and that the proposed Focus sustainability initiative a necessary and appropriate element in Focus efforts that seamlessly fits within this larger effort when that latter effort is initiated.

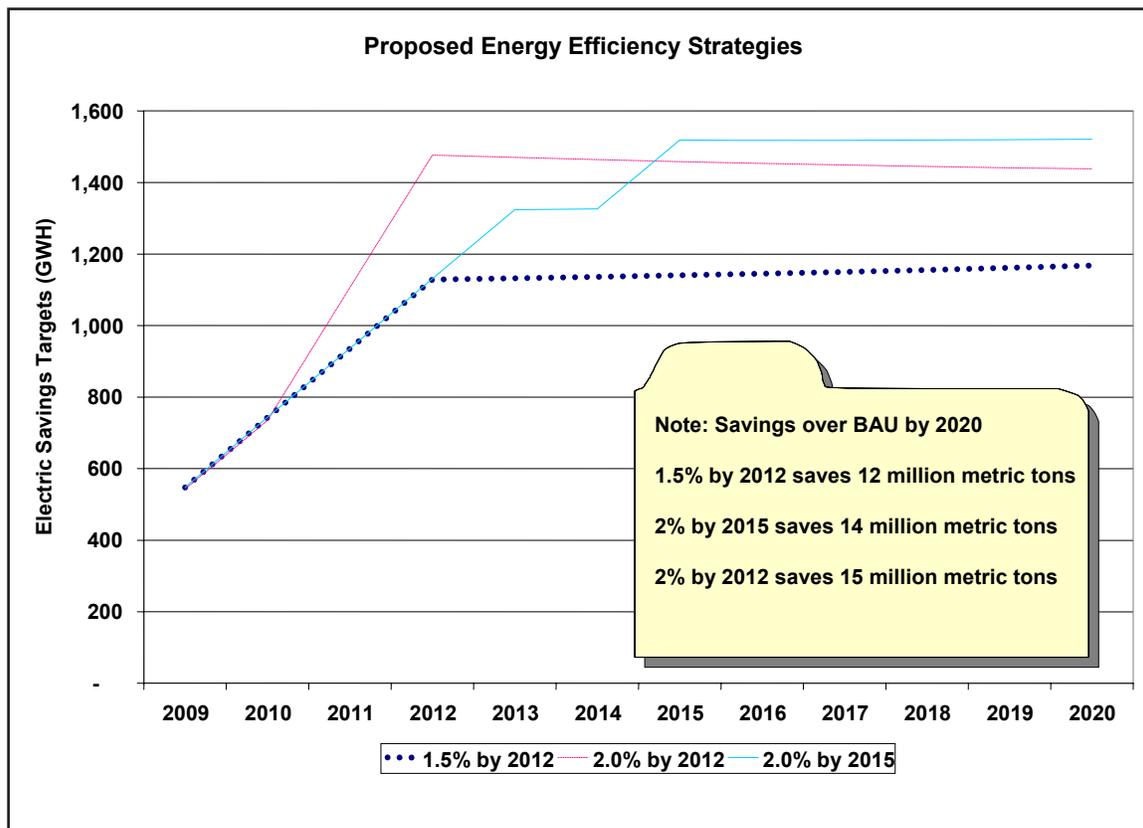
- Create programs of recognition and incentives for the most effective results. For example, seek to use lighting programs to accelerate the movement in the marketplace to lower or no mercury compact fluorescent light bulbs (CFLs) and other lighting while in the meantime ensuring effective CFL recycling efforts.
- Create a public scorecard of achievement for the state, by sector or by utility or other geographic division or affinity group that is readily accessible by the public.

- Integrate other individual utility efforts with statewide conservation and energy efficiency programs.
- Consider new ratemaking approaches to “decouple sales” from profits for utilities that may inhibit utility pursuit of all cost-effective energy efficiency. For such decoupling approaches, it may not be appropriate to include large industrial customers that operate in highly competitive markets. The PSC should consider testing such decoupling approaches with energy intensive customers before considering their wider application to such industries. Consideration should also be given to the potential impact of decoupling on low-income customers.
- Incorporate appropriate policies/initiatives to ensure that very price-sensitive customers (such as low-income customers and large customers that operate in very competitive markets) can participate in cost-effective energy conservation and efficiency opportunities without meaningful adverse impacts. For example, the PSC may wish to propose that customers with an income of 200% of federal poverty or less should be included in the state’s definition of “low-income customers” with a commensurate increase in low income funds to address the

Proposed Energy Savings Goals During Ramp-up (as % of load)				
	Electric	Est. Costs (% of rev)	Natural Gas	Est. Costs (% of rev)
2009	0.75%	2.0%	0.5%	2.0%
2010	1.0%	2.5%	0.75%	2.5%
2011	1.25%	3.0%	1.0%	3.0%
2012	1.50%	3.5%	1.0%	3.0%
2013	1.75%	3.75%	1.0%	3.0%
2014	1.75%	3.75%	1.0%	3.0%
2015	2.0%	4.25%	1.0%	3.0%
2016-2020 savings targets remain at 2015 percentage levels unless PSC increases targets				

Notes: Actual budgets should be determined periodically by the PSC in a contested case hearing process with opportunity for public input. Actual budgets in the 1990s were significantly higher than they are today, so these levels of effort are not wholly untested in Wisconsin.

Higher annual energy savings targets and budgets beyond those suggested by the work group may be appropriate and should be implemented earlier than suggested in the proposed ramp-up if information supports that the additional cost-effective energy savings opportunities will be available and attainable sooner.



needs of such customers through the existing federal/state low income weatherization and bill assistance program. This should also include a careful consideration of a transition period for a phase-in of the funding changes for “large energy customers” required by Act 141 to avoid potential “rate shock.” An ultimate benefit of cost-effective conservation and energy efficiency is to increase the productivity and competitiveness of Wisconsin businesses to maintain a strong economic environment. Achieving that benefit requires a consideration of both short and long run impacts from expanded actions to reduce GHG emissions.

- Expand “large energy customer” self-direction programs to allow increased flexibility and recognize customer-side fossil fuel usage reductions, subject to appropriate regulation. In addition, the PSC should consider whether it is appropriate to implement a rate crediting mechanism that rewards substantial early action in conservation and energy efficiency taken by large, energy intensive industry at its own expense after 2004.

8. Timetables, Duration and Stringency Option:

This program builds upon the current Focus program framework in Act 141 and establishes statewide electric and natural gas load reductions through conservation and energy efficiency. Thus, the ECEE Program will take effect as soon as the PSC approves savings targets and corresponding budget levels and the Joint Finance Committee completes its review of budgets that exceed 1.2% of annual utility sales revenues. Given these circumstances, the earliest possible date for implementation of the ECEE Program is calendar year 2009. Preparation for increased efforts can begin in 2008. The actual ramp-up periods and investment amounts should be determined pursuant to the provisions of Act 141, and after a contested case hearing process based on relative benefits and costs with the objective of capturing all cost-effective conservation and energy efficiency.

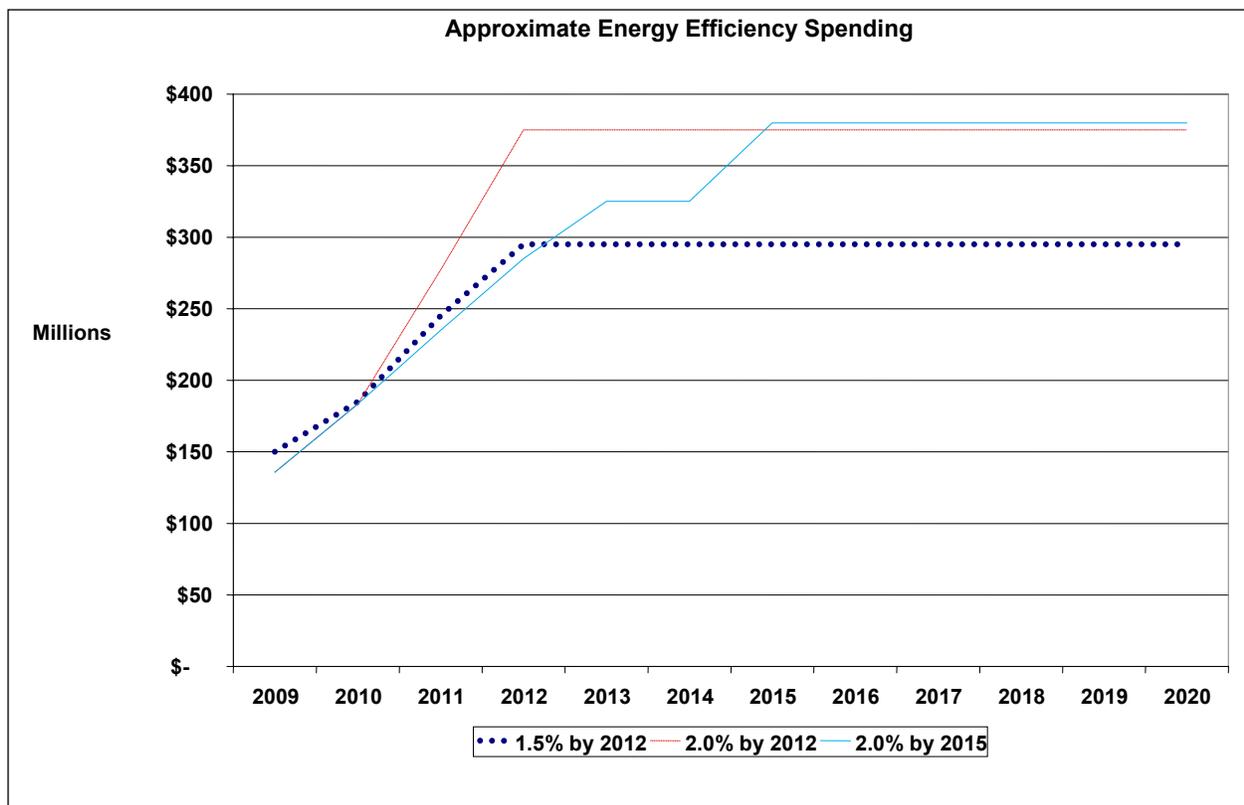
To reflect the importance and value of increased energy efficiency efforts as well as for purposes of modeling this recommendation, a suggested

ramp-up period for savings goals and estimated budgets to attain such annual targets is shown in the following chart (which does not include the far higher value of the energy savings that reduce future utility bills).

9. Explanation of Estimate of GHG Reductions: This proposal to achieve 2% annual electric savings by 2015 should reduce CO2 emissions by 14 million metric tons by 2020. This assumes some ability to achieve returns to scale with efficiency spending in conjunction with implementation of other related templates drafted by this work group, utility efforts, as well as an improved, comprehensive outreach and education efforts that are coordinated with statewide programs (including a consumer behavior initiative to increase participation in programs). These efforts will help to reduce the gap between the “achievable” and “economic” potential for energy efficiency as a resource. Coordination of program and R&D initiatives with other states in the region would also help in achieving more sustainable, widespread reductions.

10. Approximation of Costs for Selected Years: By 2012, estimated spending would be about \$285 million per year on electric and natural gas efficiency programs and by 2020 approximately \$380 million per year. These estimates are based on the current savings/cost relationships in which approximately 1.2% of annual utility revenues has resulted in approximately 0.4 - 0.5% of annual electric load reduction and 0.3% of annual natural gas usage. These estimated budgets include administrative costs which cover program oversight, as well as measurement and verification or results. These costs and projections will depend on the speed of implementation and effectiveness of other conservation and energy efficiency initiatives such as improved building codes and appliance standards, low carbon electric generation sources, reduction of business energy intensity, and the actual underlying growth rates in electricity and natural gas usage. (Some of these initiatives are addressed by other Task Force policy templates).

The following chart shows the approximate estimated total budgets for three distinct ramp-ups to achieve the scenario recommended in this template of annual savings of at least 2% of



annual electric usage by 2015. The incremental increase in budgets to achieve the proposed savings targets is the difference between the approximate \$90 million Focus budget in 2008 based on 1.2% of estimated annual utility revenues in that year and the total spending budgets by year shown in the table.

The objective of the ECEE proposal is to maximize overall aggregate net benefits at the lowest cost. It should be noted that the costs for this template are calculated based on a cost/benefit ratio methodology which does not recognize the potential for greater economies of scale, more innovative or effective programs, or more innovative and effective approaches to funding an ECEE Program. Increasing conservation and energy efficiency spending to at least up to 3.5% to 4.25% of annual electric revenues and up to 3.0% per year of natural gas revenues, is justified to capture the far higher benefits from reducing sales growth and mitigate future utility and environmental costs by taking advantage of all cost-effective conservation and efficiency opportunities available.

Actual Focus budgets should be determined periodically by the PSC in a contested case hearing process taking account of relative benefits and costs of such program efforts. This hearing should also consider the development of more innovative, lower cost funding for such efforts, and the development of policies to better align regulation with the objectives of: (1) reducing GHG emissions; (2) avoiding, or delaying, the need for expensive new power plants; (3) balancing the need to provide clear ratepayer benefits with the need to maintain a healthy utility industry able to meet Wisconsin's energy needs on a highly reliable basis. Such incentives will contribute to the success of a significantly larger effort. Costs of this policy should be compared to the cost of business-as-usual which would include building new generation and paying for the associated fuel. These estimates assume that innovative rate design and more comprehensive consumer education and outreach will be implemented at least to some extent to help support and achieve the desired results.

11. Barriers to Implementation: Customer participation is the largest barrier. To be more effective, more innovative in investing in energy efficiency, using a best practices approach and an increased level of customer education and outreach, as well as an integrated customer value approach is appropriate. Increasing the overall value to customers will also require increased long-term program and technological R&D to better design programs.

While cost-effective energy efficiency provides significant benefits to society and participating customers, increased short-term rates from increased energy efficiency budgets (as well as other costs causing rates to increase) can cause concerns, especially for low-income customers and large customers who operate in very cost competitive markets. Actions to mitigate adverse impacts from increased funding for the ECEE Program, while maintaining the opportunity to achieve cost-effective savings, should be pursued.

These actions include: (1) the continuation and possible expansion of an effective "self-direction" option that encourages large customers to pursue their own significant cost-effective savings opportunities that can be credited toward their overall contribution requirement for the ECEE Program (including qualified and verifiable actions funded by Industrial Revenue Bonds, revolving loan programs and performance contracts, as well as demand response programs); and (2) the creation of a "large customer" advisory group for the ECEE Program to help develop and target effective programs to better address the diverse savings opportunities and needs of such customers. Integrating ECEE Program actions with opportunities for potential productivity improvements, and meeting emission reduction requirements through a "single stop" process, offered with other federal/state entities or public-private partnerships, should also be encouraged for such large price-sensitive customers.

12. Other Factors:

Savings versus Spending/All Wisconsin Energy Utilities

It is important to emphasize that this new target savings goal approach is a major departure from the current spending cap approach. The proposed savings goals are set considerably higher than expected goals of the current Focus program (but not higher than achievements set in the state's earlier conservation programs in the 1990s) and therefore must rely on state-of-the-art programs, as well as a portfolio of other complementary policies initiatives (such as innovative tariffs, and consumer education and outreach, etc.) to motivate increased participation and success. The cost figures may represent a modest increase in rates but should result in a decrease in usage for participating customers. Over the course of the ECEE Program, participants will experience lower bills than would otherwise have been the case, despite the modest addition to rates.

Similar increases in energy savings targets, energy efficiency efforts and funding levels should be set for all Wisconsin energy utilities including municipal utilities, and electric cooperatives to ensure equity in achieving and maximizing the achievement of GHG reductions in Wisconsin. Equitable participation by large energy customers in the program, both as to benefits and costs, is also recommended and required in order to meet the established targets. Wisconsin should continue and expand its initiatives for improved programs and R&D efforts with other regional entities.

Comparison of this Recommendation to Recent Estimates of Potential

In 2005 the Energy Center of Wisconsin conducted a study of the achievable potential for energy efficiency and customer-sited renewable technologies in Wisconsin. In the study the term "achievable" was meant to connote a level of adoption of economic technologies and initiatives similar to those observed under past programs that featured rebates, incentives, technical assistance and the like. The measure of achievable potential also recognizes that consumers and businesses simply do not implement all

cost-effective energy efficiency or behavior change strategies. This is reflected in program participation rates that reflect past practices. The scope of the 2005 study excluded any initiatives or efforts to combine programs with innovative rate structures, as these initiatives were not included in the current Focus program, or under the Public Benefits charge "umbrella." Estimates were made based on programs and approaches which were similar to those currently used by the Focus program (or "tried and true"). The scope of the study also excluded any efforts or initiatives that were not currently within the purview of the current program.

In any potential study, the price of electricity will determine the level of economic or cost effective efficiency investments. The data used in the 2005 study was pre-Hurricane Katrina and did not reflect subsequent natural gas price increases. Natural gas prices affect both natural gas efficiency opportunities, as well as opportunities in the electric sector where natural gas is used for generation. This means that the 2005 estimates were understated due to the price changes immediately after the report was final.

Further, the 2005 study did not make a separate estimate of "economic" potential. The cost-effective savings target estimates proposed in this template are likely to be less than the economic potential, but more than the so-called business-as-usual "achievable" potential.

Future Potential Studies

Future potential studies should incorporate a number of scope and method modifications to provide data for future decisions by the PSC:

- A. Carbon reductions and other environmental benefits should be valued at some range of values or actual market rates if possible.
- B. Market prices for electricity should also be used to value efficiency.
- C. Future reductions in usage should not be discounted.

- D. The useful lives of measures should be reexamined to reflect best available information.
- E. The combined effect of efficiency programs with higher levels of complementary efforts such as education, outreach, and innovative tariffs should be incorporated into participation rates. This will likely require additional research.
- F. More innovative, aggressive program approaches should be explored for inclusion.
- G. New technologies should be incorporated.
- H. An evaluation of the contribution of building code and appliance standard changes should be assessed, but counted separately from efficiency potential from voluntary program efforts.
- I. Both economic and achievable potential should be calculated.

Finally, all research presented to the Task Force on energy efficiency indicates that it is one of the most cost effective, immediate tools to address GHG reduction. The proposed annual energy savings targets can be achieved using current, proven technologies, while technologies to reduce emissions on the supply side continue to need additional research and development (CCS, nuclear, biomass) before they can reach full potential. Energy efficiency has the capability to provide immediate cost-effective results on a fast-track timeline to reduce GHG emissions and to mitigate future utility costs and infrastructure needs.

This recommendation makes no assumptions about the potential impacts on electric system usage from the addition of electric cars (PHEVs).

13. Related Policies:

- State Appliance Efficiency Standards
- Aligning Public and Private Interests for Conservation and Energy Efficiency
- Enhanced Renewable Portfolio Standard (RPS)
- General Incentives for Industrial Energy Conservation and Efficiency

Aligning Public and Private Interests

1. **Work Group:** Conservation and Energy Efficiency
2. **Policy Name:** Aligning Public and Private Interests for Conservation and Energy Efficiency (Aligning Interests) -- included in Interim Report
3. **Policy Type:** PSC policy changes to consider the need to and, if appropriate, the means to remove disincentives, and create positive incentives, for Wisconsin utilities to accomplish conservation and energy efficiency (CEE) and innovative rate design objectives. The policy changes should also explore mitigation strategies to minimize customer impacts, especially to price sensitive customers if such policy changes are pursued. The PSC should consider these issues in a process that provides for the opportunity for effective public participation such as a contested case hearing process.
4. **Affected Sectors, Sub-Sectors and/or Entities:** Utilities, utility customers
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy and does not result in any direct greenhouse gas (GHG) emission reductions
6. **Estimated Costs:** Administrative costs for modifying PSC ratemaking policies will be minimal beyond current efforts. Potential increased costs for utility customers will depend on the type of mechanisms developed.

Funding Sources: This investigation would be funded within the current PSC operating budget

7. Specific Description of Policy Proposal:

Background

A major increase in end-user CEE can make an essential contribution toward meeting GHG emission reduction goals. While this will require additional expenditures, CEE can be accomplished in the near term, in contrast to many other GHG strategies. CEE therefore should be a very high priority.

Dramatically increasing CEE and innovative rate

design efforts would benefit substantially from aggressive efforts and support by utilities. To obtain such efforts and support, it is essential to recognize that substantially increased CEE has the potential impact to erode a utility's current earnings and diminish its future profitability for two primary reasons. First, in the short term (between rate cases), to the extent energy sales are less than forecasted in the test year, the utility will under-recover its fixed costs (which include a profit margin). This result is produced because, under current PSC practice, some of the utilities' fixed costs (including profit margin) are recovered through an energy (kWh) charge. This is done to provide better long term price signals to consumers. But, CEE and significant changes in rate design, such as inverted block rates, may contribute to lower sales than forecasted, and thus lower profits. The risk created provides a potential disincentive for a utility to pursue aggressive cost-effective CEE and innovative rate designs where the risk of lower than estimated sales result in direct losses to shareholders.

Second, to the extent that aggressive CEE (or innovative rate designs) reduces sales, the lower sales will reduce the need for capital expenditures on future utility infrastructure. While this reduction provides societal benefits, it also potentially lowers earnings growth opportunities for utilities, since they are allowed to earn a return only on capital investment. If an entity can earn a return on only one type of investment, it is encouraged to make that type of investment, even if another option would be less costly to its customers and society.

The potential interaction of traditional regulation and aggressive CEE or new rate design initiatives can also create a tension between a utility's customer service objectives (controlling bills and achieving societal objectives) and a utility management's fiduciary duty to its shareholders (providing a reasonable return). Left unaddressed, this tension may create a disincentive for a utility to strongly support aggressive CEE efforts, as well as measures like stronger building codes, appliance standards, or new rate designs. The

existing PSC ratemaking paradigm creates these potential disincentives and the prospect of a carbon constrained world should provide motivation for considering and resolving this tension.

Recommended Action

The work group recommends that the PSC, as soon as possible, establish a public hearing process to analyze the nature and extent of potential disincentives to utility support for aggressive CEE and innovative rate design initiatives and identify and, if appropriate, take the steps necessary to address such disincentives.

This inquiry should include both the potential need to remove specific disincentives and also the potential need for, and design of, effective mechanisms that would provide utilities a positive incentive to support aggressive CEE initiatives (such as allowing a utility to share in a portion of the net benefits created by its efforts or earning a return on its CEE expenditures).

It also should include exploration of rate mitigation strategies to minimize customer impacts by: (1) exploring less costly means of funding cost effective CEE efforts; and/or (2) by potentially excluding specific customer classes such as large, price-sensitive customers with the option of “self-direction” from a “decoupling” mechanism. The self-direction option should allow internal CEE project costs to offset the overall amount required to fund the third party administered portion of statewide programs, should be verifiable and flexible and should permit the use of alternative financing methods such as Industrial Revenue Bonds, revolving loan programs and performance contracts. The PSC should also consider the impact of new or revised ratemaking changes on lower-income customers.

8. Timetables, Duration and Stringency Option:

Because these action(s) may be necessary to facilitate other actions, PSC consideration of these issues should be initiated as soon as possible and if determined to be appropriate, specific proposed changes should be considered for implementation in a contested case hearing process, such as a

utility rate case. The policies would remain in effect until changed by the PSC.

9. Explanation of Rough Estimate of GHG

Reductions: This is an enabling policy and does not result in any direct GHG emission reductions

10. Rough Estimate of Costs for Selected Years:

Administrative costs will be borne in the near term.

11. Barriers to Implementation: The primary barrier is the need for PSC action to modify its ratemaking policies to achieve CEE objectives. There also may be opposition to the policy changes by certain utilities or customers due to perceived impacts on earnings or rates or other principled objections to such new policies.

12. Other Factors: Many of the GHG reductions achievable by new PSC policies may be accomplished without the need for new legislation. The incremental impact on overall GHG reductions is difficult to predict.

This policy option should be considered together with the other policy options concerning energy efficiency, ratemaking policy and innovative rate designs. All three are closely related, should be seen as a package of actions available to the PSC to reduce GHG emissions, and should not be acted upon separately, but in an integrated manner.

This policy would facilitate the implementation of the Enhanced Conservation and Energy Efficiency Program, and other conservation and energy efficiency efforts, as well as the implementation of innovative rate designs.

13. Related Policies:

- Enhanced Conservation and Energy Efficiency Program
- Improved and Innovative Rate Design
- Demand Response and Load Management

Improved Rate Designs

- 1. Work Group:** Conservation and Energy Efficiency
- 2. Policy Name:** Improved and Innovative Rate Designs (Improved Rate Designs) – included in the Interim Report
- 3. Policy Type:** Regulatory. PSC policy changes to better align utility electric and natural gas rate designs with the impact of usage on global warming and the need for future energy infrastructure and fuel supply. It is possible some approaches may need legislative authorization.
- 4. Affected Sectors, Sub-sectors and/or Entities:** Electric and natural gas utilities, electric and natural gas utility customers
- 5. Estimated Greenhouse Gas Emissions Reduction Impact:** Together with the Enhanced Conservation and Energy Efficiency Program, expected to reduce total annual electric sales by at least an additional 1.5% per year beyond the current 0.5% annual savings from the existing Focus on Energy program. This policy would create price signals that better reflect the cost of the carbon footprint created by a customer's usage, and would facilitate the uptake of lower cost options such as increased conservation and energy efficiency.
- 6. Estimated Costs:** Limited administrative costs to hold regulatory proceedings. New rate designs would likely result in a different distribution of costs among different customers depending on level and time of usage. Implementing new rate designs will create new costs for recovery by utilities including metering, billing, customer service, marketing and IT, especially if new metering infrastructure must be created.

Funding Sources: This investigation would be funded within the current PSC operating budget

7. Specific Description of Policy Proposal: Background

Improved rate designs and rate design options are necessary to provide better price signals to customers concerning their cost of consumption, and that consumption's impact on greenhouse

gas (GHG) emissions, and the need to build new physical infrastructure or buy future new supply. A good rate design should reflect costs that differentiate between demand at the time of system peak, on-peak and off-peak as well as when GHG emission impact costs are significant.

The current flat rate design for smaller customers provides very blunt signals about the effect of a customer's consumption on GHG emissions or the need for new infrastructure and supply. Innovative rate designs are needed to better reflect these costs and to help to offset adverse GHG emission impacts and mitigate the sources of future utility cost increases. These innovative rate designs, in addition to providing better price signals, should also facilitate the ability of customers to effectively respond to such price information to lower their overall bills. Such new rate designs are needed as soon as possible.

Effective, improved rate designs are both a source of efficiency savings in and of themselves (as customers modify their behavior or take action to reduce their bills), and a means to help facilitate other savings efforts such as the Enhanced Conservation and Energy Efficiency Program. It also needs to be recognized that the adoption of significant new rate designs, like a substantial increase in energy efficiency efforts, can create revenue stability problems for a utility that need to be addressed to eliminate a potential disincentive for a utility to implement such new designs.

Recommended Action

The work group strongly recommends that the PSC, with all deliberate speed, open a proceeding(s) to investigate improved and innovative rate designs for all customer classes, that better reflects the impact of consumption on global warming, and the need for new energy infrastructure and supply. This inquiry should: (1) provide appropriate price signals to customers that reflect the ultimate costs imposed on the utility to serve, as well as impact on global warming; (2) provide effective opportunities for customers to respond to such price signals by reducing their overall bill (including during critical

peak pricing periods); and (3) recognize that rate designs should be better integrated with demand response and energy efficiency opportunities, as well as improved information, and information pathways, to affect customer behavior. These important, latter linkages in the development of new rate designs should be specifically integrated in that process to create as valuable, seamless and easy a choice for customers to control their usage as possible. Utilities should also be provided the flexibility to offer a menu of appropriate rate designs.

The work group urges the PSC to specifically analyze for implementation inverted rates, and/or inverted time-of-use rates, for smaller customers, as well as other options, to better track and reflect the impact of usage on global warming. Additionally, the PSC should analyze these rates (and other options) to address the situation of customers who have the least-financial ability to respond to these new types of price signals. For larger customers, we recommend an investigation of improved time-of-use rates, among other innovative new options. The PSC should also continue to improve utility buy-back tariff designs to both better reflect costs and benefits, and especially to recognize the carbon reduction value of customer-owned renewable energy.

The PSC should also consider the potential disincentive of lost revenues from new rate designs that can discourage a utility from pursuing such designs. This could be done in the same proceeding recommended in the Aligning Public and Private Interests for Conservation and Energy Efficiency policy template.

The PSC should adopt improved rate designs after the opportunity for effective public participation. Given the expected rate impacts from rate design changes, specific rate design changes for a utility should be included in a contested case hearing process, such as a utility rate case.

- 8. Timetables, Duration and Stringency Option:** Improved rate designs that better reflect the costs of GHG emissions, and the cost of future supply to meet future consumption, should be an immediate priority. While ensuring full

participation by interested parties, the PSC should pursue the development and implementation of improved rate designs with all deliberate speed. Both improvements in electric and natural gas rate designs should be treated as a priority, but given limited resources and greater expected GHG emission reductions from improved electric pricing, the PSC, if necessary, should proceed with developing and implementing innovative electric rate designs first.

- 9. Explanation of Rough estimate of GHG Reductions:** See Section 5

- 10. Rough Estimate of Cost for Selected Years:** As previously noted, the main direct costs are for administrative proceedings, although implementing new rate designs will potentially create new costs for utilities for metering, billing and IT. The main costs will come from incurring the metering, IT and billing costs to allow smaller customers to be faced with, and respond to, better price signals.

- 11. Barriers to Implementation:** New costing approaches, and the implementation of new rate designs, will re-distribute cost responsibility among existing customers. It should be expected that, to the extent some customers incur greater cost responsibility from better aligned rate designs, they may be resistant to such changes, regardless of the overall utility and societal benefits. Currently, not all Wisconsin utilities have the same metering, communications and/or IT capabilities and, as a result, are limited to provide some of the innovative rate designs without additional investment. This latter situation poses both a potential timing and cost barrier. Also, some designs may require legislative authorization.

It is important that the PSC address the potential impact of innovative rate designs on lower income customers (whose usage distribution ranges from low to high levels). Providing higher price signals to customers with a limited ability to respond to them in appropriate ways should be expected to only exacerbate other social concerns and problems.

12. Other Factors: While providing better price signals for the cost of global warming and future utility costs is a necessary condition, providing customers effective options to respond to such price signals, is also a necessary condition that allows customers, the utility and society to mutually benefit from lower future costs and diminished global warming impacts. This policy option should be considered together with the other policy options concerning energy efficiency and ratemaking policy. All three are closely related, should be seen as a package of actions available to the PSC to reduce GHG emissions, and should not be acted upon separately, but in an integrated manner. These three policies facilitate, and are facilitated by, the Enhanced Conservation and Energy Efficiency Program, and other conservation and energy efficiency efforts that provide an effective and least cost means for customers to respond to improved price signals.

13. Related Policies:

- Demand Response and Load Management
- Aligning Public and Private Interests for Conservation and Energy Efficiency
- Enhanced Conservation and Energy Efficiency Program

Demand Response and Load Management

1. **Work Group:** Conservation and Energy Efficiency

2. **Policy Name:** Demand Response and Load Management (Demand Response, Load Management) – included in the Interim Report

3. **Policy Type:** This policy is to review and recommend an expansion of current PSC demand response and load management policies, and related rate designs, to address global warming. This template focuses on demand response and load management actions that would reduce greenhouse gas (GHG) emissions.

Additionally, this policy calls for implementation of pilot programs to test rate design and equipment, define communication standards and promote evolution to a “Smart Grid” in ways that create greater customer acceptance and greater energy efficiency.

4. **Affected Sectors, Sub-Sectors and/or Entities:**
Affected sectors are principally electric utilities and utility customers

5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy that assists in achieving the success of the Enhanced Conservation and Energy Efficiency Program and thus, while appropriate demand response/load management programs would be expected to result in some direct reduction in GHG emissions, these reductions have been accounted for under the Enhanced Conservation & Energy Efficiency template.

6. **Estimated Costs:** Future costs will depend on the nature and extent of any recommended load management efforts. However, types of potential costs that may be incurred can be identified:

- Limited administrative costs for technical hearings
- Additional costs for rate design and costs to cover R&D for equipment for pilots
- Pilot programs to test effectiveness of rate design, equipment, customer acceptance, and level of energy efficiency gains. (see EPRI

“Prices to Devices” to use as template for pilots)

- Additional costs to develop education and communications materials for customers to understand, accept and implement demand response and load management programs and rate designs

Funding Sources: Administrative costs would be funded within the PSC operating budget

7. **Specific Description of Policy Proposal: Background**

Load management is defined by the Edison Electric Institute as: “Economic reduction of electric energy demand during a utility’s peak generating periods. Load management differs from conservation in that load management strategies are designed to either reduce or shift demand from on-peak to off-peak times, while conservation strategies may primarily reduce usage over the entire 24-hour period. Motivations for initiating load management include the reduction of capital expenditure, circumvention of capacity limitations, provision for economic dispatch, and cost of service reduction, system efficiency improvements, or system reliability improvements. Actions may take the form of normal or emergency procedures.”

Demand response is defined by the Federal Energy Regulatory Commission as: “The planning, implementation, and monitoring of activities designed to encourage customers to modify patterns of electricity usage, including the timing and level of electricity demand. Demand response covers the complete range of load-shape objectives and customer objectives, including strategic conservation, time-based rates, peak load reduction, as well as customer management of energy bills.”

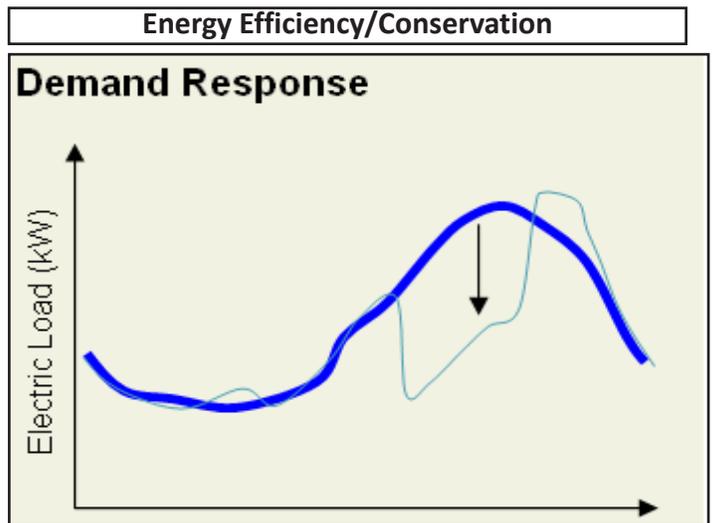
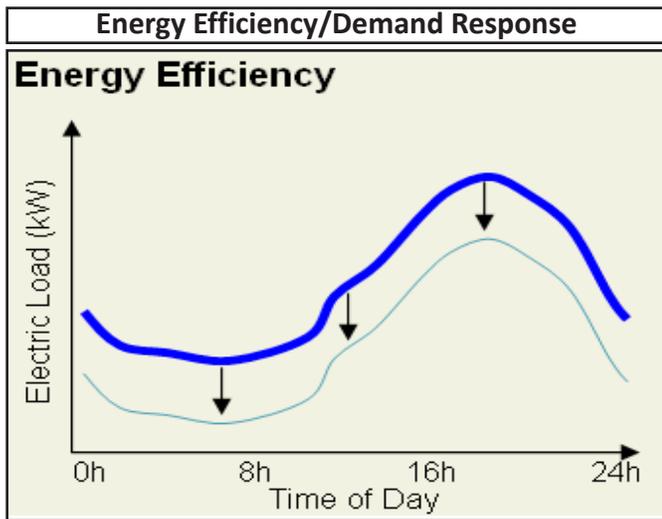
This policy is intended to promote demand response and load management strategies, programs and rate designs that incorporate energy efficiency gains, thus GHG reductions, as well as reducing peak demands to avoid building

infrastructure that would also create a carbon footprint. These actions have other benefits such as deferring the need to build new infrastructure and mitigating the level and volatility of wholesale energy markets.

Load management and demand response create a heightened awareness of peak usage and energy usage in general. Effective demand response pricing reduces peak loads and mitigates the need for infrastructure additions that add to the total carbon footprint. Demand response and load management programs provide incentives for customers to conduct a critical review of energy

value for customers by achieving a net reduction in GHG emissions. Effective programs will require innovative rate design, technology advances, and customer acceptance including providing customers an acceptable means to respond to demand response options and signals.

- B. Require State of Wisconsin facilities to participate in demand response programs offered by utilities.
- C. Upon completion of evaluation of pilot programs to verify cost effectiveness, degree of customer acceptance and impact on environment, implement full scale programs as soon as



usage, especially at peak times. Research has demonstrated that customer awareness of electric real time prices, such as demand response, can lead to conservation and efficiency not previously identified and therefore could contribute to a reduction in overall GHG emissions.

Recommended Action

This policy recommends the following:

- A. That the PSC require all electric utilities to implement pilot programs to test acceptance of demand response programs and options for customers. The pilot programs should evaluate rate design, load management and demand response and related equipment, customer acceptance, and improved energy efficiency and the contribution to reducing GHG emissions. Pilot programs should be structured in such a way to optimize environmental and economic

practical, based on equipment availability and completion of necessary communications and device deployment, billing changes, etc.

- D. Develop education and communications materials for customers to understand, accept and implement demand response and load management programs and rate designs. Incorporate information on available demand response and load management offerings with enhanced statewide programs and existing infrastructure and channels to further disseminate information and acceptance of demand response and load management. Seek out further opportunities for energy efficiency when promoting demand response and load management.

In developing and implementing these programs, it is important that the utilities and the PSC consider the overall costs of peak and off-peak energy, as well as their levels of GHG emissions, to ensure that the goal of GHG emission reduction is furthered by the selected programs.

8. Timetables, Duration and Contingency Option:

The PSC should establish an expeditious time frame for this activity. A potential timeline considered by the work group proposes to implement pilot programs in the 2010-2011 timeframe to be completed and evaluated by 2013-2014. Full scale implementation would be completed, to the extent practical, shortly after initial pilot program evaluations.

9. Explanation of Rough Estimate of GHG

Reductions: This is an enabling policy and does not result in any direct GHG emission reductions

10. Rough Estimate of Costs for Selected Years:

Administrative costs for rate design and implementation would be minimal. Rough estimates of the costs of implementation for residential customers could range from \$100 - \$1000/customer. Costs of implementation for commercial and industrial customers will vary, according to individual applications and equipment.

New costs for customer education, metering, billing, IT and communications infrastructure may vary from utility to utility according to what technology innovations have already been adopted. The customer education component must provide for feedback to create the needed customer behavior changes for adoption of demand response and load management programs and rate designs.

11. Barriers to Implementation: A barrier to implementation is resistance to change from customers due to perceived or real "inconvenience." Changes in energy usage may lead to a decrease in customer comfort. Load management and demand response actions may be time consuming, or require operational changes. These factors could erode

customers' perception of value. Customers may be resistant to change regardless of overall utility, environmental or societal benefits. Large customers may experience product and service interruptions that impact other aspects of their business quality, costs, etc.

The process for considering these options and programs should provide the opportunity for effective public participation. A specific proposal for implementation should be considered in a process that provides the public the opportunity to be heard (such as a contested case hearing process).

12. Other Factors: Load management and demand response actions have the potential to shift loads that can result in GHG emissions increases rather than reductions. The focus of this template is on efforts to identify and pursue actions that reduce overall GHG emissions.

This policy option should be considered together with the other policy options concerning energy efficiency, ratemaking policy and innovative rate designs. All three are closely related, should be seen as a package of actions available to the PSC to reduce GHG emissions, and should not be acted upon separately, but in an integrated manner. These three policies facilitate, and are facilitated by, the Enhanced Conservation and Energy Efficiency Program, and other conservation and energy efficiency efforts that provide an effective and least cost means for customers to respond to improved price signals.

13. Related Policies:

- State Government as Leader
- Improved and Innovative Rate Design
- Aligning Public and Private Interests for Conservation and Energy Efficiency
- Enhanced Conservation and Energy Efficiency Program

Residential and Commercial Building Codes

1. **Work Group:** Conservation and Energy Efficiency
2. **Policy Name:** Residential/Multi-Family and Commercial Building Codes (Residential and Commercial Building Codes) – included in the Interim Report
3. **Policy Type:** Legislation to update residential/multi-family and commercial building codes (chapter 63) and introduce a voluntary, higher performance commercial building code with incentives (referred to here as a “Commercial Green Building Code”)
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Residential, Multi-family, Agricultural and Commercial building sectors
Sub-Sector: Electric and natural gas utilities
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Total reductions are estimated at 2.0 million metric tons (MMt) of CO₂ by 2020.
6. **Estimated Costs:** Administrative costs for the updated residential and commercial building code will be minimal beyond current efforts. Enforcement costs would likely increase in order to achieve a targeted level of 90% compliance. There would also be additional cost for education on the new code(s). Establishing an additional Commercial Green Building Code, based on BSR/ASHRAE/USGBC/IESNA 189P, would represent an incremental administrative cost, but less than that of creating a custom state energy code. The cost impact of the accelerated permitting process would be neutral through fee adjustments for standard permit applications. Property tax rebates should be used to encourage participation in the Commercial Green Building Code, and equivalent financial incentives for entities that do not pay property taxes (e.g. government agencies and non-profits) should also be developed.

Funding Sources: Costs and benefits will accrue in the private sector. Funding sources for increased code enforcement and Commercial Green Building Code to be determined

7. **Specific Description of Policy Proposal:** The ultimate objective is to realize zero energy usage for new residential and commercial buildings by 2030. Achieving “zero-demand buildings” will require the development of appropriate policies and applications, which ensure the expansion of cost-effective renewable energy resources and promote energy efficiency.

This policy proposal consists of two distinct but complementary actions. The first is to establish a policy of automatically adopting the latest International Energy Conservation Code (IECC) code, at a minimum, as the state residential/multi-family and commercial building codes (chapter 63) within 18 months of publication (with the opportunity for customization to fit Wisconsin circumstances). Future versions of the commercial IECC code will be based on the next ASHRAE 90.1 standard that is expected to increase energy efficiency in commercial buildings by 30%. Future residential/multi-family building codes would be expected to increase energy efficiency by approximately 20% with the next residential/multi-family code revision in 2010 and 15% for each subsequent revision. This policy is consistent with Act 141 that requires at least three year review/updates and “consideration” of IECC, ASHRAE or other “generally accepted” commercial energy efficiency codes.

The second policy recommendation is to establish a Commercial Green Building Code based on proposed standard BSR/ASHRAE/USGBC/IESNA 189P. This draft standard, being drafted in code compliance language, includes a number of provisions and requirements to improve the energy and environmental performance of commercial buildings. The current draft standard would increase energy efficiency by 30% over ASHRAE 90.1-2007 and require 1% of electrical service load to be provided by renewable power generation. This provides a convenient mechanism to enforce Executive Order 145 that mandates that state buildings be designed to be 30% better than code in energy efficiency. ASHRAE has stated a long-term goal of net zero energy-use buildings and by 2015 to have standards for buildings that

consume 70% less energy than buildings built in 2000. The State of Wisconsin should join other organizations, including the American Institute of Architects and 375 Colleges and Universities, in committing to this long-term goal. There are additional environmental benefits to these high efficiency standards including reduced water usage, improved indoor environmental quality and the use of recycled/recovered materials. Other high efficiency standards (e.g. LEED, GBI) could be used as equivalent standards for compliance.

In addition to the property tax rebates noted in section 6, the legislative options that could be considered to encourage compliance with the Commercial Green Building Code include (1) mandatory compliance for state-owned facilities; (2) a fast-track permitting process for such buildings; (3) a 0.5% of construction cost low interest loan for private sector new construction and major retrofit projects; and (4) a 0.5% of construction cost low interest state loan for primary, secondary and higher education new construction and major retrofit projects. High energy efficiency standards for new construction building codes should also be developed and implemented for agricultural buildings (including but not limited to barns, milking parlors, cheese processing facilities) by the beginning of 2010.

8. Timetables, Duration and Stringency Option: This policy of adopting the

latest residential/multi-family and commercial IECC model and related codes and Standard 189 within 18 months of issuance would remain in effect until changed by law.

9. Explanation of Rough Estimate of GHG Reductions: Greenhouse gas (GHG) reductions from the enhanced commercial building code make the following assumptions: (1) 12.5% average energy efficiency improvement (half of the 25% 2006 IECC improvement due to current

over compliance); (2) 90% participation; (3) 31.6 million ft² of new construction and major retrofit per year for commercial buildings greater than 20K ft², (4) 17.1 kWh/ft² and 35.5 CF/ft² energy use. GHG reductions from the Commercial Green Building Code assume: (1) an additional 30% energy efficiency improvement (beyond 2006 IECC); (2) 25% participation.

These assumptions result in the following reduction calculations: estimates for new commercial buildings are based on two policies: (1) the commercial building code update is estimated to yield a reduction of 55,000 metric tons of CO₂ in 2010; (2) the Commercial Green Building Code is estimated to yield an incremental reduction of 36,700 metric tons of CO₂. By 2020 these two policies are estimated to yield total reductions of approximately 1.7 million metric tons of CO₂. By 2020 improved residential/multi-family codes are estimated to yield a reduction of 0.3 million metric tons of CO₂. Annual reductions, when totaled, are estimated at 2.0 million metric tons of CO₂ by 2020.

Specific modeling assumptions are captured in the table below (note that the Commercial Green Building Code is referred to as “High Performance Green Building Code”).

Carbon Modeling Assumptions														
	Base Case	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Commercial Energy Code														
Compliance	100%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Overcompliance	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Incremental Energy Reduction	N/A	25%	25%	25%	55%	55%	55%	60%	60%	60%	70%	70%	70%	70%
High Performance Green Building Code														
Compliance	0%	25%	40%	50%	25%	40%	50%	25%	40%	50%	25%	40%	50%	50%
Incremental Energy Reduction	N/A	30%	30%	30%	60%	60%	60%	70%	70%	70%	75%	75%	75%	75%

GHG emission reductions and energy savings for the improved residential/multi-family building codes were modeled in the Policy Case 1 by the Technical Advisory Group and can be found in that documentation. The actual energy savings and GHG emissions reductions attained are in part dependent on the level of compliance with the codes (thus also on the level of enforcement of the codes).

10. Rough Estimate of Costs for Selected Years: The incremental cost of meeting commercial IECC 2006 energy requirements can be considered very small due to the estimated high level of over-compliance to the current commercial IECC 2000 based code. For example, recent studies (Langdon, 2007) have shown that the average incremental cost of meeting a LEED – New Construction Silver rating is approximately 1% with a resulting annual energy operating cost reduction of 32%. The cost of compliance with the expected improvements in residential and multi-family IECC codes is also not expected to be significant as the code is developed to achieve cost-effective energy savings. The cost of increased building code enforcement, a property tax rebate approach and alternative financial incentive approach to incent participation in the higher voluntary code needs to be developed.

11. Barriers to Implementation: The primary barrier is the need for legislation concerning the proposals to upgrade existing and future building codes and a funding source(s) providing incentives to encourage widespread adoption of the Commercial Green Building Code. There may also be opposition to the policy of automatically updating the state building codes to reflect the most recent IECC model codes due to the uncertainty of future content and local impact, despite the opportunity to customize the code for Wisconsin during the 18 month window between IECC code availability and automatic implementation. There is also concern about the ability to effectively enforce the residential/multi-family and commercial building codes without additional funds and efforts

12. Other Factors: Some of the GHG reductions claimed by enhancement of state building codes could be duplicated in other policy proposals. This policy would be implemented by the existing state organizations responsible for maintenance and enforcement of commercial building codes and administration of Focus on Energy. Ensuring effective enforcement of the revised codes should be a critical element of ensuring that the expected reductions actually occur. Review of lighting plans and specs by DOA prior to issuing a permit for new

construction would also further the attainment of the overall objective.

In addition, “Dark Skies” type initiatives that focus on both energy savings and diminishing nighttime “light pollution” from outdoor light sources, are valuable initiatives and should be developed into building codes or facilitated through local ordinances.

13. Related Policies:

- State Appliance Efficiency Standards
- Enhanced Conservation and Energy Efficiency Program
- State Government as Leader
- Study of Retrofit Codes
- Enhanced Water Efficiency and Conservation

Government as Leader

1. **Work Group:** Conservation and Energy Efficiency
2. **Policy Name:** “State Government as Leader” Program (Government as Leader) – included in Interim Report
3. **Policy Type:** Executive, administrative and legislative
4. **Affiliated Sectors, Sub-sectors and/or Entities:** State government agencies, University of Wisconsin System facilities, state facilities and state transportation assets
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Reductions were not estimated for this policy
6. **Estimated Costs:** See Section 10

Funding Sources: Sources were not identified for this policy

7. **Specific Policy Description:** The recent adoption of Act 141 and Executive Order 145 significantly increased the role and targets for energy efficiency as part of state government initiatives in building new facilities, retrofitting existing buildings and purchasing energy efficient products and equipment. These actions build on a Wisconsin government tradition of recognizing that cost-effective energy efficiency is an important means to stabilize agency budgets while capturing multiple societal benefits. The ability of cost-effective energy efficiency to reduce both capital costs, and operating expenses, provides important savings opportunities that save government funds, as well as provide an example of how valuable energy efficiency actions can be. By highlighting the value of cost-effective energy efficiency to achieve multiple objectives, including the cost-effective reduction of greenhouse gas (GHG) emissions, state government provides both an example of “good government” and good fiscal management.

The state should extend its role as a “leader” by: (1) establishing overall GHG emissions reductions targets and (2) demonstrating that the utilization of cost-effective conservation and energy efficiency is the least cost means to achieve those targets. Therefore, the state should pursue the following actions:

- A. Require state agencies and facilities (including the University System) to identify their current GHG footprints. Based on this data, establish an overall target and implementation plans for state agencies, facilities and state transportation to reduce overall GHG emissions to at least 1990 levels by 2020. Opportunities for GHG reductions that the state should consider include, but are not limited to: energy efficiency, potential upgrades and fuel switching of state boilers and energy generation facilities, transportation including a reduction in employee travel through increased use of video conferencing, reduced material usage, increased recycling and afforestation of state lands, such as rights-of-way adjacent to highways or other roadways, where there are limited or no opportunity costs to using the land for forestry.
- B. Establish a “sustainability office” to oversee the GHG emission reduction targets and implementation plans of state government, as well as the energy efficiency and other sustainability goals and programs necessary to attain such targets from state facilities and state transportation assets.
- C. Adopt the following three specific policy recommendations that build on expanding cost-effective energy efficiency initiatives by ensuring the effective implementation of Act 141 and E.O. 145 by: (1) providing adequate resources and priority for such implementation including the formation of an internal working group within state government whose primary responsibility and authority across agency lines is identifying the opportunities and obstacles to cost-effective energy efficiency initiatives and acting to capture such opportunities while eliminating and mitigating the obstacles; (2) extending the targets and timeframes set forth in E.O. 145 until at least 2020 to achieve increased incremental savings including at least a 30% reduction in energy usage per square foot in existing buildings by 2020 from a FY 2005 baseline; (3) improving the ability of state and local governments and schools to benefit from using third party performance contractors, sharing experience and models and joint purchasing of energy efficient equipment.

To become even more effective, achieving appropriate reductions in GHG emissions through the use of least cost resources, such as conservation and energy efficiency, must be

treated as a high priority whenever constrained public funds are utilized. There are important, continuing needs to address the potential disincentives to GHG emissions reductions including: through energy efficiency created by the distinction between capital and operating budgets and the priorities established within those budgets, the diversity of purchasing authorities within government, the potentially divergent energy efficiency standards for equipment use in existing facilities (e.g. for compact fluorescent lighting, ENERGY STAR “plug load” equipment and vending machines) and the pressures created by multiple objectives, especially for smaller equipment purchases and practices.

The state should also assess in 2008 whether it would be desirable to become a participant in the Chicago Climate Exchange in order to generate additional benefits from its actions to reduce GHG emissions and increase conservation and energy efficiency.

8. Timetable, Duration and Stringency Option:

State facilities and agencies should identify their GHG emissions footprint by June 30, 2009. The State should establish specific savings targets for state agencies, facilities and state transportation by December 31, 2009, adequate to achieve a reduction of GHG emissions to 1990 levels by 2020. State facilities and agencies should identify specific reduction implementation plans to achieve the established targets so that such plans can be implemented no later than July 1, 2010. The means to achieve the overall target should include an extended savings target of at least a 30% reduction in energy usage per square foot in existing state buildings by 2020 (based on a FY 2005 baseline) should be established by 2010 to extend the current requirements in Act 141 and E.O. 145. In addition, the current 30% improvement for new state buildings over the existing state commercial building code should be interpreted to mean a 30% savings over the state commercial building code in effect when a new state building is to be constructed.

9. Explanation of Rough Estimate of GHG

Reductions: Reductions were not estimated for this policy

10. Rough Estimate of Costs for Selected Years: The proposal will be cost-effective (i.e. direct benefits/savings will exceed costs).

11. Barriers to Implementation: Extending the requirements of E.O. 145 to (1) establish GHG emissions targets and programs for state facilities (including state agencies and the University System) and state transportation use and (2) increase the cost-effective energy efficiency savings target for existing state facilities through 2020 will require executive, action. The effective implementation of GHG emission reduction targets including existing and future energy efficiency initiatives will require a “champion(s)” with requisite authority and reach to help facilitate appropriate actions as well as identify and mitigate existing barriers.

12. Other Factors: Increased sharing of experiences and effective models among the various levels of government (state, county and local) would be a valuable aid to facilitate future effective actions. In addition, all levels of government should promote the multiple benefits of cost-effective energy efficiency as good, effective government that is leading by example, while highlighting the private and societal benefits from such actions to encourage similar actions by others. To assist in promoting this message, increased and more prominent use of the Energy Efficiency Recognition award (authorized in Section 14.165 of the Wisconsin Statutes) should be pursued by the state to further raise the public recognition of the availability and valuable benefits from cost-effective energy efficiency opportunities.

These efforts should build on, and enhance, the good foundation to achieve the objective of this template established by the Conserve Wisconsin Initiative administered by the Department of Administration. The Conserve Wisconsin Initiative has made important progress and should be viewed as an important base within, or around which, to pursue the proposed additional initiatives. Also, in implementing this policy of leading by example, the state should work in tandem with the Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reduction Initiative.

13. Related Policies:

- Residential and Commercial Building Codes
- Demand Response and Load Management
- Off-Road Equipment Emission Reductions
- Government Fleet adoption of Plug-In Hybrid Electric Vehicle Incentives

- Advanced Biomass and Biofuel Commercialization and Utilization
- Energy Efficiency in Schools
- Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reduction Initiative

Rental Lighting Standards

1. **Work Group:** Conservation and Energy Efficiency
2. **Policy Name:** Energy Efficiency and Safety through Lighting for Rental Properties (Rental Lighting Standards) – included in the Interim Report
3. **Policy Type:** Legislation establishing minimum lighting efficiency standards for rental properties in Wisconsin
4. **Affected Sectors, Subsectors and/or Entities:** Landlords and tenants
5. **Estimated Greenhouse Gas Emission Reduction Impact:** 589,100 tons of CO₂/year
6. **Estimated Costs:** \$200,000 to produce educational materials and work with landlord and tenant associations to educate them about this requirement. No anticipated additional enforcement costs. Enforcement would be a combination of complaint driven (by tenant) and standard inspection procedures, including fire departments that inspect compliance with exit sign ordinances. Savings to renters and landlords with 100% compliance would be approximately \$46,000,000 annually.

Funding Sources: Funding source for education materials to be determined. All other costs and benefits would accrue to landlords and/or tenants.
7. **Specific Description of Policy Proposal:** The proposed legislation should require all rental properties in the state of Wisconsin to install fluorescent or light emitting diode (LED) bulbs, or any other bulb that has an energy efficiency of at least fifty (50) lumens per watt, in all common areas by July 1, 2009, and all mounted fixtures with Edison bases at the beginning of each lease period starting January 1, 2010. This requirement shall not apply to fixtures controlled by dimmer switches or to any fixtures in appliances. The legislation should further require that all exit lights in rental properties be lit by LED bulbs. To increase compliance rates this proposal should include requirement that a landlord provide a certification to each tenant at time of lease that he/she has complied with these requirements. In addition, the legislation could provide that tenants can deduct the cost of purchasing bulbs from their rent if the landlord has not provided the energy efficient lighting.
8. **Timetables, Duration and Stringency Options:** July 1, 2009 for common areas including exit lights and starting in January 1, 2010 for in-units fixtures, with at least one year of compliance assistance and education.
9. **Explanation of Rough Estimate of GHG Reductions:** Efficient fluorescent lighting uses about one-fourth of the electricity that incandescent bulbs use and lasts up to ten times as long. Exit signs lit with LEDs can last up to 25 years and use less than 4% of the electricity required for incandescent exit signs. Requiring efficient lighting in Wisconsin's rental properties would cut electricity and maintenance bills as well as bulb replacement costs. In addition, common areas would be safer for residents because of less bulb failures. There are approximately 278,000 rental buildings in Wisconsin, with 658,000 rental units. If all rental properties that have not already switched to efficient lighting were to do so in common areas, fixed in-unit fixtures, and exit signs, they would:
 - Reduce annual energy use by 560 million kWh, or 2% of annual residential electricity demand in Wisconsin, according to the 2006 Wisconsin Energy Statistics report
 - Cut global warming pollution by 589,100 tons of CO₂ each year
 - Save landlords and tenants \$46,000,000 each year in energy costs alone, assuming the average cost of a compact fluorescent bulb (CFL) is \$2.
10. **Rough Estimate of Costs for Selected Years:** \$200,000 for first year
11. **Barriers to Implementation:** Requires legislation. Rental property owners may prefer voluntary programs to convert to more energy efficient lighting than a mandatory requirement.

12. Other Factors: This program should be coordinated with Focus on Energy's new CFL recycling program to ensure safe disposal of CFLs.

13. Related Policies:

- Study of Retrofit Codes
- Residential and Commercial Building Codes

Appliance Standards

1. **Work Group:** Conservation and Energy Efficiency
2. **Policy Name:** State Appliance Efficiency Standards (Appliance Standards)
3. **Policy Type:** Legislation would be required to create state appliance/equipment efficiency standards for products not covered by federal government standards or for which a waiver of the federal standards could be sought
4. **Affected Sectors, Sub-Sectors and/or Entities:** Businesses that manufacture, distribute or sell at retail the specified appliances / equipment; consumers
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Based on an estimate by the Appliance Standards Awareness Project and American Council for an Energy-Efficient Economy (ASAP/ACEEE), the enactment of state appliance standards for residential gas furnaces and furnace fans, compact audio equipment and high efficiency commercial boilers, combined with a standard for industrial boilers (based on an independent estimate separate from ASAP/ACEEE), would save 392,809 metric tons of CO₂ by 2020.
6. **Estimated Costs:** Based on the ASAP/ACEEE estimates, the net present value (NPV) of the reductions in bill savings for consumers is positive and would yield a NPV of approximately \$550,000,000 by 2030. Thus while there would be increased consumer costs from the higher incremental cost of the new equipment, these costs would be recouped by consumers over a payback period ranging from less than a year to up to 6-7 years. There would also be some cost for administrative rulemaking to implement and revise the standards as established by the enabling legislation.

Funding Sources: Administrative costs for adopting and enforcing new standards would be funded through state operating budgets
7. **Specific Policy Description:** State appliance efficiency standards establish minimum energy efficiency levels for appliances and other energy-consuming equipment not already covered by federal standards, or for which an application for waivers of federal pre-emption to increase the standard for selected other equipment would be made. These standards

typically prohibit the sale of less efficient models within a state.

Appliance efficiency standards are a proven means for improving energy efficiency. Their objective is to raise the efficiency of residential, commercial and industrial energy-consuming equipment where cost-effective to do so. Standards have proved to be an especially effective tool for addressing split incentive situations, emergency purchases and for mass market products where energy efficiency improvements may only be a small element, but when aggregated provide a meaningful contribution to load growth (e.g. “plug loads”) and are difficult to capture through voluntary energy efficiency programs. They also are an effective means to ensure that energy use reductions translate into lower greenhouse gas (GHG) and other pollutant emissions.

The recommended action is that a specific appliance standard bill be developed for Wisconsin based on actions already taken in other states and be enacted by the legislature for new commercial & industrial boilers, new residential furnaces, and furnace fans and compact audio equipment. The ASAP/ACEEE proposed model bill standards set forth in “Leading the Way: Continued Opportunities for New State Appliance and Efficiency Standards, 2006” serves as a guide for the enabling bill development process in Wisconsin. If the uses in the proposed bill are pursued, then a waiver of the existing federal standard for commercial boilers and residential furnaces may need to be sought since there are federal standards currently for both items. There is no explicit federal standard for residential furnace air handlers until at least 2015 or for industrial boilers.

Recommended standards

For commercial boilers, the proposed standard would require new commercial boilers to have a thermal efficiency of at least 80% for natural gas boilers, and 83% for oil boilers, installed in Wisconsin. This is a 3% increase over the federal standards set in 1989. For industrial boilers, the proposed standard would require new industrial boilers installed in Wisconsin to have a thermal efficiency increase of at least 3% compared to the average efficiency of applicable, currently available models. Existing commercial and industrial boilers

are unaffected by the proposed new standards. All new boiler installations must comply with federal, state and local requirements.

The proposed standard for new residential gas furnaces would require a 90%+ AFUE and an efficient furnace fan (as defined in the ASAP/ACEEE model bill). The current federal standard is an 80% AFUE with no standard for the furnace fan. For residential furnaces, the standard would apply to all new residential furnaces, with the exception of mobile homes and attic mounted furnaces.

While the work group has set forth specific recommended efficiency standards for boilers and furnaces, we also recommend adopting the proposed compact audio product efficiency standards set forth in the “Leading the Way” report noted above.

8. Timetable, Duration and Stringency Option: The sooner an acceptable state appliance efficiency standard can be developed and enacted, the sooner that important energy savings can be achieved and GHG emissions reduced. A start year of 2010 would be needed to achieve the estimated levels of GHG savings identified. The standards should stay in place until changed by law as part of a periodic review and upgrade process delegated to an agency by the enabling legislation.

9. Explanation of Rough Estimate of GHG Reductions: The emissions reduction amount from ASAP/ACEEE is based on an estimate assuming the enactment of state standards for specific items of equipment/appliances similar to those enacted by at least 10 other states in 2006 (including California, New Jersey, Connecticut, Oregon and New York) including: residential furnaces and furnace fans; compact audio equipment; and commercial boilers. The estimated reduction for industrial boilers was developed by the work group with assistance from World Resources Institute.

By 2020, there would be a GHG emissions reduction of approximately 392,809 metric tons of CO₂. About 90% of this reduction is from the residential furnace and furnace fan standard resulting in a GHG reduction of 367,405 metric tons of CO₂. Commercial boilers save about 3,711 metric tons of CO₂; industrial boilers (assuming only natural gas savings) save about 1,896 metric tons of CO₂; and the compact audio equipment standard saves about 19,802 metric tons of CO₂.

10. Rough Estimate of Costs for Selected Years: The

incremental costs estimated by ASAP/ACEEE are: (1) for commercial boiler, \$2,968 per unit with about a 6.9 year payback; (2) for residential furnaces/furnace fans, about \$100 per unit with a 1.2 year payback and (3) for compact audio equipment, a \$1 cost per unit with 0.2 year payback. For new industrial boilers, incremental costs are estimated to be proportionately higher than for commercial boilers, but with a similar 6.9 year payback.

11. Barriers to Implementation: There is a need for legislation to enact a state appliance efficiency bill for Wisconsin. The most likely objections would be from the provider/retailer of a specific product/equipment included in the bill or concern about the impact of a specific included product on up-front consumer costs. Consumers may also be concerned about higher up-front product costs despite lower-lifetime costs. Meeting with interested providers and retailers of affected products as part of the bill’s development could help mitigate potential concerns. For a specific measure, there may be a need to seek a waiver of federal preemption.

12. Other Factors: A Wisconsin Appliance Efficiency Standard would achieve GHG savings and reduced energy costs from areas that are typically difficult to achieve by other means. It also helps as part of a broader portfolio of policy actions to diversify the cost impacts/incidence to reduce GHG emission, rather than concentrating those mitigation costs primarily on a single set of entities or consumers (e.g. electric customers).

Wisconsin should work with neighboring states to achieve regional coordination and advocate for stronger appliance efficiency standards where this is technically feasible and economically justified.

13. Related Policies:

- Enhanced Conservation and Energy Efficiency Program
- Study of Retrofit Codes
- Residential and Commercial Building Codes
- Industrial Boiler Efficiency Improvements

Energy Efficiency in Schools

1. **Work Group:** Conservation and Energy Efficiency
2. **Policy Name:** Energy Efficiency in Schools (EE Schools)
3. **Policy Type:** Legislation to create fiscal incentives to implement energy efficiency programs in schools and to change the existing school levy limits and/or the shared revenue funding formulas to eliminate conservation and energy efficiency project disincentives for schools.
4. **Affected Sectors, Sub-Sectors and/or Entities:** Local schools
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Reductions were not estimated for this policy.
6. **Estimated Costs:** Cost can only be determined following an energy audit of a significant sample group of Wisconsin schools, 50 to 100 buildings. As some schools fall far behind others in terms of efficient energy use, allocations would have to vary from school to school.

Funding Sources: The State should help provide adequate funds to facilitate local school districts to develop greenhouse gas (GHG) emission targets and action plans. Focus on Energy funds, especially under the Enhanced Conservation and Energy Efficiency template funding levels, could be used to assess and develop cost-effective energy efficiency plans and actions.

7. **Specific Description of Policy Proposal:** Local school districts should be encouraged and provided adequate resources and expertise necessary to:
 - A. Identify the current GHG emission footprint of the school district and the individual school facilities and transportation within the district.
 - B. Establish GHG emission reduction targets and develop plans to reduce GHG emissions through appropriate actions including cost-effective conservation and energy efficiency, transportation

strategies, reduced materials usage and increased recycling.

- C. Utilize such reduction actions as an educational tool on the benefits of such actions to students and the community.
- D. The Department of Public Instruction (DPI) should facilitate information and resources for educational efforts including leveraging the current University of Wisconsin at Stevens Point Environmental Education Initiative. It is imperative that current and future school levy, fund sharing formulas and other statutory enactments, provide incentives, rather than disincentives, to local school districts to reduce their current GHG emissions footprint from school facilities and transportation.

Under the current school funding formula, schools are funded based on need. Therefore, the less spent in a given budget cycle, the less allocated to a school from the state's General School Fund in the following budget cycle. This formula results in a financial disincentive for local schools to adopt energy efficiency policies; eliminating this disincentive requires legislative approval. Implementation of reforming legislation should enable local schools to retain monetary savings derived from energy efficiency programs. Because energy savings would be directly proportional to new funds available, schools would incrementally benefit with each biennium. Using third party funding energy efficiency programs could be designed and implemented. Savings resulting from upgrades and implementation of energy efficiency curriculum can eventually be rolled into the General School Fund to address funding shortages. Reforming legislation would have to address lifting the school spending cap specifically for energy efficiency and reduction of GHG emissions, as well as changing the school funding formula within the same parameters.

Information on how much energy a typical elementary, middle or high school in Wisconsin should consume is currently available from Focus on Energy. This information will assist other

schools to see how far they have to go to meet acceptable levels of energy consumption, or how they can raise the standards. It is important to note again that some schools far exceed others in terms of efficient energy use; therefore allocations would have to vary from school to school. Focus on Energy has information available on the lowest/highest performing schools in terms of energy efficiency. A Focus on Energy study group could be utilized to determine the best starting point. Addressing the needs of the lowest performing schools would have the greatest overall impact for GHG emissions in Wisconsin. The study group could identify these lowest performers, as well as which improvements/behavior modifications would have the greatest impact in the least amount of time. Energy efficiency will be addressed by the study group, with equal attention given to GHG emission reduction.

A case study conducted by Focus on Energy (*Public Schools Benchmarking Project, If You Cannot Measure It, You Cannot Manage It*) compiled quantifiable data regarding energy usage, and would help enable schools to plan energy efficiency improvements.

8. Timetable, Duration and Stringency Option:

Establishing a timetable will require development of a business plan from consultants working with schools. Time requirements could be written into the reforming legislation. Duration would be ongoing, barring attempt to rescind legislation over time.

9. Explanation of Rough Estimate of GHG

Reductions: Reductions were not developed for this policy.

10. Rough Estimate of Costs for Selected Years: See Section 6

11. Barriers to Implementation: Political barriers to passing legislation may include claims of irresponsible spending by schools of monies saved; claims that money saved through energy efficiency should go toward property tax relief. Changing the school funding formula and

eliminating revenue caps is a highly contentious issue that is heavily debated and may be a hard sell to the legislature. While we recognize the immense value in passing such legislation, it is likely to be a tough battle.

12. Other Factors: None

13. Related Policies:

- State Government As a Leader
- Enhanced Conservation and Energy Efficiency Program

Non-Regulated Fuels

- 1. Work Group:** Conservation and Energy Efficiency
- 2. Policy Name:** Non-regulated Fuels Efficiency and Conservation (Non-regulated Fuels)
- 3. Policy Type:** Legislation to develop and fund conservation and energy efficiency programs for consumers of fossil fuel energy sources that are not regulated by the Public Service Commission of Wisconsin for heating, production and other non-transportation uses and the establishment of an audit and tracking mechanism to ensure that such funding is used to the benefit of the consumers of these fuels.¹
- 4. Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Residential, commercial, agricultural and industrial equipment and building sectors
Sub-Sector: Propane, oil, coal industry
- 5. Estimated Greenhouse Gas Emissions Reduction Impact:** Reduction to 1990 levels of CO₂ (1,845,345 metric tons) by 2020 from the use of non-regulated fuels in Wisconsin.
- 6. Estimated Costs:** The costs for the proposed conservation and energy efficiency program should be developed as part of the legislation. However, to aid in that calculation the work group proposed two funding options: one that phases in over time and a second that establishes an annual funding level that remains constant by percentage of gross sales revenue over time. Under the first option, the first year program costs would be a designated lower level for program in the first year and continually ramp by an adequate amount to secure adequate GHG reductions that would reduce GHG emissions from the use of these fuels back to 1990 emission levels by 2020 and to attain the emission reduction target recommended by the Task Force for 2050. Estimated annual program delivery costs are presented in a table in section 10.

1. These fuels include liquid petroleum gas (LPG), fuel oil (oil) and coal; throughout this policy template the term “non-regulated fuels” refers to this category of fuels. Other fuels, such as natural gas, are already regulated by the PSC and are referred to here as “regulated.”

The second funding level option starts at the same level at which natural gas and electricity customers currently contribute to the Focus on Energy program (in aggregate 1.2% of annual gross sales revenues, or whatever level they will be increased to, based on the recommendations of the Task Force to the Governor). Programs funds would change as this constant percentage is applied to changing annual gross sales.

Funding Sources: The specific means by which funding is secured for the conservation and energy efficiency program should be established by the legislation. As described above, the work group proposed that funding be provided by a fee or tax on the respective fuel source (i.e. an increase in the current gross receipts tax on such fuels).

- 7. Specific Description of Policy Proposal:** The work group recommends legislation be developed and enacted to design and implement a non-regulated fuels conservation and energy efficiency program that addresses residential, commercial, agricultural and industrial consumer needs. While the work group has tried to provide initial estimates and recommendations, we believe that more time and effort is needed to design the specific program elements and funding structure that will result in successful private and societal benefits. An audit and tracking system should be established to ensure that funds collected for non-regulated fuel conservation and energy efficiency efforts are being used to benefit the consumers who are contributing the funds for the program.

Significant potential cost-effective GHG reductions are available through improved conservation and energy efficiency for the use of the “non-regulated fuels.” Similar to customers of regulated energy sources, non-regulated fuel users should be provided effective assistance in reducing their energy bills and carbon footprints. The CO₂ emissions factors for LPG (136 lb/MMBtu) and oil (159 lb/MMBtu) are greater than for natural gas (118 lb/MMBtu), thus the GHG reductions for equivalent savings in energy are greater for the non-regulated fuels, further emphasizing the interest in developing programs to improve the

efficiency of their use.

Greatly reducing GHG emissions in Wisconsin will require increasing the efficiency of use of all fossil and biomass fuels. Wedge analyses by EPRI, McKinsey and Princeton University show conservation and energy efficiency to be the largest wedge for reducing GHG emissions. Wisconsin has successfully implemented programs to reduce the use of electricity and natural gas during the last three decades. This success *significantly* did not include non-regulated fuels (other than in the federal/state low-income weatherization program). Prior to 2005, the Focus program was allowed to help homes using eligible electricity to save LPG, oil and other non-regulated fuels *to a limited degree*. This was an important means to achieve a “whole house” savings approach in which maximum cost-effective savings from a home could be captured at lower costs. The revisions made in Act 141 appear to prevent this effort.

According to the Wisconsin Energy Statistics, LPG and oil make up 17% of the residential sector fossil fuel use (or 21% as much fuel as natural gas use). The total LPG and oil use in Wisconsin is 10% of the total natural gas use in buildings. This suggests the potential savings in the commercial and industrial sectors, while lower in aggregate potential than in the residential sector, are still important (e.g. coal use for boiler fuel). There are particularly important opportunities in the agricultural and industrial sectors, as reflected by the recommendations of the Agriculture and Forestry and the Industry work groups for an energy efficiency program for non-regulated fuel sources funded through state general revenues or by some other means.

8. Timetables, Duration and Stringency Option:

The timetable for this policy recommendation could mirror the timetable for implementing the Enhanced Conservation and Energy Efficiency Program. Funding is prescribed through 2020 and beyond based on emission reduction targets: 1990 emission levels by 2020 and 80% below 1990 emission levels by 2050.

9. Explanation of Rough Estimate of GHG

Reductions: The projected (from 2007 data) natural gas savings for the Focus program for FY08 would be about 29,755,892 first year therms for the residential and business sectors. This is about 0.84% of the 2005 statewide natural gas use. If we assume that the current Focus programs were allowed to include the non-regulated fuels program to achieve comparable savings, a simple sales projection would suggest that about 1,930,988 gallons of LPG and oil could be saved in the first year (1,803,198 gallons of LPG and 127,790 gallons of oil).² These 1,930,988 gallons saved equate to 191,289 MMBtu conserved, and, using the emission factors discussed earlier, result in an estimated reduction of 13,233 metric tons of CO₂.

Assuming a program would start in FY2008, 1990 GHG emissions of 1,845,345 metric tons of CO₂ could be reached in 2020 with reductions of 47,201 metric tons of CO₂ that year. An 80% reduction from 1990 levels could be reached in 2050 with 374,659 metric tons of CO₂ being emitted in that year.

10. Rough Estimate of Costs for Selected Years:

The proposal suggests that a program to help Wisconsin residents reduce their use of non-regulated fossil fuels usage be part of the larger, existing Focus program. This is intended to reduce the cost of implementation (e.g. by applying a “whole house/facility” delivery approach that reduces delivery costs while maximizing benefits to customers by offering full services to residential, commercial and industrial customers to save both regulated and non-regulated fuels). The non-regulated fuel reduction opportunities are used in some facilities that are eligible for current Focus programs based on their electricity or natural gas provider. Also, these opportunities

2. The potential may be greater based on two market conditions: (1) the cost of LPG and oil per Btu is significantly higher than that of natural gas and (2) there is more “low hanging fruit” still available because homes and businesses using these fuels have not been explicitly eligible for conservation and efficiency programs in the last 20 years. Also, there is potential not considered here from improving efficiency in homes and commercial/industrial facilities using biomass and coal to produce thermal energy for heating and processes (e.g. fuel-switching from coal to natural gas which is currently prohibited by Focus’ limited scope of regulated fuels).

are available in facilities that are in the proximity of others that are, or will, participate in existing Focus programs and the local deliverers of the Focus programs typically have the skills and opportunities to implement similar approaches for non-regulated fuels.

The main costs to deliver these program services as an extension of Focus programs are likely to be proportional to the Focus program cost. The average year 2007 cost for program efforts for Focus programs differs between the residential and business programs. The estimated first year costs for the delivery of program services as part of the Focus effort is \$2,953,049 for the residential sector and \$986,106 for the business sector – for a total of \$3,939,158. This cost would rise to \$12,986,116 in 2020.

The above estimates are based on a program with a budget commensurate with the Focus 2007 program budget – and with significant increases (>10% albeit off a far smaller base than Focus) per year.³ The table below shows the values of emission reductions and costs through 2020. The cost escalates by 10.45% per year through 2020 to provide accelerated savings by this plan to facilitate early success.

11. Barriers to Implementation: The major barrier to implementation of this policy is the need for legislation to establish funding the program. Opposition may come from purveyors of LPG, oil, and coal in Wisconsin for fear of reduced sales and from consumers due to slightly increased prices, especially if a gross receipts tax is used to raise the required funding. Opponents may argue that relative to sales of natural gas, sales of these non-regulated fuels are small. However, as much as 11% of the fossil fuels used for thermal processes in buildings are non-regulated fuels. And it is likely that about 17% of the GHG emissions from building and business thermal processes are from these non-regulated fuels. However, using a more gradual (or equivalent occasional) increase in the funding could mitigate opponents' arguments.

3. An analysis was also done assuming a higher starting budget that is four times the assumed budget in the first year – rather than by set percentage of sales or revenues over time. This was done to give the Task Force another option of recommendation for this policy; results are available for review.

12. Other Factors: Creating non-fuel-discriminatory programs also allows for replacement of fossil fuel technologies with biomass technologies (such as pellets, corn, cherry pits, etc). This could offer much greater potential for reducing GHG than is discussed here.

In addition, the high costs of LPG and oil provide a significant opportunity to reduce the financial burden on our citizens for energy purchases from sources out of state. While the fee to create the program will slightly add to the price of the fuel product, the funds will result in bill savings for those who participate in the program and reduce GHG emissions. The local environmental impacts of SO_x and NO_x are reduced compared to natural gas (impacts of Hg might increase). Finally, LPG and oil are delivered to each home by trucks, so reducing the use of these fuels would yield an additional reduction in GHG emission through fewer fuel delivery trips.

While the work group was able to begin to estimate the potential costs and sources of funding for a non-regulated fuels program, it was felt that more effort was needed to confirm the initial numbers and estimates, including potential impacts on consumers. These key elements on the funding source annual program funding amount and program delivery method should be ultimately resolved by the legislature in the legislation drafted to implement this recommendation and involve the participation of interested industry and consumer interests.

It is important to note that the Industrial Boiler Efficiency Improvements template and the Industrial Boiler Fuel Switching template are intimately related to this template in that a program could facilitate the ability of industry to move to less intensive GHG emitting fuels or renewable energy in lieu of the use of coal boilers. This is also true of the Agriculture and Forestry work group templates seeking to improve energy efficiency in the use of non-regulated fuels. This template and the other templates call for an adequate funding source. But, it is important to note that the emission reductions from these different templates are NOT additive and attempts to sum the emission reduction estimates may result in overlap and double counting.

13. Related Policies:

- Industrial Boiler Efficiency Improvements
- Industrial Boiler Fuel Switching
- Enhanced Conservation and Energy Efficiency Program

Study of Retrofit Codes

1. **Work Group:** Conservation and Energy Efficiency
2. **Policy Name:** Study of retrofit codes for mandatory upgrades of existing single and multi-family units (Study of Retrofit Codes).
3. **Policy Type:** Establish a legislative study committee to consider the need for, and nature of, potential mandatory, minimum energy efficiency standards triggered by specific events (e.g. point of sale) for existing single-family home and multi-family rental units to complement voluntary energy efficiency programs for these sectors.
4. **Affected Sectors, Subsectors and/or Entities:** Home buyers and sellers, realtors, multi-family rental owners, renters and home improvement and building contractors
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy and does not result in any direct greenhouse gas (GHG) emission reductions. Potential emission reductions that may occur as a result of any retrofit codes are discussed in section 9.
6. **Estimated Costs:** The direct cost of this recommendation is the cost of funding the legislative study committee activity. Potential costs of any legislative enactments would depend on the specific retrofit codes/standards adopted. These costs would include the private sector costs to comply with retrofit codes and the public cost to ensure effective enforcement of such codes; these are discussed in section 10.

Funding Sources: Direct costs would be absorbed by State budgets
7. **Specific Description of the Policy Proposal:** The specific recommendation is to establish a legislative study committee to provide recommendations on the need for, and content/design of, effective energy efficiency retrofit requirements for existing residential homes (1-2 family) and multi-family units. This should include a review of the existing rental unit energy efficiency standards in section 101.022 of Wis.

Stat. and potential improvements.

The work group tended to believe that a preference for voluntary energy efficiency programs for existing residential homes and multi-family units was appropriate, but recognized that there may be circumstances where voluntary programs by themselves would be inadequate to help achieve the emissions reductions targets and objectives established in Wisconsin. For example, Wisconsin has adopted a set of mandatory energy efficiency requirements for existing multi-family units at the time of sale of the building (Wis. Stat. 101.122) to overcome the split incentive between owner and tenant that has limited the effectiveness of voluntary programs in this sector.

The work group recognized that mandatory energy efficiency retrofit requirements should be a carefully considered and crafted. The recommendation to establish a legislative study committee (including affected parties) is to allow this appropriate consideration to be undertaken. This more thorough consideration is appropriate because potential retrofit codes requiring energy efficiency upgrades (existing single-family residence or multi-family rental) could have two important benefits: (1) it could accelerate the time when cost-effective emission reductions occur and (2) it could increase the overall level of energy savings or emission reductions to more than would be expected with only voluntary energy efficiency programs. Thus, while over time, some savings from retrofits in existing dwellings would be expected to be captured through voluntary programs, point of sale/transfer type triggering event requirements for certain energy efficiency upgrades would address areas where voluntary programs have important limitations on their effectiveness due to barriers such as split incentives or a history of limited penetration of voluntary efforts.

8. **Timetables, Duration, and Stringency Option:** The adoption of any recommended requirements should be sought to be enacted by legislation in 2009 so that any retrofit code adopted could be operating by 2010.

9. Explanation of Rough Estimate of GHG

Reductions: The level of GHG emission reductions from retrofit codes depends on the specific retrofit codes/standards adopted. The following are the potential benefits in GHG emission reductions that might be achieved through energy efficiency retrofit requirements for existing single-family and multi-family homes that underlie the recommendation that such legislation be considered and adopted as appropriate. These specific potential retrofit code applications are provided to better understand the potential benefits that may be available rather than to suggest what types of approaches should or should not be considered by the legislative study committee.

- A. Existing Single-Family Residential Units. The study committee should consider requiring energy efficiency upgrades at point of sale, during major renovations, and other similar measures adopted in other states and cities. There are approximately 115,000 existing single-family homes sold in Wisconsin annually. At point of sale, or another similar triggering event, the seller could be obligated to install all measures identified by Energy Center of Wisconsin (ECW) having a 10 year payback period or less (i.e. the savings exceed the cost within that period). This would include replacing older appliances (boilers, furnaces, water heaters, etc.) with Energy Star appliances, and various insulation and lighting upgrades.

A separate stand-alone retrofit requirement provision could require that an existing electric water heater could not be replaced with a conventional electric water heater (or on-demand electric water heater) in homes where natural gas, LP gas or oil are available in the home for heating to reduce GHG emissions as well as electric system demand. Converting an electric water heater would save approximately 3.1 metric tons of CO₂ per year and reduce system demand by about 0.4 kW per home on average. Since approximately 26% of the water heaters in Wisconsin are electric (about 585,000 water heaters), this requirement could significantly reduce GHG emissions and as well as electric system demand.

ECW estimates that implementing all 10-year payback measures in existing units would save 82 therms of natural gas, 15 therms of propane, 16 therms of fuel oil and 493 kWh of electricity. Using conversion figures of 1.692 lbs CO₂/kWh and 11.708 lbs CO₂/therm of natural gas (and conservatively assuming fuel oil and propane have the same CO₂ emission rate as natural gas) the annual CO₂ reductions = 1.08 tons CO₂/unit/year.

Assuming 115,000 existing homes sold annually were updated with energy efficiency measures with 10-year payback or less, this policy would yield approximately 1.24 million metric tons of CO₂ by 2020. Additional savings could be accomplished if energy efficiency measures were also required during major renovations. Further reductions would be attained if a prohibition on replacing an existing conventional electric water heater with a new conventional electric or on-demand electric water heater was enacted

- B. Existing Multi-Family Residential Units. There are approximately 277,763 rental buildings encompassing 658,000 housing units in Wisconsin. Small buildings (fewer than 5 units per building) constitute 90% of the buildings and more than 50% of the units are single-family or duplexes (ECW, April, 2005). Improved energy efficiency in rental units is difficult for a number of reasons, but especially due to the “split incentive” situation (i.e. where the owner and who pays the energy bill are different persons).

As a starting point, the study group could focus on identifying how to achieve energy savings no later than 2020 equivalent to installing all 10-year payback options in rental properties statewide. The ECW list of such measures with less than a 10-year payback include refrigerator, boiler, furnace and washer replacement, fuel switch water heater (or a provision similar to the electric water replacement requirement for residence that prohibits a new conventional or on-demand electric water heater replacing an existing electric water heater if the building already uses natural gas, LP gas or oil), reduce temperature water heater, replace water heater, showerheads, water pipe insulation, boiler controls and lighting. The

initial focus should on the 40% of buildings that offer 80% of the savings as noted by ECW. The possible recommendations to achieve these energy savings could also consider expanding the rental Efficiency Standards in Wis. Stat. 101.122, to include rental properties constructed after 1976.

The legislative study should also recommend ways to improve the current Wis. Stat. 101.122(2) the Rental Unit Efficiency Standards statute that requires certain energy efficiency actions at point of sale or transfer (that would cover about 5,000 rental buildings annually).

According to the ECW study, if all technically feasible measures with a 10-year payback were implemented in existing rental properties the energy savings would equal 2,168 million kWh.

These savings would convert to more than 1.9 million metric tons of CO₂ by 2020. Total potential CO₂ reduction by 2020 from Retrofit Codes for existing residences and rental units could approach approximately 3.14 million metric tons of CO₂.

10. Rough Estimate of Costs for Selected Years: The costs resulting from retrofit codes depend on the specific retrofit codes/standards adopted. The following are the potential costs that might be recognized through energy efficiency retrofit requirements for existing single-family and multi-family homes that underlie the recommendation that such legislation be considered and adopted as appropriate. These specific potential retrofit code applications are provided to better understand the potential costs rather than to suggest what types of approaches should or should not be considered by the legislative study committee.

A. Existing Single-Family Residential Units. The cost per unit for all 10-year payback measures is estimated at \$496 and five-year payback measures at \$160. This assumes low prices for electricity (\$0.065/kWh) and natural gas (\$0.60/therm). Using more current energy prices the savings would be even greater and paybacks shorter.

B. Existing Multi-Family Residential Units. The estimated cost to install all 10-year measure paybacks would be about \$748 million. State legislation could be enacted in 2009 to be effective in 2010 (its impact would likely be phased, for example if time of sale was the driver, only a certain # of rental units would be affected any year)

11. Barriers to Implementation: Retrofit codes could involve a large number of transactions that increase the challenge of ensuring effective enforcement (e.g. approximately 115,000 annual sales of single family homes and 5,000 annual sales of multi-family units). In addition, such retrofit codes would impose costs on multi-family unit owners and sellers/buyers of existing homes who may have concerns about the impacts of such costs. Mandatory requirements may not be preferred over more aggressive voluntary retrofit program efforts. Any statute or ordinance would need legislative approval.

12. Other Factors: Realtors, multi-family building owners and other directly affected parties must be engaged in the work of the legislative study committee for the consideration and formulation of potential cost-effective and workable retrofit codes.

13. Related Policies:

- State Appliance Efficiency Standards
- Enhanced Conservation and Energy Efficiency Program
- Residential and Commercial Building Codes
- Enhanced Water Efficiency and Conservation
- Energy Efficient Housing Retrofit and Rehabilitation Program

Residential Retrofit and Rehabilitation Program

1. **Work Group:** Task Force Co-Chairs
2. **Policy Name:** Residential Energy Efficiency Retrofit and Rehabilitation Program (Residential Retrofit and Rehab Program)
3. **Policy Type:** Regulatory, legislative
4. **Affected Sectors, Sub-Sectors and/or entities:** Homeowners, renters and rental properties owners, municipalities, utilities, community organizations, Focus on Energy and construction trades
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** See section 9
6. **Estimated Costs:** See section 10

Funding Sources: Because of the “financing” model nature of the initiative, the primary funding for the effort should come from state or other funds outside of the Focus on Energy program (however the Focus program should coordinate and assist the initiative). A significant portion of the funding is proposed to come from allowance fees or any auction revenues under the Task Force’s Cap and Trade Program recommendation.

7. **Specific Description of the Proposal:** This initiative is targeted at improving the energy efficiency of residential and multi-family buildings, especially in lower-income urban and rural areas through retrofit and rehabilitation activities. The objective is to improve inefficient buildings to enhance existing community housing stock that will save owners and renters money, reduce greenhouse gas (GHG) emissions, mitigate future utility cost increases and infrastructure needs and increase “green job” employment opportunities for skilled and unskilled work for building trades (including the opportunity for a related job development and training program), especially for community residents.

The initiative is designed to overcome the current barriers to increased retrofit and rehabilitation efforts which include split-incentives between renters and rental property owners; limited resources available to owners and renters; limitations on current energy efficiency funds for housing rehabilitation purposes; and lack of access to information. To overcome these barriers, the initiative is based on: (1) providing

property owners and renters (with the landlord’s cooperation) with an audit identifying cost-effective energy efficiency measures; and (2) allowing the cost of installed measures to be paid back over time (i.e. “financed”) out of the savings generated by the energy efficiency savings, preferably on the utility bill. Focusing on community efforts, as well as the “green jobs” potential of this initiative not only magnifies benefits beyond energy savings and GHG reductions, but may also lead to higher participation levels than have been reached by other programs which also aim to achieve increased energy efficiency in existing housing.

8. **Timetables, Duration and Stringency Option:** A prototype for this type of initiative has already been proposed by the Center for Wisconsin Strategy (COWS) in the City of Milwaukee. Current efforts have involved COWS, the City of Milwaukee, We-Energies and Focus on Energy in moving the proposed program to implementation. Thus, this initiative could begin as early as 2009 and expand to others areas as interest is created. The model of the initiative is applicable to many communities in Wisconsin and therefore over time would be expected to expand and generate energy savings, GHG reduction and other benefits. Because the energy savings and GHG emissions from this initiative are subject to Measurement & Verification, the stringency of the GHG reduction attained would be high.
9. **Explanation of the Estimate of GHG Reductions:** The expected reductions from the broad implementation of this initiative are yet to be determined. However, the proposed Milwaukee initiative (discussed in section 8) for an electric and natural gas residential building retrofit and rehabilitation targeted to all rental units and owner-occupied homes built prior to 1960 is estimated to yield annual electric savings of 388,488,360 kWhs and annual natural gas savings of 16,649,500 therms (assuming a 50% participation rate). This would represent approximately 25% of residential electric sales in Milwaukee and 9% of residential natural gas sales. The estimated cost for this initiative is approximately \$162,000,000. The estimates of residential savings opportunities is based on surveys performed by the Energy Center of Wisconsin and set forth in two reports: *Energy and Rental Housing in Wisconsin: A Wisconsin*

Characterization Study (2005) and Energy Efficiency and Housing in Wisconsin: A Study of Owner-Occupied Single Family Homes (2000).

These studies also indicate that lower-income properties built prior to recent improvements in building codes provide a potentially deep source of additional cost-effective energy savings for Wisconsin (and corresponding GHG reductions).

10. Approximation of Costs for Selected Years:

Because total costs are dependent on the extent to which the initiative is broadly implemented across Wisconsin communities, the costs for selected years are yet to be determined. Estimated costs (in relation to expected energy savings) for the proposed Milwaukee initiative are identified in section 9. Also, it should be noted that the use of a “financing” model in which customers pay back the cost of installed measures out of savings would be less costly than the traditional model of only relying on customer incentives, thereby lowering the overall cost to attain energy savings and corresponding GHG reductions.

11. Barriers to Implementation: There are three primary barriers to successful implementation of the initiative: (1) an adequate funding source to allow installed measures to be “financed” (i.e. paid back over time using the savings from the installed measures); (2) the ability to allow payment by customers to be made on the utility bill, including the potential for such repayment obligation to be conveyed to a subsequent owner/renter (it appears this would require new legislative authority to allow such a model); and (3) the lack of increased customer participation expected from the innovative design of the initiative compared to prior efforts in residential retrofit efforts. This initiative will require the effective cooperation of a number of partners as noted in section 4.

12. Other Factors: While the initiative is focused on increasing cost-effective energy savings and corresponding GHG reductions, it also has as its objective increasing other important public benefits. These include increasing “green job” opportunities plus the opportunity for increased job development and training; revitalization of lower income communities and enhancing the quality of the existing housing stock in Wisconsin communities.

13. Related Policies

- Enhanced Conservation and Energy Efficiency Program
- Enhanced Water Efficiency and Conservation
- Non-Regulated Fuels Efficiency and Conservation
- Cap and Trade Program

Geologic Carbon Sequestration Study

1. **Work Group:** Electric Generation and Supply
2. **Policy Name:** Wisconsin Geologic Carbon Sequestration Study – included in the Interim Report
3. **Policy Type:** Create a Commission to work collaboratively with Midwest partners to study and recommend possible opportunities for geologic sequestration of CO₂ from Wisconsin's utility sector. Continuation of this work, through annual revision, is recommended to keep current with advancements in technology and adaptations for Wisconsin greenhouse gas (GHG) reduction policies.
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric utility
Sub-Sector: Distribution utilities
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy and does not directly result in any GHG emission reductions.
6. **Estimated Costs:** There should be limited governmental administrative costs associated with this program. These costs would mostly involve the state's involvement in the proposed Commission.

Funding Sources: The study is to be completed within the PSC operating budget

7. **Specific Description of Policy Proposal:** Carbon sequestration, also referred to as carbon capture and storage (CCS), is a strategy for reducing GHG emissions from baseload electric generation. The PSC and DNR should form a Commission to evaluate the technical and economic potential, and infrastructure requirements, for CCS deployment in Wisconsin. In addition to the DNR and PSC, representatives from the University System, independent power producers, environmental groups, industrial groups, and others should be included on the Commission.

Background

The absence of promising geological formations for storage in Wisconsin will likely result in the need to either transport CO₂ by a pipeline system that does not currently exist, or transport low or non-carbon gaseous fuels (e.g. synthetic natural gas or hydrogen) in the current natural gas or future hydrogen pipelines. As with the electric transmission grid, planning the future gas pipeline

infrastructure in the state is not well suited to any individual utility or industry in Wisconsin.

The timeline for deploying CCS to lower GHG emissions from Wisconsin's electric generation sector is strongly dependent on the pace of carbon storage implementation in adjacent states. The carbon storage opportunities closest to Wisconsin's major baseload power plants are the oil and gas fields, coal seams, and deep saline aquifers found in relatively uniform layers across a wide area of Illinois, Indiana, and Kentucky in the geological feature known as the Illinois Basin.

The implementation timeline for CCS is also dependent on the technology used. For Wisconsin we assume that the construction of a new IGCC plant with CCS, or the retrofit of an existing plant with CCS, is not likely for at least 10 years. In Illinois, CCS from a coal or petroleum coke plant producing synthetic natural gas, and selling CO₂ for enhanced oil recovery, may be possible in 2 or 3 years.

8. **Timetables, Duration and Stringency Option:** The CCS Commission should convene by July 1, 2008 and should issue its initial findings and recommendations by December 31, 2008. The report will be reviewed and updated annually.

As discussed in section 7, deployment of CCS in Wisconsin is assumed to be at least 10 years away. However, as CCS technology becomes more available, Wisconsin needs to achieve rapid deployment.

9. **Explanation of Rough Estimate of GHG Reductions:** This policy, standing alone, would not result in any direct GHG emission reductions. However, if CCS is found technically and economically feasible, the findings and recommendations of the Commission would inform those responsible for assisting in the development of this technology for Wisconsin and would provide a foundation for planning the infrastructure necessary for CCS.

The magnitude of GHG reductions from this technology depends on the type of capture (e.g. pre-combustion or post-combustion) and the type of fuel. In some cases, CCS implemented at a facility burning or co-firing biomass can have an even larger reduction impact on GHG emissions.

10. **Rough Estimate of Costs for Selected Years:** As

identified in section 6 there would be relatively limited governmental administrative costs with this policy. If the timeline suggested here is followed, most of these costs should conclude by January 2009. Some costs may be required beyond this time for annual updates.

- 11. Barriers to Implementation:** There should not be barriers to convening the CCS Commission. There may be legal and other barriers to any recommended actions issued by the Commission.
- 12. Other Factors:** The work group discussed the potential of CCS and concluded that the future feasibility and cost of this technology was no more certain than other large-scale GHG reduction options, such as nuclear. The goals for GHG reduction need to be established in a state-wide PSC planning forum where the uncertainties in technology availability can be evaluated (see the Amended Strategic Energy Assessment template). The safety and environmental risks of either CO₂ pipelines, or geologic storage sites for captured CO₂, would also need to be addressed to gain public acceptance of this option. The U.S. Department of Energy and numerous foreign countries are sponsoring research in this area. Three large-scale (greater than one million metric tons of CO₂ per year) projects are currently using geologic storage, but the scale of CCS necessary to have a significant impact on regional GHG emissions is much greater.

- 13. Related Policies:** None

Wind Siting Reform

1. **Work Group:** Electric Generation and Supply
2. **Policy Name:** Wind Siting Reform – included in the Interim Report
3. **Policy Type:** Legislation that reforms the siting process for wind projects less than 100MW to make it comparable to the process for projects 100 MW and greater.
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric utility
Sub-Sector: Distribution utilities, the PSC, counties, municipalities, towns, and the wind energy industry
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This policy would not directly reduce greenhouse gas (GHG) emissions. Wind Siting Reform is an enabling policy to an Enhanced Renewable Portfolio Standard (RPS), and would contribute to the overall reduction of GHG emissions in the RPS.
6. **Estimated Costs:** Implementation of this option would result in increased costs resulting from greater workload at the PSC, but reduced costs for wind power producers and consumers.

Funding Sources: Rule development would be completed within the PSC operating budget
7. **Specific Description of Policy Proposal:** This policy recommendation includes the following elements: (1) definitions of large and small wind energy turbines; (2) a requirement for the PSC to draft uniform standards for siting large and small wind energy turbines; (3) creation of an optional process for PSC review of projects less than 100 MW; (4) a mechanism for allowing parties to appeal a decision rendered by a local jurisdiction to the PSC; (5) extending Chapter 227 judicial review provisions to wind projects permitted by local jurisdiction; and (6) a prohibition on local ordinances restricting meteorological test towers. The new standards adopted by the PSC for wind projects less than 100 MW would not require an alternative site as part of the permit application.
8. **Timetables, Duration and Stringency Option:** This proposal calls for the enactment of legislation, the process for which would include opportunities for public input by local groups and others. If the legislation is enacted, the PSC would have a

specified period of time to adopt rules establishing uniform standards for permitting wind projects. Local groups and others will be able to raise concerns and suggestions regarding the rules during this process. These regulatory standards would apply to PSC-reviewed wind projects as well as those reviewed by local jurisdictions. These rules would remain in effect indefinitely. Regardless of whether wind siting decisions are made by local jurisdictions or by the PSC, local groups and others would continue to be able to provide input relevant to such decision making.

9. **Explanation of Rough Estimate of GHG Reductions:** Today, at least 400 MW of wind projects currently under development are subject to local restrictions that prevent them from going forward. 440 MW of wind power operating at a capacity factor of 29% should produce approximately one million MWh annually, which in turn should reduce annual emissions by approximately 925,000 metric tons of CO₂e. Continued contributions from these smaller wind resources could reduce 1.4 million metric tons of CO₂e annually by 2020 and 1.85 million metric tons of CO₂e annually by 2025. (See Enhanced RPS template for full potential of renewable resources)
10. **Rough Estimate of Costs for Selected Years:** Costs would be borne in the near term.
11. **Barriers to Implementation:** This policy recommendation could generate opposition from specific municipalities.
12. **Other Factors:** The Wind Siting Reform recommendation was considered by the work group as an enabling policy necessary to meet the supply requirements of an Enhanced RPS with the economic benefits of in-state wind generation.
13. **Related Policies:**
 - Enhanced Renewable Portfolio Standard (RPS)

Great Lakes Wind Study

1. **Work Group:** Electric Generation and Supply
2. **Policy Name:** Great Lakes Wind Study – included in the Interim Report
3. **Policy Type:** Commission a study group to assess the technical and economic potential for wind generation in the Great Lakes, with cooperation of the other Great Lakes states.
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric utility
Sub-Sector: Distribution utilities
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy and does not directly result in any greenhouse gas (GHG) emission reductions.
6. **Estimated Costs:** There should be limited governmental administrative costs associated with this program. These costs would result mostly from the state's involvement in the proposed study group.

Funding Sources: The study is to be completed within the PSC operating budget.
7. **Specific Description of Policy Proposal:** The PSC, DNR, and the Board of Commissioners of Public Lands should be requested to form a study group to evaluate the technical and economic potential for wind generation in Lake Michigan and Lake Superior. Among other issues, this group should evaluate costs of development of wind facilities in the lakes, public trust issues related to wind development in the lake bed, avian impact issues, potential riparian owner concerns, and effective regulatory approaches to addressing siting issues. The study group should also evaluate whether Wisconsin should explore a partnership with Michigan regarding the development of off-shore wind facilities in Lake Michigan.
8. **Timetables, Duration and Stringency Option:** The study group should convene by July 1, 2008 and should issue its findings and recommendations by December 31, 2008.
9. **Explanation of Rough Estimate of GHG Reductions:** This policy, standing alone, would not result in any GHG emission reductions. However, if off-shore wind development is found technically and economically feasible, the findings and recommendations of the study group may assist in the development of off-shore wind projects, which would help the state meet its present, and potentially its Enhanced, Renewable Portfolio Standard requirements.
10. **Rough Estimate of Costs for Selected Years:** As identified in section 6 there would be relatively limited governmental administrative costs with this policy. If the timeline suggested here is followed, these costs should conclude by January 2009.
11. **Barriers to Implementation:** There should not be barriers to convening the off-shore wind study group. There may be legal and other barriers to any recommended actions issued by the study group.
12. **Other Factors:** None
13. **Related Policies:**
 - Enhanced Renewable Portfolio Standard (RPS)

The study group should likely have representatives from the DNR, PSC and the Board of Commissioners of Public Lands. In addition, utility, independent power producer, environmental, commercial fishing, commercial shipping, riparian, and other representatives should be included.

Amended Strategic Energy Assessment

1. **Work Group:** Task Force Co-Chairs
2. **Policy Name:** PSC Amended Strategic Energy Assessment (Amended SEA)
3. **Policy Type:** PSC proceeding and report
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric Utilities
Sub-Sector: Generation
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy to address the implementation of specific greenhouse gas (GHG) reduction efforts for the electric generation sector and would not directly result in any emission reductions.
6. **Estimated Costs:** To be determined, with the expectation of minimal administrative costs.

Funding Sources: PSC and utilities will cover costs from their operating budgets.

7. **Specific Description of Policy Proposal:** The current Strategic Energy Assessment (SEA) should be reopened, with all utilities subject to the SEA required by October 15, 2008 to prepare, document and file comprehensive GHG emissions inventories for their systems, using recognized standards on a consistent basis (such as the internationally recognized GHG Protocol), as determined by the PSC. These filings should include reasonable estimates of emissions associated with imported power. They should present this information in detail in a format accessible to others for expert review and analysis and also in a summary format easily understood by the public. In conjunction with these filings, each utility should:
 - Identify the actions currently being taken or planned to be taken during the next three years (including, but not limited to, conservation and efficiency measures in its service area and renewable resource deployment), that will reduce its GHG emissions, showing estimated reductions, costs and other relevant information; and,
 - Identify other actions that are not included in its current actions or plans that could be taken by it during this period to further reduce its

GHG emissions, such as dispatch modifications and early unit retirements, and identify the potential emissions reductions available, the associated costs and any other relevant information.

Upon review of all this information after public input and examination of leakage issues, each utility would be asked by the PSC to set voluntary, near-term (prior to implementation of a Cap and Trade Program) GHG emission reduction goals for its systems, including in its internal operations, just as many other major businesses are doing, and to report regularly on progress. Future rate filings should identify any reduction measures included in the cost-of-service and recovery of reasonable and prudently incurred costs to meet goals consistent with the PSC's Assessment should be permitted.

8. **Timetables, Duration and Stringency Option:** This policy calls for the development of voluntary GHG reduction plans and should not be considered stringent. The timetable for this policy is ambitious and is based on statutory requirements. PSC was required to complete a draft of the SEA by July 1, 2008. PSC must hold a non-contested case public hearing no later than 90 days after issuing the draft, and must complete the final SEA within 90 days after the hearing. This means the SEA must be completed by the end of 2008. This policy requires utilities to submit information by October 15, 2008, leaving PSC with approximately 2 months to incorporate the supplemental information into the SEA. Although this policy proposal is focused on the current SEA, PSC may routinely require similar information as part of each future SEA.
9. **Explanation of Rough Estimate of GHG Reductions:** This policy will not directly result in GHG reductions but it will lead to the development of voluntary near-term reduction goals for each utility. The amount of reductions that might be included in those plans cannot be predicted.
10. **Rough Estimate of Costs for Selected Years:** A detailed analysis of the costs associated with this policy has not been completed. Again it is important to note that this policy does not directly require capital expenditures for GHG reductions, but such expenditures may be necessary as part of the voluntary plans developed by each utility.

11. Barriers to Implementation: PSC has broad statutory and regulatory authority to request information from utilities for the SEA. However, PSC is under a statutory schedule for completing the SEA and adhering to that schedule will be more difficult as a result of this policy. Utilities will be on a tight schedule to compile the necessary information described in this policy and PSC will be on a very tight schedule to analyze that information and include it in the final SEA.

12. Other Factors: One alternative a utility may wish to pursue may be to join the Chicago Climate Exchange and make voluntary commitments through that vehicle, provided that the SEA process and reporting requirements discussed above are fulfilled. In addition, utilities should be encouraged to join the Climate Registry.

13. Related Policies:

- Enhanced Conservation and Energy Efficiency Program
- Improved Rate Designs
- Aligning Interests
- Demand Response, Load Management
- Incentives for Voluntary Programs
- Enhanced Renewable Portfolio Standard

Enhanced Renewable Portfolio Standard (RPS)

1. **Work Group:** Task Force Co-Chairs
2. **Policy Name:** Enhanced Renewable Portfolio Standard (RPS)
3. **Policy Type:** Legislation amending existing RPS
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric
Sub-Sector: Distribution utilities and retail electric cooperatives
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** To be determined. The Electric Generation and Supply work group estimated that a similar policy proposed by their work group could reduce GHG emissions by 11.6 MMT in 2020 and 19.5 MMT in 2025, compared to business-as-usual.
6. **Estimated Costs:** To be determined. The Electric Generation and Supply work group estimated that the annual costs associated with a similar policy proposed by their work group could range between \$612 million and \$1,109 million above business-as-usual costs in 2025 (based on 2007 dollars). In terms of costs, there may be significant differences between that policy proposal and this one.

Funding Sources: Electric rates paid by utility customers and cooperative members

7. **Specific Description of Policy Proposal:**
Wisconsin's existing RPS law (§ 196.378, Wis. Stats.) requires electric providers (electric utilities and retail electric cooperatives) to increase their use of renewables to generate electricity. The overall effect of the law is to require 10% of Wisconsin's total electric energy consumption in 2015 (and thereafter) to originate from specific "renewable resources" as defined in the law.

Requirements vary for each electric provider depending on their average renewable energy percentage in the years 2001-2003. Individual electric providers can meet their RPS requirement by generating electricity from renewable resources or by purchasing renewable resource credits from another provider. Compliance deadline extensions (a.k.a. "off ramps") can be granted by the PSC if despite reasonable efforts to comply, there will be undesirable impacts on reliability, unreasonable increases in rates, or delays as a result of receiving

required siting or permitting approvals or transmission constraints.

This policy would modify the existing RPS through legislation as follows:

A. New Minimum Standards

- The current 2015 RPS should be amended to move the 10% requirement forward from 2015 to 2013 in order to accelerate early reductions of emissions through renewable energy substitution. The post-2013 standards will be 20% by 2020 and 25% by 2025.
- To meet the post-2013 standards a minimum amount of each electric provider's renewable energy should be required to come from Wisconsin-based renewable energy resources, including any Great Lakes wind and renewable energy credits from Wisconsin sources. This requirement should increase reliability and decrease the need for expensive, difficult to site new transmission, as well as stimulate growth of jobs in Wisconsin. The Wisconsin source RPS minimum by 2020 would be 6% and 10% by 2025. Conversely, the maximum amount of renewable energy from out-of-state used to meet the RPS would be 14% for the 2020 standard and 15% for 2025 standard. These requirements are minimums that are likely to be exceeded if Wisconsin-based sources are the most economic alternatives. Whether this will be the case is impossible to predict. It will depend, among other factors, on whether Great Lakes wind is feasible at a reasonable cost, cost-effective development of the state's bio-energy and solar potential, the construction of major transmission improvements to the west and the cost responsibility for such facilities assigned to Wisconsin.

B. Changes to the Definition of "Renewable"

- The definitions of renewable energy and renewable resources in the existing RPS law would be expanded to include the thermal portion of Wisconsin co-generation projects

fired with biomass (in addition to the electric portion of such projects which is covered by the current definition), as well as biogas produced in Wisconsin that is put in the gas pipeline system, solar water heating and other verifiable renewable applications in an electric provider's service area that displace fossil fuel use by the electric provider. The revised definition of renewable resources would also remove the existing 60 MW size restriction on new hydroelectric facilities, but only for the purposes of meeting the non-Wisconsin portion of the standards after 2013. This change would permit purchases of hydroelectric power from any large project, including new Manitoba projects, to qualify post-2013. This recommendation does not constitute endorsement of any new hydroelectric projects planned by Manitoba Hydro. The First Nations and others have strongly voiced concerns about the impacts of the existing hydro system on the First Nations and the environment, including concerns about the licensing status of the existing projects. The Task Force recognizes that the construction of proposed new plants by Manitoba is likely to be controversial and involve complex issues. These issues, as well as the licensing of any new plants, and any conditions imposed in any new licenses or on existing projects must be resolved under Canadian law, treaties with the First Nations and any agreements reached by affected parties. This recommendation is based on the premise that the concerns of the First Nations related to the existing hydro system and any new proposed projects, including issuance of final licenses, will be resolved before new projects are built, as Manitoba Hydro has indicated. The Task Force cannot predict whether new plants will be built or, if so, when or under what conditions, or whether the related transmission necessary for export of energy to the U.S. will be built. This recommendation simply recognizes that: (1) hydroelectric generation is a renewable resource regardless of size; (2) the output of any new plants built by Manitoba that is exported to the U.S. and displaces fossil fuel generation will reduce GHG emissions; and

(3) the Manitoba Hydro system can provide significant storage benefits that will enhance the value of U.S. wind power, provide renewable resource diversity and enable more efficient use of major new transmission built to access wind resources to the west of Wisconsin.

- To incent the conversion of existing Wisconsin industrial coal-fired boilers and other customer-owned coal-fired boilers to biomass prior to implementation of a Cap and Trade Program, electric providers should be permitted to purchase renewable energy credits for such conversions. In the alternative, where an industry wishes to deploy its capital elsewhere, by contract with the affected industry, an electric provider may install and own a replacement boiler, supply process steam and heat to the industry on a contract basis and utilize the equivalency credits directly.

C. Changes to the Treatment of Renewable Resource Credits

- To meet the revised standards in this Proposal and incent early action on a cost-effective basis, renewable resource credits (a.k.a. renewable energy credits or RECs) available for compliance should not expire after four years, but have an unlimited carry-forward life. A Wisconsin source requirement, coupled with credit carry-forwards, will stimulate quicker development of the state's renewable resource potential and provide related business and job benefits, enhance electric system reliability and reduce transmission costs and transmission losses.
- There should be no limit on the use of renewable energy credits to meet the revised standards in this Proposal, so long as the underlying resource for the REC qualifies as a "renewable resource" under Wisconsin law, and only Wisconsin sources may be used to meet the Wisconsin minimum source requirements. Use of the Midwest Renewable Energy Tracking System (M-RETS) credits would be available for the remainder of the

requirements regardless of source location. In addition, to mitigate rate impacts, the PSC should have the authority, but not the obligation, to allow the use of credits from other programs that are comparable in terms of stringency and verification to (M-RETS).

D. Other Changes

- To enable electric providers to meet the new, more aggressive RPS recommended in this Proposal in a timely manner and to avoid the need for compliance deadline extensions, the revised RPS should: (1) stream-line the regulatory approval (for all affected agencies) and siting process for renewable projects; (2) encourage proposals that encompass multiple projects, with multi-project, integrative plans for acquisition of sites, equipment and contractors; (3) allow for PSC approval of multi-year commitments for acquisition of necessary equipment in a timely manner, with appropriate recovery of development costs; (4) provide additional resources for the PSC to process applications; (5) encourage larger electric providers to partner on projects with smaller electric providers; and (6) remove existing siting and equipment transportation barriers.

All other provisions of the existing RPS law would apply to the revised portfolio standards in this Proposal, including the existing “off ramp” provisions for compliance deadline extensions. In the event that a compliance deadline is extended with respect to the in-state RPS minimum, the remedy may be to waive the in-state source requirement, while maintaining the integrity of

the overall RPS.

8. Timetables, Duration and Stringency

Option: The timetable is implicit in this policy recommendation. Duration is until changed by law. This policy should be regarded as stringent as a result of PSC enforcement authority identical to the enforcement provisions of the existing RPS (2005 Act 141).

9. Explanation of Rough Estimate of GHG

Reductions: A detailed analysis of the emission reductions associated with this policy has not been completed. Preliminary estimates can be made based on calculations done by the Electric Generation and Supply work group in association with a similar proposal for an Enhanced RPS policy, which called for the same targets in 2020 and 2025 but was different in other details. The amount of energy needed to meet the 2020 and 2025 targets will depend on total demand for electricity. Two scenarios were considered by the work group, based on business-as-usual (2% growth per year) and the proposed Enhanced Conservation and Energy Efficiency policy (0.5% growth per year). The work group concluded that meeting the RPS targets in their proposed policy under these two scenarios would require the following amounts of MWh from renewable energy resources (in excess of 2003 renewable generation):

10. **Rough Estimate of Costs for Selected Years:** A detailed analysis of the costs associated with this policy has not been completed. Preliminary estimates can be made based on calculations done by the Electric Generation and Supply work group in association with a similar proposal for an Enhanced RPS policy, which called for the same targets in 2020 and 2025. However, it is important to note that the work group’s policy

The work group estimated the following associated impact in terms of CO₂ reductions:

Enhanced RPS MWh Output (in Million MWh, in excess of 2003 renewable generation)		
	Business-as-usual (2%/yr Growth)	Enhanced Conservation and Energy Efficiency (0.5%/yr Growth)
2020	13.8	11.5
2025	23.3	18.1

CO ₂ Reductions In Million Metric Tons (MMt)		
	Business-as-usual (2%/yr growth)	Enhanced Conservation and Energy Efficiency (0.5%/yr growth)
2020	11.6	9.7
2025	19.5	15.2

proposal did not allow for new large hydropower projects and did not include minimum in-state renewable generation targets. The differences between the two proposals may have a significant impact on costs and further analysis may be necessary to understand those impacts.

Incremental administrative costs of the Enhanced RPS are estimated to be negligible because the PSC already has in place the infrastructure for regulating this requirement. The other costs are potential impacts on electric rates. These impacts will depend on demand growth, as well as the projected costs of power and energy from the mix of renewable resources employed to meet the requirement compared with the estimated cost of coal- and gas-fired generation that is displaced, including carbon adders. The Electric Generation and Supply work group estimated the following increases in annual electric costs based on their proposal for an Enhanced RPS and a range of assumptions about demand and cost variables:

Increases in Annual Electric Cost - Business-as-usual (2%/yr Growth)		
2025 (RPS = 25%), (in millions 2007 \$)		
	Replaces Energy & Capacity	Replaces Energy Only
Wind Capital Cost = \$1,650/kW	612	742
Wind Capital Cost = \$2,215/kW	979	1,109

Increases in Annual Electric Cost - Enhanced Conservation and Energy Efficiency (0.5%/yr Growth)		
2025 (RPS = 25%), (in millions 2007 \$)		
	Replaces Energy & Capacity	Replaces Energy Only
Wind Capital Cost = \$1,650/kW	388	489
Wind Capital Cost = \$2,215/kW	688	790

These estimates are based on the projected costs for wind projects developed in Wisconsin and the West (Wisconsin projects are assumed to have the lowest current costs). The following amounts of Wisconsin and West wind projects (based on nameplate capacity) are included in the cost estimate:

Wind Nameplate MW Capacity For 25% RPS in 2025		
	Business-as-usual (2%/yr growth)	Enhanced Conservation and Energy Efficiency (0.5%/yr growth)
Wisconsin	7,500 (assumed maximum for Wisconsin)	6,891
West	1,020	0

Other resources, including biomass and solar, may be used by electric providers to meet the Enhanced RPS, but insufficient data were available to estimate the costs of these other technologies in Wisconsin.

11. Barriers to Implementation: The major barrier to implementation of this policy is the need for legislation to amend 2005 Act 141. Opposition may come from electric customers who believe that this requirement will materially increase their electricity costs. The new requirements for Wisconsin-based renewables could potentially face legal challenges based on the Interstate Commerce Clause of the U.S. Constitution. Questions have been raised in other states that already have in-state RPS requirements, but to date none of those state laws have been challenged in court on that basis. The drafters of the Enhanced RPS legislation should carefully examine the Interstate Commerce Clause issue and draft the in-state requirement to minimize the risk of a successful Interstate Commerce Clause challenge.

12. Other Factors: The targets of the proposed Enhanced RPS are consistent with the targets of the Midwestern Governors Association Energy Security and Climate Stewardship Platform adopted in November, 2007, although the Platform also endorses a 30% by 2030 target not included in this proposal. Also, for the purposes

of the MGA targets, the definition of renewable is somewhat more limited.

Meeting the Enhanced RPS under business-as-usual growth in electric demand will entail greater difficulty than future scenarios that include reduced electric demand through energy conservation and efficiency programs and other factors.

Enabling policies for the Enhanced RPS include Wind Siting Reform, Great Lakes Wind Study, Advanced Renewable Tariff Development and Electric Transmission and Distribution Improvements.

13. Related Policies:

- Enhanced Conservation and Energy Efficiency Program
- Incentives for Co-Generation/Combined Heat and Power (CHP)
- Electric Transmission and Distribution Improvements
- Advanced Renewable Tariff Development
- Wind Siting Reform
- Great Lakes Wind Study

Transmission Improvements

1. **Work Group:** Electric Generation and Supply
2. **Policy Name:** Electric Streamline Transmission and Distribution Improvements (Transmission Improvements)
3. **Policy Type:** If not already being accomplished by the Midwestern Governors Association Energy Security and Climate Stewardship platform efforts and/or the Midwest Independent Transmission System Operator (MISO) study efforts, then the PSC should initiate a study group and/or open a PSC docket to evaluate changes to the state-wide and regional electric transmission system that would facilitate increased electric generation by renewable and/or low-carbon resources. The study group and/or PSC docket would also direct the evaluation and/or participation of Wisconsin in negotiations with other states, MISO and Federal Energy Regulatory Commission (FERC) regarding regional transmission system expansion and cost allocation.
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric utility
Sub-sectors: Transmission Utilities, Distribution Utilities, MISO, FERC
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This policy would not directly reduce greenhouse gas (GHG) emissions. It is an enabling policy to allow the greater expansion of renewable and lower-carbon generating options.
6. **Estimated Costs:** There would be limited governmental administrative costs associated with this program. These costs would mostly involve the state's involvement in a proceeding to develop and implement improvements in transmission support for low-carbon resources.

Funding Sources: Costs would be met within the PSC operating budget
7. **Specific Description of Policy Proposal:** Based on generation costs alone, renewable and/or low carbon projects (including wind projects) developed in Minnesota, Iowa, and the Dakotas are estimated to be cheaper than similar projects developed in Wisconsin due to higher capacity factors. However, when actually considering the importation of electricity to Wisconsin from projects in these states, the lower generation costs could be more than offset by higher

transmission costs. Additional analysis, however, is required to actually determine the amount of transmission that would need to be built to adequately lower transmission costs for importation of electricity from projects in these states, the costs of building this transmission and Wisconsin's share of the costs. Wisconsin's share of the additional transmission costs could range from as little as 15% to 80 - 100%, depending on the policies adopted at FERC and the amount of benefit Wisconsin would receive from the interconnections.

Changes in generation-transmission interconnection processes are needed at the regional level to enable the connection of large amounts of wind generation. The currently defined tariffs of MISO for interconnecting generation are designed in such a way that the first wind generator to create a need for additional transmission must pay for the entire project, with subsequent wind generators being free riders. This discourages the initial connection of wind generation. There is an effort underway at MISO to discuss revising the process. Wisconsin should be an active participant in that effort if out-of-state wind generation is to be available to meet native load.

There are also efforts underway to evaluate the potential impacts of connecting a large amount of variable (i.e. wind generation) resources onto the transmission grid. Studies from Minnesota presented to the work group indicate that although the issues are significant, large amounts of variable energy can be accommodated by the electric generation and transmission system in that state. There are no comparable studies of the transmission system in Wisconsin.

8. **Timetables, Duration and Stringency Option:** The PSC should determine the scope of work needed to implement this policy within one month after the task force report is accepted by the governor and implement as soon as possible after this date.
9. **Explanation of Rough Estimate of GHG Reductions:** This policy directive is necessary to evaluate the transmission changes necessary to meet an Enhanced Renewable Portfolio Standard and to enable low-carbon and distributed generation to displace higher carbon generation sources.

10. Rough Estimate of Costs for Selected Years: The minimal administrative costs identified in section 6 will be limited to the completion of this study.

11. Barriers to Implementation: Other than associated administrative costs, there are no significant barriers to forming this study group and/or opening this PSC docket.

12. Other Factors:

- There are generating facilities in Wisconsin with GHG emission rates much lower than conventional baseload coal plants, (i.e. natural gas combined-cycle plants) that have transmission constraints which prevent them from displacing additional high-carbon emitting generators.
- Additional policy options recommended by this and other work groups, such as Advanced Renewable Tariffs and Co-Generation incentives, may have different transmission implications depending on where in the state they are developed.
- The magnitude of the GHG reductions being discussed by the Task Force will require changes in the electric generation system in Wisconsin that are greater than the planning capacity of any single utility.

13. Related Policies:

- Enhanced Renewable Portfolio Standard (RPS)

Tax Incentives for Renewables

- 1. Work Group:** Electric Generation and Supply
- 2. Policy Name:** Tax Incentives for Renewable Energy Development (Tax Incentives for Renewables)
- 3. Policy Type:** Redesign of, or additional renewable electrical energy program, to allow customers to make tax deductible contributions for renewable energy development
- 4. Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric utility, participating non-profits
Sub-Sector: Distribution utilities
- 5. Estimated Greenhouse Gas Emissions Reduction Impact:** Under this proposal, additional utility customers would select renewable energy rate options due to favorable federal, as well as state, tax treatment, resulting in an increase in the amount of renewable energy generated in the state.¹ For every additional MWh of energy that is purchased by the utility from renewable energy providers, an estimated 1,850 pounds of CO₂ emissions are avoided.
- 6. Estimated Costs:** The overall annual cost to develop and implement this policy would be limited to administrative time of the non-profit organization(s) that would be responsible for structuring the funding mechanisms for the relevant projects. If today's utility programs that already exist for customers continue to be offered, there would be no incremental administration costs to utilities. However, should existing utility programs continue, and this policy be implemented as an *additional* customer program, then there would be some additional utility administrative costs in support of this new program opportunity.

Funding Sources: Administrative costs of the non-profit organization(s) would be funded through revenues collected from customers and renewable resource suppliers. Any loss of state tax revenues would have to be absorbed within the state budget.

1. This policy template provides incentives for the use and development of renewable electrical energy. After the policy in this template is implemented, the state should likely evaluate whether a similar program for biogas and potentially other sources of non-electrical renewable energy would encourage their development and use.

- 7. Specific Description of Policy Proposal:** Develop a new customer program option administered by a non-profit organization(s) (existing or new) to allow customers to make potentially tax deductible donations to fund an increase in their utility's renewable energy or to fund directly additional renewable resource projects in the state. Utilities would provide customers *information* regarding this program through their bills and other communications to customers, but the contributions by the customer would be made to the non-profit organization(s).

This program would create incentives for customers to support the development and use of additional renewable energy by making the amounts that they contribute tax deductible, to the extent allowed by law. A model for this program already exists: Wisconsin Public Service Corporation's SolarWise program. SolarWise provides funding for the installation of solar panels on schools with monies collected by a non-profit 501(c)(3) foundation that the company established for this purpose. Renewable energy that results from the implementation of this policy would not count toward Renewable Portfolio Standard requirements of utilities.

- 8. Timetables, Duration and Stringency Option:** This policy could be implemented as soon as a non-profit organization can be established to administer the statewide program or separate non-profit organizations can be established for each utility. Existing utility programs could be modified to work through this organization(s).
- 9. Explanation of Rough Estimate of GHG Reductions:** The incremental renewable energy supply resulting from this policy would reduce 1,850 pounds of CO₂ for every MWh contracted under this program.
- 10. Rough Estimate of Costs for Selected Years:** There would be additional administrative costs for this program associated with the staffing and functioning of the non-profit organization(s). These added costs could be collected from the participating utility customers and renewable energy suppliers. Efficiencies could be gained in the collection and distribution of funds to renewable energy providers by establishing a single statewide organization for this purpose, rather than using utility specific program alternatives and multiple non-profit organizations.

- 11. Barriers to Implementation:** Some change in state revenue planning would need to occur to acknowledge the changes in state and federal tax collections.
- 12. Other Factors:** The option of continuing to have local customer programs like SolarWise should be considered. Also, utilities should have the option to either participate through a state program or to participate through their own program.
- 13. Related Policies:** None

Renewable Tariffs

1. **Work Group:** Electric Generation and Supply
2. **Policy Name:** Advanced Renewable Tariff Development (Renewable Tariffs)
3. **Policy Type:** PSC proceeding and possible authorizing legislation
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric utility
Sub-Sector: Distribution utilities
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** The development of Advanced Renewable Tariffs is an enabling policy to an Enhanced Renewable Portfolio Standard (RPS) and so it does not directly lead to any greenhouse gas (GHG) emission reductions. It would contribute to the achievement of overall reductions of GHG emissions in the RPS. It is expected that this policy would expand the development of smaller scale projects and that these projects would be brought to market more quickly with this policy.
6. **Estimated Costs:** The overall annual cost to develop this policy would be limited to administrative time of the PSC and utilities to establish an implementation approach and cost recovery treatment for the tariff.

Funding Sources: Establishment of these tariffs would be completed within the PSC operating budget
7. **Specific Description of Policy Proposal:** The Advanced Renewable Tariff policy should encompass the following principles:
 - A. Tariffs should be set according to specific production costs of a particular generation technology
 - B. The tariffs should include a rate of return comparable to the utilities' allowed return
 - C. The tariffs should be fixed over a period of time that allows for full recovery of capital costs
 - D. Renewable energy credits acquired through these tariffs can be rate-based or sold through a utility's voluntary renewable energy program
 - E. When the fixed term of the tariff ends (capital costs of project have been recovered), the energy from these systems can be acquired through the utility's parallel generation tariff or through a negotiated purchased power agreement.
8. **Timetables, Duration and Stringency Option:** This policy should be developed and implemented by 2009. If the PSC believes it has the authority to establish advanced renewable energy tariffs without legislation, it could convene a proceeding at any time to determine the production costs of various distributed renewable resources such as solar, wind, small hydro, landfill gas, biogas, and other biomass sources.
9. **Explanation of Rough Estimate of GHG Reductions:** The development of Advanced Renewable Tariffs is an enabling policy to an enhanced RPS. If the Enhanced RPS is not adopted, this policy should be done so that smaller scale renewable projects are encouraged in Wisconsin. As a stand-alone policy, if utilities supplied 2% of their sales with distributed renewable resources by 2020 (above current requirements), and 3% by 2025, this would result in reductions of 1.5 million metric tons/yr of CO₂e by 2020, and 2.25 million metric tons/yr of CO₂e by 2025.
10. **Rough Estimate of Costs for Selected Years:** The cost to develop this tariff is administrative only and can be considered part of traditional utility ratemaking. The cost to fully implement an Advanced Renewable Tariff is dependent on tariff design principles.
11. **Barriers to Implementation:** It is not clear whether legislation would be required to provide the PSC with the authority to set advanced renewable tariffs and impose targets on utilities.
12. **Other Factors:** It is recognized that Advanced Renewable Tariffs would likely result in increased costs per unit of electrical output compared to utility-scale renewable projects, but that these costs are justified by the economic and environmental advantages from encouraging distributed small-scale generation. Establishing a single tariff approach across the state may result in unequal cost impacts to each utility because of differences in renewable resource potential

within their service territory boundaries and other variables. As an example, some utilities may have lower cost biogas projects due to land use patterns and existing customer business choices. Some utilities will be advantaged with solar project applications due to building sizes and weather conditions. This policy recommendation requires an examination of these service territory inequities. The benefits expected to be achieved by this proposal will require a solution to these cost inequities. A cost recovery approach may be challenging from a PSC rules-and-ratepayer equity perspective.

13. Related Policies:

- Enhanced Renewable Portfolio Standard (RPS)

Modify Nuclear Moratorium

1. **Work Group:** Task Force Co-Chairs
2. **Policy Name:** Modify Moratorium on Construction of New Nuclear Plants (Modify Nuclear Moratorium)
3. **Policy Type:** Legislation revising statutory provisions relating to nuclear plants
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric utility
Sub-Sector: Distribution utilities
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy and is not likely to result in any direct greenhouse gas (GHG) emission reductions prior to the 2022 GHG emissions reduction goal.
6. **Estimated Costs:** There are minimal costs associated with this recommendation

Funding Sources: Any costs of developing legislation would be absorbed through state operating budgets and any resultant PSC action would be completed within the agency's operating budget
7. **Specific Description of Policy Proposal:** Under Wisconsin's current "nuclear moratorium" law (§ 196.493, Wis. Stats.) the PSC may not authorize the construction of a nuclear plant unless it finds that a federal facility (or facility outside the country) will be available for the disposal of high-level waste from all Wisconsin nuclear plants, and that the proposed nuclear plant is economically advantageous to ratepayers based on specified factors.

This proposal would modify the terms of this moratorium, as follows:

- A. The proposed modifications to the moratorium would be effective upon the latter of (1) enactment into law of a 25% by 2025 renewable portfolio standard consistent with the Task Force's Enhanced Renewable Portfolio Standard template or (2) final approval by the PSC and, where required, approval by Joint Finance, of revised energy efficiency goals, and related spending and program requirements, consistent with the Task Force's Enhanced Conservation and Energy Efficiency Program template.

- B. The proposed modifications would:

1. Add a new Certificate of Public Convenience and Necessity (CPCN) provision to Section §196.493 (2) (b) Wis. Stats. requiring that the proposed nuclear plant must be built to meet Wisconsin electricity needs at a cost that is reasonable and advantageous to customers in comparison with available alternatives, taking account of emission reductions benefits. If such a nuclear plant is a plant to be built and owned by a party other than a Wisconsin utility, the output would need to be sold to Wisconsin utilities to meet the needs requirement. In any event, any new nuclear plant, regardless of any changes in ownership or operational responsibility during the life of the plant, would be subject to regulation by the PSC on a basis that is comparable to the regulation that would apply to such a plant if owned and operated by a Wisconsin public utility.

2. Replace Section §196.493 (2) (a) Wis. Stats., dealing with the requirement of a federally licensed nuclear waste disposal facility, with a requirement that to obtain a CPCN, the PSC must find that the nuclear waste plan for the plant is economic, reasonable, stringent, and in the public interest, given the safety and other risks presented by such waste.

3. The proposed CPCN requirements for a nuclear plant would apply to any proposed nuclear unit regardless of size and include any replacement of any existing nuclear unit.

4. In addition to the existing right of the PSC to apply for extension of the 180-day time limit to act on a CPCN, an additional extension could be sought by the PSC in the case of a nuclear plant for a reasonable, but defined period.

8. **Timetables, Duration and Stringency Option:** The passage of the legislation is contingent upon the criteria described in section 7.A.
9. **Explanation of Rough Estimate of GHG Reductions:** This is an enabling policy and is not likely to result in any direct reductions.
10. **Rough Estimate of Costs for Selected Years:** Costs will be borne in the near term.

11. Barriers to Implementation: This proposal would meet the same challenges faced by any legislation

12. Other Factors: This recommendation is not a recommendation by the Task Force that a new nuclear plant be built. However, it would allow utilities to prudently plan and propose that alternative, if they believe it is the most cost-effective and beneficial means to meet GHG reduction goals and their obligations to serve over the long term. Whether such plants are built will depend on the success of the state's conservation and efficiency and renewable programs, the need for new generation driven by actual load growth and plant retirements, the economics of nuclear power, the feasibility of alternatives, and addressing nuclear fuel issues in a manner acceptable to federal and state regulators.

The conditions in section 7.A. are intended to provide assurance that all cost-effective conservation and efficiency measures will be pursued as a first priority and that any need for a nuclear plant will be determined after taking account not only of costs and benefits (including emissions reductions) of available supply-side alternatives, but also of demand-side reductions achieved through a comprehensive, aggressive conservation and efficiency effort, other demand-side measures and a challenging renewable resources requirement.

13. Related Policies:

- Enhanced Conservation and Energy Efficiency Program
- Enhanced Renewable Portfolio Standard

Green Tariff Study

1. **Work Group:** Electric Generation and Supply
2. **Policy Name:** Green Tariff Option for Customers – Feasibility Study (Green Tariff Study)
3. **Policy Type:** Directive to the PSC to study the feasibility of new renewable tariff approaches (with legislation, if necessary amending Wis. Stat. Section 196.192)
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric utility
Sub-Sector: Distribution utilities
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy which will not result in any direct greenhouse gas (GHG) emission reductions until renewable resources are developed in accordance with study recommendations.
6. **Estimated Costs:** The overall annual cost to develop and implement this policy would be limited to administrative time of the PSC and utilities to conduct a study and investigate tariff options, assessing the implementation issues, including the recommended accounting for the billing, and cost recovery treatment for the tariff.
Funding Sources: The study would be completed within the PSC operating budget
7. **Specific Description of Policy Proposal:** The development of a green tariff option for customers is an enabling policy to further encourage the development of renewable energy in Wisconsin. This policy directs the PSC to study the feasibility of market-based pricing options for customers that would be designed to accommodate individual contracts between retail customers and renewable energy providers. These contracts would be implemented through their utilities and would be longer-term, fixed price contracts for energy and capacity. Renewable energy that resulted from the implementation of these tariff proposals would not count toward Renewable Portfolio Standard requirements of utilities.
8. **Timetables, Duration and Stringency Option:** This feasibility study should be conducted in 2008 so that implementation recommendations could be considered in 2009.
9. **Explanation of Rough Estimate of GHG Reductions:** The results of the study recommended in this policy, if implemented, would reduce 1,850 pounds of CO₂ for every MWh contracted under these tariffs.
10. **Rough Estimate of Costs for Selected Years:** There would be limited governmental administrative costs to conduct the study and implement the recommendations. There would be administrative costs for the utilities in the development of the tariffs and application of the tariff rules for the customers who want their energy service under this tariff option.
11. **Barriers to Implementation:** It is not clear whether legislation would be required to provide the PSC with the authority to establish this tariff option for retail customers.
12. **Other Factors:** The tariff option recommended by this policy requires further study by the PSC. This policy recommendation is unlike other tariff proposals because it considers a relationship between a third party energy provider and the customer through the utility. It is not clear if this can be accommodated without changes in utility law. The purpose of this policy is to encourage further implementation paths for renewable energy use by Wisconsin customers and encourage additional development of renewable resources in the state. The tariff described in this policy proposal would provide an option for customers and renewable energy providers that would not otherwise be available. The contracting terms, legal considerations for retail energy marketing and protection for grid access are just a few of the reasons that a study is needed.
13. **Related Policies:** None

Rate Mitigation Strategies

1. **Work Group:** Task Force Co-Chairs
2. **Policy Name:** Rate Mitigation Strategies
3. **Policy Type:** PSC investigation
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric Utilities
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy that would not directly result in any greenhouse gas (GHG) emission reductions.
6. **Estimated Costs:** To be determined, with the expectation of minimal administrative costs.

Funding Sources: PSC operating budget
7. **Specific Description of Policy Proposal:** Given the expected high fixed costs of new baseload generation and other utility investments required to meet GHG emission reduction goals, this policy calls for the PSC to investigate rate mitigation strategies, such as: (1) levelization of cost recovery in rates of high capital cost, low-carbon and GHG reduction projects to avoid early year rate shock; and (2) on a voluntary basis, securitization of related debt to lower interest costs and allow for more highly leveraged capital structures for particular projects that will not adversely affect bond ratings. Any such mechanisms must provide an opportunity for utilities to invest significant equity capital in such projects. Such mechanisms should be designed to lower total return costs for customers and, at the same time, incent utility investments in low carbon and GHG reduction projects.
8. **Timetables, Duration and Stringency Option:** The PSC should establish an expeditious time frame for this activity.
9. **Explanation of Rough Estimate of GHG Reductions:** This is an enabling policy that would not directly result in any emission reductions.
10. **Rough Estimate of Costs for Selected Years:**
Administrative costs for this investigation are expected to be minimal, but a detailed analysis of the associated costs has not been completed.
11. **Barriers to Implementation:** Although PSC can open this investigation on existing authority, actual

implementation of rate mitigation strategies may require new legislation and/or rule development. For example, the existing environmental trust financing mechanism was created through legislation.

12. **Other Factors:** None
13. **Related Policies:**
 - Improved Rate Designs
 - Aligning Interests

California Vehicle Emission Standards

- 1. Work Group:** Transportation, with revisions by Task Force Co-Chairs
- 2. Policy Name:** California Vehicle Emission Standards (often referred to as California Cars)
- 3. Policy Type:** Legislative action to adopt the California vehicle emission standards (California emission standards) rather than continue participation in the federal Corporate Average Fuel Economy (CAFE) program. The California emissions standard would require greater GHG emission reductions for on-road passenger vehicles and light trucks sold in Wisconsin.
- 4. Affected Sectors, Sub-Sectors and/or Entities:** Car/light truck manufacturers, dealers, parts manufacturers, auto scrappage and consumers.
- 5. Estimated Greenhouse Gas Emissions Reduction Impact:** The California emission standards would provide greater vehicle emission reductions than CAFE (revised as part of the Energy Independence and Security Act of 2007). These emission standard rules are often referred to as Pavley 1 (affecting vehicles produced from 2009 - 2016) and Pavley 2 (these rules are still under development and would establish emission standards for vehicles produced from 2017-2020).

GHG Reduction from California Emission Standards*

	2020	2024
Pavley 1	2.0 million metric tons (MMt)/year	2.4 MMt/year
Pavley 1 and 2	2.6 MMt/year	3.7 MMt/year

* The additional GHG reduction achieved under the California emission standards compared to CAFE.

The Transportation work group had two goals: (1) stabilizing GHG emissions; and (2) reducing sector GHG emissions to 1990 levels by 2020. Only the California emission standards (Pavley 1 and 2) approach the stabilization goal about 2024. The 1990 emissions goal is not achieved by either the California emission standards or CAFE.

- 6. Estimated Costs:** Average Increase in Vehicle Price, Lifetime Savings and Payback Time*

	Near-term (2012)	Mid-term (2016)
	23% GHG reduction	30% GHG reduction
Increase in vehicle price	\$300	\$790
Lifetime savings	\$2,362	\$3,253
Payback time (years)	1.2	2.9

(*Source: California Air Resources Board)

The Alliance of Automobile Manufacturers estimates CARB regulations will increase average vehicle prices by \$3000 in 2016.

Funding Sources: Consumers purchasing new vehicles will bear the increased price, but they will also benefit from lower fuel consumption.

- 7. Specific Description of Policy Proposal:** The Task Force recommends adoption of the California Car (CARB) emission standards for the following reasons:

- A single, nation-wide set of aggressive vehicle standards to reduce GHG emissions is desired. The Task Force recognizes the burden on automakers and the resulting cost burden on consumers if industry is required to meet multiple standards.
- The California Car (CARB) standards will materially reduce GHG emissions compared with the federal CAFE standards.
- The Task Force has been informed that automakers will build to a single set of standards in any event.
- Those standards should be higher than CAFE, consistent with the actions of other industrialized countries.

For these reasons, the Task Force recommends that Wisconsin join with the other states that have endorsed or adopted the California Car (CARB) standards in order to help move those standards forward as the single, consistent set of vehicle emission standards that will be applied nationally.

The Task Force also recommends that the state, with the Janesville community and other affected parties, work diligently with General Motors on a plan of action to convert its Janesville facility to manufacture highly efficient vehicles in order to take advantage of the highly skilled labor force in Janesville and the supply chain that exists, instead of closing the plant.

Furthermore, the state should develop a comprehensive consumer transportation education and marketing program, to aid automakers in the sale of highly efficient vehicles. This effort should be part of the marketing campaign of the proposed Comprehensive Initiative to Support Long-Term Voluntary Greenhouse Gas Emission Reductions.

The CARB standards establish mandatory minimum GHG emission standards for passenger vehicles, light trucks and SUVs. The standards are achieved through improved vehicle performance (e.g. engine performance, power train improvements), use of low global-warming-potential AC gases and vehicle scrappage.

The standards would apply to new motor vehicles starting two model years after legislative approval (see section 8 for more detail). These rules would apply to cars, pickups, minivans, SUVs, and any other vehicles whose primary use is non-commercial personal transportation. The Pavley 1 reductions (Pavley 2 reductions in parentheses) would result in new car fleets emitting about 27% (27%) less GHG emissions than CAFE standards by 2015 and 24% (35%) less than CAFE standards by 2020. The California emission standards would reduce new light truck/SUV fleet emissions 7% (7%) lower than the revised CAFE standards by 2015 and 4% (21%) lower by 2020.

The California emission standards incorporate these vehicle emission elements:

- Carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) emissions from operation
- Refrigerant emissions from air conditioning system leakage or losses during recharging
- Vehicle scrappage
- A separate Transportation policy recommendation proposing a separate 10% low carbon fuel requirement is not part of the California emission standards.

8. Timetables, Duration and Stringency Option:

The California emission standards are currently under appeal in the federal courts and consist of the Pavley 1 rules. If Wisconsin were to adopt the California emission standards they would be phased-in over two model years. Pavley 2 regulations now under development would affect model years 2017-2020.

Automakers can implement any combination of technologies across their passenger vehicle fleet as long as they achieve the prescribed CO₂-equivalent fleetwide emissions reductions each year. They are also allowed early emission reduction credits as appropriate.

9. Explanation of Rough Estimate of GHG

Reductions: Compared to CAFE, the California emission standards should provide a minimum reduction of 6% lower annual emissions by 2020 and a maximum reduction of 11% lower annual emissions by 2024 for the light-duty on-road fleet. Both the California emission standards and CAFE regulations slow the growth in GHG emissions, but increases in the state population and the number of vehicles plus potential increases in the vehicle miles traveled indicates multiple policies must be implemented to actually reduce GHG emissions.

Both Pavley 1, and Pavley 1 and 2, combined with the Low Carbon Fuels and Energy Efficient Communities policies achieve the stabilization and 1990 emissions goals for the on-road fleet prior to 2015. While Pavley 1 fleet emissions are rising by 2024, the Pavley 1 and 2 emissions are still declining. The Pavley 1 and 2 option provides the deepest and most sustained emission reductions.

CAFE combined with the Low Carbon Fuels and Energy Efficient Communities policies achieves stabilization prior to 2015 and the 1990 emissions goal about 2020. However, by 2024 the light duty on-road fleet emissions are rising and exceed the 1990 goal.

10. Rough Estimate of Costs for Selected Years: See table in section 6

11. Barriers to Implementation: EPA has denied the California emission standards. California has appealed this ruling and the major automakers have challenged the legal authority of a state to regulate GHG emissions of cars. These challenges have been denied in the two court rulings to date.

The application of this rule means Wisconsin would have to adopt future changes in the California emission standards as they applied to GHGs and other pollutants.

This rule may affect the availability of certain high emission vehicles to achieve the desired emission reduction.

12. Other Factors: California and 12 other states have adopted these regulations. Those states represent roughly one third of the U.S. population. The Illinois and Minnesota global warming advisory councils also assessed the California emission standards and the majority of council members recommended this policy be forwarded for further state consideration.

13. Related Policies:

- Electric, Hybrid and Plug-in Hybrid Electric Vehicle Incentives
- Government Fleet Adoption of PHEV
- Energy Efficient Communities
- Low Carbon Fuel Standard
- Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions

Off-road Equipment GHG Reductions

1. **Work Group:** Transportation
2. **Policy Name:** Off-road Equipment Greenhouse Gas Emission Reductions (Off-road)
3. **Policy Type:** Voluntary and mandatory emission reduction measures to reduce GHG emissions from off-road sources.
4. **Affected Sectors, Sub-Sectors and/or Entities:**
This template addresses the off-road non-transportation related construction, agriculture, lawn/garden care, recreational and industrial/commercial sectors. It does not address non-road transportation emissions associated with interstate rail, aircraft and marine sectors.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** These voluntary and mandatory measures could reduce annual emissions an estimated 1.6 million metric tons (MMt) of CO₂ in 2020.
6. **Estimated Costs:**
 - Based on discussion with industry sources, fuel efficiency improvement costs for equipment manufacturers are estimated at 1% to 3% of total equipment cost per 1% increase in fuel efficiency. The increased purchase cost may be partially to totally offset by lower fuel costs. The stability of fuel prices will be a major factor driving fuel efficiency improvements.
 - Low carbon biofuels (ethanol and biodiesel) are not commercially competitive and public subsidies have been provided (\$0.50 and \$0.50 - 1.00/gallon respectively). The public will need to subsidize biofuels until either market costs for petroleum based fuels exceed those for biofuels or biofuel production costs decrease. Current federal biofuels subsidies cost approximately \$8 - 10 billion/year.
 - Idle reduction is a low to no cost option for reducing emissions and saving fuel.

Funding Sources: The costs of these voluntary measures are primarily borne by equipment purchasers and contractors. Incentives and mandatory measures funded through state government capital and operating budgets.

7. Specific Description of Policy Proposal:

- A. Voluntary measures.
 - Allow market forces to drive fuel efficiency and alternate power sources (e.g. biofuels, electricity, etc.)
 - Promote public/private sector reductions (e.g. voluntary relationships)
 - Increase availability of low carbon fuels
 - Promote idling reduction
 - Adopt use of low global warming potential (GWP) refrigerant gases
 - Develop tax/fiscal incentives to promote the adoption of low GHG emitting equipment
 - Provide educational material to increase understanding of the options and opportunities to reduce both GHGs and criteria pollutants
- B. Mandatory measures.
 - Public (state) sector purchase of low GHG emitting/fuel efficient equipment
 - Public sector develops and implements mandatory idle reduction policies
 - Contracts for state funded projects require idle reduction provisions
 - Public sector adoption of low GWP refrigerant gases
 - Preferential purchase of low carbon fuels by state and local governments
8. **Timetable, Duration and Stringency of Option:**
Industry literature indicates market driven fuel efficiency increases in the 5 - 20% range are achievable for different classes of off-road vehicles/equipment by 2020. These technology changes will be permanent and the costs to consumers should decrease over time. Biofuels currently constitute about 3% of Wisconsin's vehicle/equipment fuels. The goal of 10% biofuels by 2020 is within the targets established by both the federal and state governments.

9. Explanation of Rough Estimate of GHG

Reductions: The overall estimated emission reductions of 1.6 MMT achieved through these policy measures are as follows:

- Low carbon fuels: (10% carbon reduction in diesel and gasoline) $5.7 \text{ MMT} \times 0.1 = 0.57 \text{ MMT}$ reduction
- Reduced idling: (5% reduction) $6.7 \text{ MMT} \times 0.05 = 0.34 \text{ MMT}$ reduction
- Improved fuel efficiency: (10% reduction) $6.4 \text{ MMT} \times 0.1 = 0.64 \text{ MMT}$ reduction

This is a sizeable reduction, but is still several hundred thousand metric tons greater than the 2005 stabilization goal. A 27% emission reduction from the business-as-usual scenario would be needed to attain the 2005 stabilization goal (4.9 MMT) by 2020. To achieve the 1990 emissions goal (4.2 MMT) by 2020 would require a 38% reduction from the 2020 business-as-usual emission projection.

Attaining the stabilization and 1990 emission levels within the 2015 - 2020 timeframe will require concerted private/public efforts. Market force (e.g. increasing fuel prices) could provide a significant incentive for equipment providers to increase fuel economy (e.g. 15 - 25% by 2020) and consumers to seek energy efficient construction, agricultural, recreational and industrial equipment.

Higher fuel prices and energy security/independence policies at the federal and state level will encourage the development of low carbon biofuels in the 2020 time frame.

Targeted fiscal incentives could be used to promote these trends. Public and private actions through contracts and purchasing (e.g. requiring/incentivizing the use of fuel efficient vehicles, low GHG emitting equipment, idling reduction, etc.) could help meet these emission targets. Mandated actions, such as idling reduction ordinances, could provide additional reductions.

Promote GHG emission reductions through environmental management system and programs such as DNR Green Tier and Cleaner Air Faster to facilitate reductions through educational outreach activities. Efforts to maintain attainment or achieve attainment for criteria pollutants should

be compatible with and promote GHG emission reduction activities. State and local governmental/institutional purchases/contracts could enhance the adoption and purchase of new off-road technologies and products with lower GWP. This policy will require sustained purchasing, education and voluntary/mandatory efforts to provide the needed emission reductions.

10. Rough Estimate of Costs for Selected Years: Not available

11. Barriers to Implementation: Barriers to success for both voluntary and mandatory initiatives include the long-life of off-road diesel equipment (20+ years), technological/ infrastructure/ institutional barriers to improving fuel efficiency, and the development and marketing of low carbon fuels and GWP gases. Market and private sector forces such as fuel prices and other industry cost control decisions will affect demand for fuel efficient and low GHG emitting equipment and products.

Developing compelling educational and motivational marketing programs along with the needed funding for outreach capacity are critical factors. For example, developing purchasing guidelines that include meaningful GHG reductions will require cross sector collaboration and knowledgeable, dedicated staff to implement this outreach.

Idle reduction will need to focus on operator/ management behavior and project planning. Technological options already exist for idle reduction in on-road settings, but this equipment often has limited applicability to the diversity of types and uses of off-road equipment.

12. Other Factors: Fuel efficiency and technology improvements may migrate from on-road engines and components to off-road settings thus reducing development costs.

Market forces (e.g. rising fuel prices) will foster private/public demand for fuel efficient equipment. The public sector may need to lead by purchasing or requiring the use of new technologies and products with lower GWP, especially if cost benefit ratios are initially low.

Education is an essential element in the adoption of any voluntary or mandatory programs.

Low carbon biofuels and freight idling reduction efforts recommended in other policy templates will affect this policy. The proposed low carbon fuels are consistent with existing federal/state initiatives to produce and consume local sources of biofuels. How/if off-road engines can accommodate biofuels, such as E85 and different grades of biodiesel, is not known. Electric power may be an alternative energy source for off-road equipment.

Voluntary idling reduction will depend on fuel costs and owner/operator education.

This template relies heavily on substantial voluntary efforts by both the public and private sectors to be successful. If stabilization or progress toward the 1990 emission levels are not achieved the need for regulatory based reductions (e.g., perhaps target years should be established as trigger points) should be re-examined.

13. Related Policies:

- State Government as Leader
- Low Carbon Fuel Standard
- Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions

Idle Reduction

1. **Work Group:** Transportation
2. **Policy Name:** Freight Idle Reduction (Idle Reduction)
3. **Policy Type:** Regulation
4. **Affected Sectors, Sub-Sectors and/or Entities:** Wisconsin Department of Transportation (DOT), trucking companies, enforcement agencies
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Annual CO₂ reduction ~200,000 metric tons
6. **Estimated Costs:** No net cost impacts]

Funding Sources: The cost of signage and communicating the new policy to truckers could potentially be offset by penalties for non-compliance.
7. **Specific Description of Policy Proposal:** Limit truck idling at depots, over night rest areas and other long-term parking circumstances. The rule would limit idling to a maximum 5 minutes except under the following circumstances:
 - When trucks are on the roadway, held up in stop and go traffic.
 - During temperature extremes, (<10°F or >90°F ambient temperature)
 - Medical needs requiring engine power to operate external equipment, (sleep apnea machines, oxygen generators, etc.)
 - Powering equipment needed to unload freight (e.g., pumps, compressors, lifts, cranes).
 - During periods when engines are required to idle to regenerate emission filtration devices
 - For required maintenance procedures, (e.g. flushing engines, break in period, etc.)
 - Exemptions for trucks with 2007 or newer engines to reward companies who purchase the most energy efficient technologies.
8. **Timetables, Duration and Stringency Option:** Start date of 2011 with full implementation by 2013 and enforcement provided by local and state police.

9. **Explanation of Rough Estimate of GHG Reductions:** Idle Reduction can reduce CO₂ emissions from parked over the road freight trucks by 90%. The US EPA [Study of Exhaust Emissions from Idling Heavy Duty Diesel Trucks and Commercially Available Idle Reduction Devices](#) cites average emissions from idling as 144g/hr NO_x, 8224g/hr of CO₂ with a fuel consumption rate of 0.82gal/hr. The same study cited an average truck idle of 6 - 8 hours per day resulting in 1,500 – 2,400 idle hours per year. Wisconsin Department of Commerce and DOT staff indicate about 50,000 trucks (using truck registrations) would be potentially suitable for the idling reduction technology. It was assumed 25% of the 50,000 trucks would be used in a manner suitable for installation of idle reduction equipment.

12500 trucks * 8224g CO₂/hr * 1,900 hr/year * 1 ton/1000000g = ~200000 metric tons CO₂/year

10. **Rough Estimate of Costs for Selected Years:** A number of trucks will be retrofitted through the existing Commerce auxiliary power unit (APU) retrofit program <http://commerce.wi.gov/bd/BD-CA-Diesel-Grant-Program.html> that will sunset in 2011. This program is anticipated to have average annual state costs of \$2,000,000 for cost share grants (50% state funded - 50% owner operator costs) with \$70,000 in annual state personnel costs.

Costs for a mandatory idle reduction program from 2011 onward is anticipated to be revenue neutral with penalties covering program costs. APU purchase and installation costs are anticipated between \$6,000 and \$12,000 per vehicle. Fuel savings will also be obtained by the truck owners. Using the assumptions above the benefit would be 0.82 gals/hr x 1,900 hours/year x \$3/gallon = \$4,600/year

11. **Barriers to Implementation:** Resistance to this proposal is anticipated to primarily come from single owner operators or small fleets (under 10 trucks) with limited fiscal resources and technical expertise. Large fleets are already considering the fiscal implications and appropriate technologies for their fleets.

The freight industry in general is facing significant cost impacts due to the price associated with Tier 4 emission regulations (e.g. fine particles and NO_x

emissions). Anti-idling regulations will further add cost pressure. Operators/companies unable to absorb the costs will leave the industry, though growth by more competitive fleets may dampen employment losses. Drivers may choose to deliver cargoes and then leave regulated areas to park in locations where they can idle without restrictions. This could impact businesses supporting the trucking industry in Wisconsin.

12. Other Factors: Cost offsets from fuel savings for Idle Reduction may not be enough to justify the investment in idle reduction technologies. Some companies and independent operators will not be able to afford installing idle reduction technologies on their trucks. Drivers sleeping in an uncomfortable environment will likely suffer fatigue, a major contributor to truck accidents.

13. Related Policies: None

Government Fleet Adoption of Plug-in Hybrid Electric Vehicles

1. **Work Group:** Transportation
2. **Policy Name:** Government Fleet Proposal for Displacement of Petroleum-based Fuels with Plug-in Hybrid Electric Vehicles (PHEVs) (Fleet PHEVs)
3. **Policy Type:** Legislation for achieving: (1) reduction in consumption of non-renewable motor fuels; and (2) reduction in the emission of green house gases (GHG), particularly CO₂.
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Public and private delivery/service transportation fleets and electric utilities
Sub-Sector: Electric utilities and petroleum fuel distributors
5. **Estimated Greenhouse Gas Emissions Reduction**
Impact: Conservative assumptions yield an estimated net annual reduction of 314 metric tons of CO₂. Optimistic assumptions lead to an estimated net annual reduction of 1,584 metric tons of CO₂.
6. **Estimated Costs:** Administrative costs will be minimal (incremental to existing program). The implementation of a PHEV fleet will require significant infrastructure investment to provide: (1) electrical power outlet stations for recharging the battery pack during vehicle non-use periods; and (2) service facilities and personnel trained for the unique maintenance and repair tasks associated with battery systems. The incremental cost to provide vehicles with PHEV drive trains is difficult to precisely forecast. The input from an automotive OEM is critical to this discussion. Representatives from Ford Motor Company's Sustainable Mobility Technology group attended the Transportation Work Group meeting October 26th in Madison to support this proposal. As a guideline, automotive industry estimates for the incremental cost of producing an HEV range from approximately \$2,000 - \$3,500 depending on the vehicle type and HEV system design.

If we assume an average of \$2,750 dollars and a scaling factor of 5 to provide the additional energy required from a PHEV battery the resultant additional cost is \$13,750 per vehicle. In reality this number will likely be higher early in the program due to the relatively low volumes and the developmental nature of the technology. But for reference, the total cost to deliver PHEV versions of the vehicles described in this proposal would be a

minimum of \$14 million dollars.

Funding Sources: 50% would be borne by the State and 50% would be borne by the municipalities from capital and operating budgets. Some additional costs may be borne by partnering with private sector companies. We foresee two possible fundamental funding sources. The Energy Independence and Security Act of 2007 contains language directing the Department of Energy to provide funding for PHEV fleet demonstration programs. If Congress elects to appropriate funds for this activity, the cost impact of this proposal at the state and local levels could be significantly mitigated. The other funding source would be appropriations directly from the State and specified local governments.

7. **Specific Description of Policy Proposal:** Governor Doyle has declared a goal for the state of Wisconsin to become the nation's leader in energy independence and the fight against global warming. A specific element of the Governor's plan is for Wisconsin to derive 25% of its electricity and 25% of its transportation fuels from renewable sources by the year 2025. Progress towards achieving this aggressive and laudable goal can be assisted by classifying electricity as a transportation fuel. This classification is valid for PHEVs and pure Electric Vehicles (EVs) as they both utilize utility-generated electricity as a primary fuel. The plug-in is differentiated from the pure electric in that it also utilizes liquid carbon-based fuels as a primary energy source.

Any policy aimed at securing sustainable, environmentally harmonious energy sources must incorporate a fundamental underpinning of efficiency. In other words, supply security and environmental impact are important, but how efficiently these energy supplies are used is equally important. Due to their incorporation of electric drive train systems, both PHEVs and EVs are very high efficiency vehicles compared to their standard internal combustion engine counterparts. In addition to the obvious environmental and energy security benefits, vehicle efficiency is important because it goes directly to the degree of difficulty in achieving the Governor's goal for a 25% renewables fraction in transportation fuels. The 25% fraction will logically be easier to achieve if total consumption is held constant or actually reduced. A reduction would require

either improved drive train operating efficiency without changing driving habits/distances or a mandate forcing changes in transportation patterns and habits. The former approach is less disruptive and is enabled by more efficient power trains - hybrids. This policy proposal envisions the issuance of an Executive Order or legislation signed by the Governor requiring that:

- A. By the year 2012, 25% of the delivery vehicles, light trucks, and passenger vehicles operated by the state of Wisconsin have PHEV drive trains.
- B. By the year 2012, 25% of delivery vehicles, light trucks and passenger vehicles operated by municipalities with populations greater than 100,000¹ have PHEV powertrains.
- C. To assist in achieving the above requirements, the State of Wisconsin will provide grants to the affected municipalities to offset 50% of the incremental cost of purchasing PHEV vehicles compared to conventional vehicles of the same make and model. The energy cost savings from “fueling” these vehicles overnight to take advantage of favorable “time of use” rates should substantially offset the incremental purchase cost fraction borne by the participating municipalities and the state. The precise pay-back period is dependent on fleet make-up, driving distances/patterns and local utility rates.
- D. The State will make available grants to *private company partnerships*² that include vehicle manufacturers and/or vehicle systems integrators, e.g. Ford, Chrysler Group, GM, ArvinMeritor, to accelerate the introduction of PHEV drive train vehicle types required in items A and B. Preference will be given to proposals that include companies that are either headquartered in Wisconsin or whose employment ranks include a majority of Wisconsin residents.

8. Timetables, Duration and Stringency Option:

Grant program duration will be FY 2009-2012

9. Explanation of Rough Estimate of GHG Reductions:

- 1. Green Bay, Madison, and Milwaukee
- 2. *Private company partnerships* are defined as: A legally binding collaborative agreement between two or more private sector companies established for a finite time period describing the task, cost, and IP sharing arrangement between the member companies corresponding to the vehicle performance, delivery and cost targets for the programs described above.

Background

Depending on the particular vehicle usage profile, hybridization of the vehicle powertrain with a plug-in hybrid battery offers the potential for a 100% reduction in petroleum fuel usage (if the entire vehicle driving cycle is powered by the battery-only, for a limited range, e.g. 10 - 40 miles). Typical results will be less than 100%, but still substantial, i.e. a 50 - 75% improvement in fuel economy, measured at the tank. The associated *gross* reduction in CO₂ emissions at the tailpipe will be an equivalent percentage to the savings in petroleum fuel consumption.

Based on fleet composition data obtained from the State of Wisconsin’s Department of Administration, the collective *gross* reduction in CO₂ tailpipe emissions realized by converting 25% of the: (1) state-owned fleets operating in Green Bay, Madison, and Milwaukee; and (2) the city-owned vehicles in Milwaukee, Madison, and Green Bay (not including the police department) would be approximately 2,854 metric tons annually. This value assumes a 60% average improvement in fuel economy due to the Plug-In hybridization.³

Greater weight, however, should be assigned to the *net* CO₂ reductions associated with this proposal. That is, the emission reductions after taking into account the CO₂ emissions associated with the generation of electricity for the fleet PHEVs. The ratio of renewables/non-renewables in the fuel mix for the utility base will be critical in deriving a significant total *net* CO₂ emissions reduction benefit for the introduction of PHEVs. Examples of renewable energy sources for electrical generation are: wind, hydro, and solar. The use of advanced coal-burning technologies such as Integrated Gasification Combined Cycle featuring CO₂ sequestration would also help to make PHEVs more attractive from an environmental standpoint.

As for the case of a coal-fired power plant, the *net* reduction in CO₂ emissions associated with petroleum motor fuel displacement is modest. However, the *net* CO₂ reduction associated with a scenario assuming an electric generation system composed of 50% coal and 50% renewable energy is 1,584 metric tons annually. Please see Table 1 and the associated calculations below substantiating this summary. Please note that

- 3. Actual reduction will depend on municipality fleet type and usage profile.

these calculations do not include the impacts of the Green Bay police fleet, as this data was unavailable.

Calculations

CO₂ emissions reductions at the tailpipe can be estimated by calculating the reduction in petroleum fuel usage, based on an assumed PHEV efficiency advantage and the annual VMT multiplied by the factor of 8.8 kg of CO₂ emitted per gallon of gasoline consumed in the typical internal combustion engine. To calculate the *net* CO₂ impact on the environment, detailed information/assumptions will be required concerning: (1) the renewables/non-renewables fuel mix of the electric utilities serving the affected municipalities; and (2) the estimated incremental energy demand on the utilities output in order to calculate the corresponding increase in smokestack emissions for fossil-fuel burning plants; and (3) the CO₂ emissions reduction corresponding to wells-to-wheels delivery of gasoline to the pump.

To demonstrate the sensitivity to the fuel mix used by the utilities the analysis shown below in Scenario 1 assumes a 60% fuel economy improvement and 100% coal-fired electricity generation and results in a modest decrease in net annual CO₂ emissions. Scenario 2 assumes the same fuel economy improvement but 50% coal and 50% renewable energy generation and results in a net annual decrease of 1,584 metric tons of CO₂.

Scenario 1: 100% Coal-generated electricity

- A. Reduction in tailpipe CO₂ emissions = **2,854** metric tons annually
- B. Gasoline consumption reduction = **324,348** gallons
- C. CO₂ emissions reduction from the reduced production⁴ of gasoline = **663** metric tons annually
- D. Raw energy equivalent of **324,348** gallons of gasoline = **11,676,518** kWh
- E. Road energy delivered by **324,348** gallons of gasoline (assume 25% efficiency) = **2,919,113** kWh
- F. Road energy needed from the electric
 - 4. Per EPA Ann Arbor office: 4.5 pounds of CO₂ per gallon of gasoline, wells-to-pump, analysis based on Argonne National Laboratory's GREET model

drivetrain assuming a 70% efficiency = **4,170,161** kWh

- G. Energy Information Agency estimates for CO₂ emissions from coal for electricity = **1.34 lbs per kWh**
- H. So, CO₂ emission to generate electricity for the PHEV fleet = **2,540** metric tons annually
- I. NET reduction in CO₂ emissions = **314** metric tons annually

Scenario 2: 50% Coal and 50% Non-fossil Energy generated electricity

- A. Reduction in tailpipe CO₂ emissions = **2,854** metric tons annually
- B. Gasoline consumption reduction = **324,348** gallons
- C. CO₂ emissions reduction from the reduced production of gasoline = **663** metric tons annually
- D. Raw energy equivalent of **324,348** gallons of gasoline = **11,676,518** kWh
- E. Road energy delivered by **324,348** gallons of gasoline (assume 25% efficiency) = **2,919,113** kWh
- F. Road energy needed from the electric drivetrain assuming a 70% efficiency = **4,170,161** kWh
- G. EIA estimates for CO₂ emissions from coal for electricity = **1.34 lbs per kWh**
- H. CO₂ emissions to generate 50% of electricity for PHEV fleet from coal = **1,270** metric tons annually
- I. NET reduction in CO₂ emissions = **1,584 metric tons annually**

10. Rough Estimate of Costs for Selected Years: Grant program duration will be FY 2009-2012

11. Barriers to Implementation: The major barrier to implementation of this policy is the need for private company partnerships that bring together the required technology, manufacturing, and service elements related to providing the PHEV powertrain vehicle. Battery system and other key powertrain component suppliers must be able to partner with credible vehicle OEM and/or drive train integrators. Without the cooperation and participation of the OEMs and integrators the proposed program is not possible. In order for the

proposed private industry partnerships to work effectively, clear guidelines concerning Intellectual Property (IP) ownership and access rights must be agreed upon prior to program inception.

12. Other Factors: None

13. Related Policies:

- “California Car” Standards
- State Government as Leader
- Incentives to increase market shares of HEVs, and PHEVs and EVs

Table 1: Fleet Composition and CO2 Emissions Reduction

Municipal Fleet Composition and CO ₂ Reduction Potential from PHEV Conversions												
Municipality	Vehicle Type	Number of Vehicles	Ave. or Est. Miles/Year	Total Vehicle - Miles	Avg. MPG Vehicle*	Fuel Consumption gallons	Metric tons CO ₂ Tailpipe Emissions	CO ₂ Emissions @ 60% FE Improvement ⁽¹⁾ (metric tons)	Total Tailpipe CO ₂ Emissions Reduction (metric tons)	CO ₂ Reduction from a 25% Fleet Conversion (metric tons)	Gasoline Consumption Reduction (gals)	Quantity of PHEV Vehicles
State Owned Vehicles												
Madison	passenger car & mini-van	1,259	14,500	18,255,000	17	107,385.3	9,450	5,906	3,644	886	10,067.4	315
	light truck	494	15,300	7,582,000	15	50,380.0	4,434	2,771	1,663	416	47,239	124
	heavy duty light truck	99	15,300	1,514,700	13	116,515	1,025	641	385	96	10,923	25
	service van	176	12,900	2,270,400	13	174,646	1,537	961	576	144	16,373	44
	heavy truck	95	8,800	836,000	10	83,600	736	460	276	69	7,838	24
		2,123		30,434,800		195,249.4	17,182	10,739	6,443	16,111	183,046	531
Municipality Owned Vehicles												
Madison	passenger car & mini-van	192	9,272	1,780,224	17	104,719	922	576	346	86	9,817	48
	light truck	121	7,934	960,014	15	64,011	563	352	211	53	6,000	30
	heavy duty light truck	6	8,527	51,162	13	39,36	35	22	13	3	369	2
	service van	0	0	0	13	0	0	0	0	0	0	0
	heavy truck	94	5,162	485,228	10	48,523	427	267	160	40	4,549	24
		413		3,276,628		221,178	1,946	1,216	730	182	20,735	103
State Owned Vehicles												
Milwaukee	passenger car & mini-van	45	14,500	652,500	17	38,382	338	211	127	32	3,588	11
	light truck	14	15,300	214,200	15	14,280	126	79	47	12	1,339	4
	heavy duty light truck	8	15,300	122,400	13	94,15	83	52	31	8	883	2
	service van	44	12,900	567,600	13	43,662	384	240	144	36	4,083	11
	heavy truck	5	8,800	44,000	10	44,000	39	24	15	4	413	1
		116		1,600,700	13.6	110,139	969	606	363	91	10,326	29
Municipality Owned Vehicles												
Milwaukee	passenger car & mini-van	959	12,000	11,508,000	17	676,941	5,957	3,723	2,234	558	63,463	240
	light truck	259	6,000	1,554,000	15	103,600	912	570	342	85	9,713	65
	heavy duty light truck	135	6,000	810,000	13	62,308	548	343	208	51	5,841	34
	service van	71	6,000	426,000	13	32,789	288	180	108	27	3,072	18
	heavy truck	229	6,000	1,374,000	10	137,400	1,209	756	453	113	12,881	57
		1,653		15,672,000	13.6	1,013,018	8,915	5,572	3,343	836	94,970	413
State Owned Vehicles												
Green Bay	passenger car & mini-vans	22	14,500	319,000	17	18,765	165	103	62	15	1,759	6
	light truck	13	15,300	198,900	15	13,260	117	73	44	11	1,243	3
	heavy duty light truck	6	15,300	91,800	13	7,062	62	39	23	6	662	2
	service van	4	12,900	51,600	13	3,969	35	22	13	3	372	1
	heavy truck	2	8,800	17,600	10	1,760	15	6	6	1	165	1
		47		678,900	13.6	44,815	394	246	148	37	4,201	12
Municipality Owned Vehicles #												
Green Bay	passenger car & mini-vans	9	14,500	130,500	17	7,676	68	42	25	6	720	2
	light truck	24	15,300	367,200	15	24,480	215	135	81	20	2,295	6
	heavy duty light truck	0	0	0	13	0	0	0	0	0	0	0
	service van	12	12,900	154,800	13	11,908	105	65	39	10	1,116	3
	heavy truck	74	10,000	740,000	10	651	4,000	651	244	61	6,938	19
		119		1,392,500	13.6	118,064	1,039	649	390	97	11,069	30
		4,471		55,055,528		3,459,710	30,445	19,028	11,417	2,854	324,348	1,118

Speed Reduction

1. **Work Group:** Transportation
2. **Policy Name:** Speed of Travel Reduction (Speed Reduction)
3. **Policy Type:** Strict enforcement of existing 65 mph speed limit, support for a study of potential future speed limit reductions, and support and recognition for voluntary measures
4. **Affected Sectors, Sub-Sectors and/or Entities:** All passenger and some freight motorists using state and federal highways in Wisconsin.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Immediate reductions in CO₂ emissions are anticipated on federal and state highways with a current posted speed of 65 mph due to improved fuel efficiency (source: Wisconsin Department of Transportation (DOT)). The projected reduction in CO₂ emissions have been estimated if maximum speeds of 65 mph, 60 mph and 55 mph can be achieved. DOT estimates annual vehicle miles traveled (VMT) on state and federal highways at 15 billion miles (2005 baseline).

Upon adoption, measured in CO₂:

Strict adherence to 65 mph: 210,000 metric tons annually (gas savings of \$79 million)

Strict adherence to 60 mph: 400,000 metric tons annually (gas savings of \$158 million)

Strict adherence to 55 mph: 570,000 metric tons annually (gas savings of \$238 million)

Year 2020, measured in CO₂:

Strict adherence to 65 mph: 250,000 metric tons annually (gas savings of \$94 million)

Strict adherence to 60 mph: 470,000 metric tons annually (gas savings of \$187 million)

Strict adherence to 55 mph: 680,000 metric tons annually (gas savings of \$281 million)

(All savings projected on \$3 a gallon gasoline)

6. **Estimated Costs:** Administrative costs for strict enforcement and educational efforts may be offset by revenues from fines. Savings in gasoline costs will accrue to motorists.

Funding Sources: DOT operating budget

7. **Specific Description of Policy Proposal:** This template recommends strict enforcement of existing 65 mph speed limit and a state study of costs and benefits of future speed limit reductions. Additionally, the state should support and recognize voluntary policies to reduce fleet vehicle speed maximums, such as those recently implemented by Schneider Trucking.
8. **Timetables, Duration and Stringency Option:** The policy recommends strict enforcement of the 65 mph speed limit to begin as soon as practical. The transportation work group recommends a study of further speed limit reductions, to be conducted as soon as possible, to determine whether significant additional GHG emission reductions can be obtained.
9. **Explanation of Rough Estimate of GHG Reductions:** Strict adherence to the existing 65 mph speed limit should save approximately 210,000 metric tons of CO₂ emissions. The other reductions identified in section 5 assumed the current actual speed on 65 mph posted highways is 69.4 mph and 15 billion vehicle miles are driven annually on these roads. The CO₂ reductions were estimated using the Center for Clean Air Policy analysis spreadsheet program <http://www.ccap.org/trans.html>
10. **Rough Estimate of Costs for Selected Years:** Cumulative savings to motorists of up to \$238 million annually based on \$3 a gallon gasoline. A comprehensive public education campaign would require an undetermined amount of funds. Expanded enforcement might also require additional funding.

Additional law enforcement costs are anticipated for state and local police. The state police expenses are not recouped because speeding fines are distributed to the state school fund and city/county entities.

11. Barriers to Implementation: Public (passenger and freight) resistance to lower speeds on interstate and divided lane highways. Time delays and inconvenience are anticipated to be significant complaints.

12. Other Factors: Drivers would have improved fuel efficiency thus saving on fuel costs. Reduced fuel consumption also reduces dependence on imported oil for transportation in Wisconsin and the US. Incidental benefits include reduced accidents, deaths, personal injury and property damage.

13. Related Policies:

- Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions

Incentives for Electric, Hybrid and Plug-In Hybrid Electric Vehicles

1. **Work Group:** Transportation
2. **Policy Name:** Incentives to Increase Market Shares of HEVs, and PHEVs and EVs ((P)(H)EV Incentives)
3. **Policy Type:** Provide education and incentives for purchasing Hybrid Electric Vehicles (HEV), Plug-in Hybrid Electric Vehicles (PHEV) and Electric Vehicles (EV).
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Transportation, Electric Generation
Sub-Sector: Automobile Manufacturers
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Reduction in 2020 of 303,000 metric tons of CO₂ compared to business-as-usual.
6. **Estimated Costs:** Costs are based on implementing an education program, developing infrastructure and providing financial incentives for purchasing vehicles. The cost is estimated to be \$32,000,000 in 2020 and \$0 after 2020.

Funding Sources: None specifically recommended at this time. Options include feebates, fuel tax, or carbon tax.

7. **Specific Description of Policy Proposal:** The policy would include the following components:
 - A. Deliver education programs around the state to accelerate the purchase of HEVs, PHEVs and EVs.
 - B. Provide rebates or state-tax credits for purchasing HEVs immediately and PHEVs and EVs later.
 - C. Provide rebates or state-tax credits for PHEVs at a later date.
 - D. Provide rebates or state-tax credits for EVs a couple of years after starting the HEV incentives.

HEVs, PHEVs and EVs have been shown to provide significant reductions in greenhouse gas (GHG) emissions in both the near and long term. With the current mix of electric generation plants in Wisconsin, the HEVs provide greater reductions in GHGs than PHEVs and EVs – however, as the generation mix becomes cleaner, the PHEVs and EVs will at some point provide greater GHG savings than HEVs.

Also, PHEVs are not yet available for the light duty vehicle market. And the manufacturers will first make these vehicles available for heavier “fleet” vehicles. Thus this suggests that a policy to increase the market for these two types of vehicles should be staged. The policy recommendation is to provide both incentives for Wisconsinites to purchase HEVs and EVs and to educate the public on the value of purchasing these vehicles. This education component should also encourage businesses to allocate favorable parking for employees who drive these vehicles to work.

Rebates, or tax credits, should start at about \$500 and graduate based on the EPA mileage of the HEV and PHEV models compared to the non-hybrid version of the same model. Using this approach the HEV or PHEV would have to get at least 20% greater MPG than the non-hybrid version. For example, the Lexus GS 450h gets 21% greater MPG than the non-hybrid version – so the purchase would be eligible for a \$500 incentive. The other tiers might be \$1,000 for a vehicle that gets 30% greater MPG, and \$1,500 for a vehicle that gets 40% greater MPG, and \$2,000 for a vehicle that gets 50% or more MPG than the non-hybrid version. For vehicles that do not have a non-hybrid version, such as the Prius, the program would determine a comparable offering by the same manufacturer (or another if necessary) to compare MPG. When the EV and PHEV incentives are introduced, the incentives would be based on a proxy MPG calibrated to the decrease in CO₂ and/or other emissions.

8. **Timetables, Duration and Stringency Option:**
The initial component would be the education campaign. The education campaign would begin ahead of the fall 2010 new car model rollout. The HEV campaign would be continued six years – adjusted annually to be current. If the market share goals are met earlier and other programs have met or exceeded goals, the education program would be ended sooner. Conversely, if goals of this or other programs are not being met, the education would continue for a longer period. This education campaign may be a component of the proposed Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions.

Rebates would be made available for the fall 2010 model year rollout of HEVs. The rebates

would be offered at first with a sunset-unless-renewed period of six years to ensure accelerated early adoption while the incremental cost of the vehicles is high. During the six years, if market penetration is increasing faster or slower than proposed, the rebate level could be adjusted.

When the manufacturers offer at least two models of either, the PHEV and EV markets should be developed in earnest. This program is estimated to start about when the 2015 models are offered. However, if PHEV and EV vehicles are offered by several manufacturers significantly before this time and the penetration/demand is significant, the program should be moved up from this date. As with the HEV program, this program would sunset-unless-renewed in six years after starting.

9. Explanation of Rough Estimate of GHG

Reductions: The annual emissions reductions in the year 2020 are estimated to be 303,000 metric tons CO₂. This is based on a six year program for HEVs that precedes, and overlaps in one year (2015), a six year PHEV and EV program.

10. Rough Estimate of Costs for Selected Years:

The cost of the program would start in 2010 (for 2011 model year) and peak in 2015 – the year the incentives for HEVs, PHEVs and EVs overlaps. The total incentive costs are determined by the mix of models purchased commensurate with MPG above the baseline models. As the technologies mature the amount provided to each vehicle segment would shift.

The analysis assumes that incentives are provided at the previously identified four efficiency tiers. The incentives for the PHEVs would have a similar efficiency tier graduation and would begin about six years after the start of the HEV program and end after 6 years. The program cost would rise to a peak of \$48,000,000 in 2015, then drop and rise again to \$32,000,000 in 2020.

11. Barriers to Implementation:

The major barrier to implementation of this policy is the need for legislation to develop a taxing mechanism – feebates, fuel tax, carbon tax, etc. – to support the program costs. Opposition may come from legislators and citizens unwilling to invest in GHG mitigation, from oil companies and dealers. With regard to the PHEV and EV option, the program could be delayed if the necessary research to improve battery capacity with reliability is not funded adequately, and if efforts to increase the “cleanliness” of the generation mix are not adequately achieved.

12. Other Factors:

The definitive early works used to frame this analysis show clearly that there should be a phased in approach to increasing market penetrations of HEVs and PHEVs. The present mix of generation nationally and in Wisconsin results in lower GHG emissions reductions from PHEVs when compared to HEVs for five to ten years. This also applies somewhat to EVs with a twist. There is a growing movement both to change transportation rules, and for citizens to purchase small EVs for in-town driving. Also, there are a growing number of companies selling small EVs for this situation – selling commercially available, albeit expensive, vehicles.

While there are some efforts afoot to develop both OEM PHEV vehicles and HEV conversion systems, the PHEV technology is not currently mass market ready. However, it is likely that this development will accelerate – especially if funding is made available for research to both improve battery capacity/reliability and develop the vehicles to utilize these batteries. Likewise, the “cleanliness” of the present mix of generation is shown to be inadequate for expecting early GHG reductions by utilizing PHEVs. This too is poised to be changed by other Task Force work groups and similar efforts in other states. Furthermore, the present national vision is that the earliest target markets for PHEVs are fleet vehicles – delivery vans, shuttle buses, maintenance vehicles, etc. Finally, there is another policy offered by the Transportation work group that suggests state fleet vehicles purchased in the future be a mix that includes accelerating purchase of “fleet” PHEVs. If this policy is implemented, this will improve the likelihood and timing of introduction of PHEVs for light duty vehicles (cars) as addressed in this proposal.

13. Related Policies:

- “California Car” Standards
- Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions (education component)
- Government Fleet Adoption of PHEVs and EVs

1. Report by NRDC and EPRI: “NRDC PHEV Report Vol 1.pdf”
2. Analysis spreadsheet: “HEV PHEV & EV Policy Analysis 15k revised 100707.xls”

E85 Infrastructure Development & Pricing Incentives

1. **Work Group:** Transportation
2. **Policy Name:** E85 Infrastructure Development & Pricing Incentives (E85)
3. **Policy Type:** Legislation (1) supporting the further development of Wisconsin's E85 infrastructure to provide satisfactory availability; and (2) creating retail E85 pricing incentives to make E85 competitive with regular gasoline on a MPG-adjusted basis.
4. **Affected Sectors, Sub-Sectors and/or Entities:** Transportation
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Well-to-wheels analysis indicates the initial savings will be equivalent to about 26% of the carbon emissions from each gallon of gasoline replaced by E85, based on corn-based ethanol. CO₂ reductions in 2020 are accounted for in the low carbon fuel policy emission reductions. As ethanol from new sources is introduced, such as cellulosic ethanol, the savings would increase to 70% or more. To the extent that fuels exceed the 10% low carbon fuel reduction there would be additional emission reductions. These reductions would be proportional to the increased decarbonization of the fuel and the carbon neutrality of the life cycle production process. Estimates of reductions or business-as-usual of CO₂ in 2050 were not calculated.
6. **Estimated Costs:** \$25,000 towards the conversion of 1 pump per station, plus an estimated \$0.329 per gallon of E85 sold; total cost proportionate to the number of gallons of E85 used through 2020. The actual amount per gallon would be a "studied" amount; currently estimating \$0.329 per gallon (the equivalent amount of a full state tax exemption).

Funding Sources: Subsidy from general fund
7. **Specific Description of Policy Proposal:**
 - E85 Infrastructure – increased availability from current 61 stations to 500 stations by 2015 (subsidized) and 50% of all outlets by 2020 (unsubsidized).
 - E85 Flex Fuel Price Subsidy – a general fund subsidy equal to the current level of taxation on E85 (\$0.329 per gallon) to make E85 price competitive with regular unleaded fuel on a MPG-adjusted basis, until availability increased to 50% of retail outlets (2020).
8. **Timetables, Duration and Stringency**

Option: The timetable is implicit in this policy recommendation. Duration is until changed by law.
9. **Explanation of Rough Estimate of GHG Reductions:** The American Lung Association of the Upper Midwest recently contracted with the University of North Dakota Energy & Environmental Research Center and Minnesota State University-Mankato to perform emissions modeling using EPA specifications. This study, which also reviewed lifecycle GHG emissions conducted by Argonne National Laboratory, concluded that E85 reduces lifecycle CO₂ emissions by 242 grams/mile.

For example, a Flexible Fuel Vehicle burning E85, driving 15,000 miles per year, at 15 MPG, would emit some *four tons* of CO₂ less than the same vehicle, under otherwise identical circumstances, burning conventional gasoline.

General Motors estimates that corn-derived E85 reduces CO₂ emissions by 20% compared to regular unleaded gasoline, while cellulosic E85 reduces CO₂ emissions by nearly 75%. These numbers roughly comport with those estimated in an EPA Emissions Facts paper published in April 2007: Corn ethanol reduces CO₂ emissions on average by 21.8% versus 90.0% for cellulosic ethanol. The EPA paper, *Greenhouse Gas Impacts of Expanded Renewable and Alternative Fuels Use*, bases its results on Argonne's GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation) full life-cycle model.
10. **Rough Estimate of Costs for Selected Years:** The cost to convert the first 500 stations would be \$11M (500 stations – existing 61 X \$25,000). Additional support would be needed for upstream ethanol terminals (e.g. - \$3M to create 4 terminals and rail) and a "general fund subsidy" to make E85 retail price competitive with gasoline on a MPG-adjusted basis. The latter would be proportionate to total gallons of E85 used at an estimated \$0.329 per gallon.

11. Barriers to Implementation: Ethanol price and oil price fluctuations and differentials as well as competing demands for ethanol as a blending agent (e.g. E10), food stock and animal feed.

12. Other Factors: Public outreach and education are essential to explain the benefits of using E85, where it can be purchased and address fuel efficiency concerns versus gasoline.

13. Related Policies:

- Low Carbon Fuel Standard

Low Carbon Fuel Standard

1. **Work Group:** Transportation
2. **Policy Name:** Low Carbon Fuel Standard (LCFS)
3. **Policy Type:** Legislation with regulatory implementation and enforcement.
4. **Affected Sectors, Sub-Sectors and/or Entities:** Transportation, Fuel Producers and Marketers, Vehicle Manufacturers, Agriculture and Electric Utilities.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** The LCFS seeks to reduce life-cycle carbon emissions from transportation fuels. Under business-as-usual fuel consumption and carbon-intensity of fuels scenarios Wisconsin could be generating 40 - 43 million metric tons (MMt) CO₂ by 2020 and 43.2 - 50.4 MMt CO₂ by 2030 from on- and off-road sources. A 10% standard could reduce 2020 CO₂ emissions by 4.0 - 4.3 MMt per year. A 20% standard by 2030 could result in reductions of 8.6 - 9.9 MMt per year.

6. **Estimated Costs:** The net cost is difficult to determine. It will depend on the future cost of petroleum, improvements in refining technology and operations and biofuels economics. A LCFS would involve public administrative costs to set and enforce a standard and private/marketplace costs for low-carbon fuels.

There may well be macroeconomic benefits derived from an LCFS as well. For example, substitution of petroleum imports with domestic biofuels could improve balance of payments and enhance domestic capital investment and employment.

Funding Sources: Administrative costs funded through state government operating budget. Any increase in fuel costs would be paid by all consumers.

7. **Specific Description of Policy Proposal:** Fuel providers (producers, importers, refiners and blenders) would need to sell product with a declining greenhouse gas (GHG) emissions profile measured in CO₂-equivalent gram per unit of fuel energy (BTUs). The standard will be measured on a life-cycle basis in order to include all emissions from fuel consumption and production, including upstream emissions.

Each fuel provider will need to demonstrate, on an annual basis, that the fuel mix provided to the market met the standard, including, if necessary, by using credits previously banked or purchased. Providers of fuel that exceed the standard for the compliance period will be able to generate credits that could be banked or sold. Penalties for noncompliance will need to be determined.

The LCFS will be performance and market-based. It will not dictate the mix of fuels delivered. Fuel providers can meet the LCFS by providing a sales-weighted average meeting the standard. The market will determine the most cost-effective and consumer-responsive outcome. For example, providers could meet the standard by blending ethanol (corn/cellulosic) with gasoline, blending biodiesel with diesel, purchasing credits from electric utilities providing renewable electricity for plug-in hybrid electric vehicles, improved efficiency in the exploration, processing and distribution of petroleum fuels or using strategies yet to be developed.

The regulatory body overseeing the standard will need to develop a process to determine baseline for fuel carbon-intensity, the life-cycle carbon content of fuels, award credits and provide a trading platform for them.

8. **Timetables, Duration and Stringency Option:** LCFS legislation would signal the fuel markets to develop decarbonized fuels. Carbon-intensity evaluation and compliance systems could take 1 to 2 years to develop. A 10% reduction by 2020 is realistic given the policies in place at the state and federal level. The standard could be made increasingly stringent (e.g., 20% by 2030) with further increases either defined in contemporary legislation or revisited at a future date.
9. **Explanation of Rough Estimate of GHG Reductions:** The GHG emission impact will depend on the mandated level of reduction and overall fuel use at that time. It should be noted the standard applies to life-cycle GHG emissions due to fuel production and use. A significant fraction of a petroleum life cycle emission reduction would probably occur outside of Wisconsin. Calculating these emission reductions and how to apply them against the LCFS goal would need resolution.

In-state production of biofuels and vehicles powered by renewable in-state electric generation would favorably shift this balance toward in-state emission reductions.

Two important factors affecting potential emission reductions include vehicle fuel efficiency and fuel use growth across the economy. The Energy Information Agency estimates growth at 0.9%/year while 2007 Wisconsin Energy Statistics indicate petroleum fuel growth has flattened, but fuels increasingly contain ethanol and biodiesel.

- “California Car” Standards
- Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions (education component)
- Government Fleet Adoption of PHEVs and EVs

10. Rough Estimate of Costs for Selected Years:

Undetermined at this time and will depend on petroleum, electric and biofuel production and distribution costs.

11. Barriers to Implementation: Legislation will be required to enact a standard. Opposition may come from producers and marketers of petroleum-derived transportation fuels. Administrative costs, uncertainty regarding the future price and availability of credits, and/or production of products meeting the standard are potential barriers. The lack of certainty regarding low-carbon fuels costs may result in confusion over what variables and cost estimators should be used.

Funding will be needed for state implementation. Implementation will require determination of life-cycle carbon intensity of fuels from well-to-tank or field-to-tank. This will be a complicated endeavor with varied stakeholders seeking to influence the outcome. These barriers may be reduced by using models or certification systems developed in other jurisdictions or in cooperation with them.

12. Other Factors: A LCFS in Wisconsin could harmonize with regional and/or national LCFS and biofuel policies. It would incentivize research, development and commercialization of new technologies. These diverse new sources of transportation fuels will provide a hedge against price volatility of petroleum products due to geopolitical instability, natural occurrence or geologic depletion.

13. Related Policies:

- Off-Road Equipment
- E85 Infrastructure
- Cap and Trade Program
- Advanced Biomass and Biofuel Commercialization and Utilization

Carbon-Audited Transportation Investment

1. **Work Group:** Transportation
2. **Policy Name:** Carbon Audited Transportation Investment (Carbon Audit)
3. **Policy Type:** Carbon Audit / Transportation funding reform
4. **Affected Sectors, Sub-Sectors and/or Entities:** Wisconsin Department of Transportation (DOT)
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Reduction estimated at ~1.7 million metric tons (MMt) of CO₂ compared to business-as-usual by 2020 and ~2.0 MMt of CO₂ in 2025.
6. **Estimated Costs:** Nominal increase in the cost of planning and evaluating transportation projects (all modes).

Funding Sources: DOT operating budget

7. **Specific Description of Policy Proposal:** This policy is intended to inform and promote energy-effective transportation infrastructure choices. It would require a carbon audit for all state funded transportation projects, including carbon footprints for all DOT Environmental Impact Statements (EIS). This would internalize associated social costs by including their assigned value on the balance sheet for transportation proposals. Providing this information may impact infrastructure project decisions, influence driving patterns and habits (vehicle miles traveled - VMT) and/or reduce congestion.

A carbon audit would estimate greenhouse gas (GHG) emissions based on three elements: (1) forecasts of added/reduced VMT resulting from the proposed project; (2) increased/reduced emissions associated with congestion or its alleviation; and (3) life cycle GHG emissions required for the construction and maintenance of the facilities/infrastructure. The carbon audit would be reported by DOT through project related EIS evaluations or permit analyses.

To provide an economic evaluation of projects, standard dollar values (which may change over time, according to best available science in estimating social costs, and market rates for carbon credits are introduced and evolve) must be assigned to both emitted carbon, and that going into the project infrastructure itself. These figures will be included in projects' cost-benefit analyses. The role of cost-benefit analysis in the decision-making process will remain informative, not ultimately decisive, but the carbon footprint will become a consideration with assumptions regarding its assigned dollar value clearly stated.

8. **Timetables, Duration and Stringency Option:** Would require Executive Order and/or administrative rule changes.
9. **Explanation of Rough Estimate of GHG Reductions:** Literature and/or anecdotal values for estimating the associated emission reductions of this policy are not available. It is assumed this process requirement achieves a 5% net reduction (~ 2.0 million of an estimated 40.0 MMt of CO₂ equivalents business-as-usual emissions scenario) by 2025.
10. **Rough Estimate of Costs for Selected Years:** Carbon audits that reveal high levels of induced VMT would favor dismissal of the proposed project, compared to the status quo. Audits that reveal substantial relief of congestion would favor project approval. While congestion is not already a major problem on the majority of Wisconsin road-miles, the policy would, on the whole, favor net cost savings to the State as projects become more selective with fewer proposals demonstrating a net benefit.
11. **Barriers to Implementation:** Needs a discussion of how dollar values should be determined and assigned, particularly those outside of an established carbon-trading context. It is asserted that even the most conservative values would serve to establish a desirable process framework.
12. **Other Factors:** Guiding attention towards reducing GHG emissions and more energy-effective transportation investments is preferable to making transportation investments more difficult altogether. The policy requires the consideration of unfunded depreciation and maintenance costs typically not considered when evaluating

transportation projects. They represent a clear liability to the State of Wisconsin, which is addressed by existing GASB34¹ legislation. While the legislation addresses what is primarily an ongoing fiscal concern, it should be noted that stricter enforcement of GASB34, requiring all depreciation and maintenance costs being funded upon project approval, would similarly internalize a (financial) cost which is presently borne by the state at-large. This would, secondarily, serve to reduce VMT induced by transportation projects. While any associated sacrifice in transportation goals may prove contentious, GASB34 aligns fiscal accountability with desired environmental goals. This Carbon-Audit proposal does more, squarely addressing carbon footprint itself, without presenting a serious challenge to transportation objectives in general.

13. Related Policies:

- Energy Efficient Communities
- Transit Enhancement and Travel Demand Management

1. General Accounting Standards Board – directive 34

Energy Efficient Communities

1. **Work Group:** Transportation
2. **Policy Name:** Energy Efficient Communities
3. **Policy Type:** Regulatory, technical assistance, funding reform
4. **Affected Sectors, Sub-Sectors or Entities:** State and local government including city, county, municipal planning organizations and regional planning agencies.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Avoided annual emissions will depend on the vehicle emission scenario selected:
 - 6.2 million metric tons (MMt) CO₂ annual emissions by 2020 under CAFE¹
 - 5.4 MMt CO₂ annual emissions by 2020 under CARB

Net CO₂ emission reductions would be greater under CARB regulations because of greater fuel efficiency (see California Cars policy template).

6. **Estimated Costs:** Net costs should be small. In many cases the policies, such as market-based pricing for parking, will actually produce net increases in revenues for local units of government.
7. **Specific Description of Policy Proposal:**

Background

Vehicle miles traveled (VMT), both aggregate and per capita, have risen dramatically in recent decades in Wisconsin. Strategies relying on technology improvements cannot create permanent emission reductions without also reducing VMT. A recent study in the Seattle metro area estimated that even if new car mileage were increased to 94.5 mpg and the carbon content of fuels reduced by 40%, it would still require an 18% reduction in VMT to meet the region's goal of cutting greenhouse gas (GHG) emissions from transportation by 80%. The magnitude of needed VMT reduction may be different in Wisconsin, but the principle is the same.

1. CAFE and CARB are two common acronyms used in the template. CARB refers to the emission standards developed by the California Air Resources Board. CAFE refers to the mileage standards established under the federal Corporate Average Fuel Economy.

Currently, most residents in Wisconsin have little choice in travel mode. Communities have developed in ways that discourage walking, bicycling or taking transit to local destinations. The proposed policies are designed to encourage development patterns that are compatible with transit development as well as walkable destinations. It is important to note that the policies are intended to encourage development patterns that reduce dependency on automobiles by providing viable alternatives for mobility, such as walking and transit options. None of the policies prohibit driving nor do they make driving more expensive nor do they make driving less convenient. They simply promote the opportunity to use options to driving alone.

The Energy Efficient Communities are designed to promote community mobility options in two ways:

1. Existing developments will optimize vehicular, transit and walking/biking options
2. New developments will be added where compatible with transit usage and increased capacity to walk/bicycle to destinations.

Energy Efficient Communities do not make it more difficult or more expensive to drive, they simply make it possible to have desirable, efficient alternatives to driving. As energy prices increase and levels of congestion increase, the use of alternatives will increase at a higher rate than the increase use of automobiles.

The recommended policies will require cooperation across levels of government and will be sensitive to the quality of their implementation. State government (e.g., Office of Energy Independence, Department of Administration, Department of Transportation (DOT), etc.) should evaluate VMT and transportation emissions annually to determine whether the actions taken are providing the needed reductions. If not, recommendations to meet the emission reduction targets should be proposed to decision makers.

Proposal

The following list of policies should be pursued to the greatest extent feasible:

- A. Transportation funding for compact development. Special transportation funding for areas zoned

for traditional neighborhood design. This could be accomplished by reinstating Wisconsin DOT funding of \$1 million per year for comprehensive planning. This funding could be used to fund the “Smart Growth Dividend.”

- B. Complete streets. To the greatest extent feasible, road projects should include safety provisions for pedestrians, bicyclists, and (where applicable) transit vehicles. Such improvements should include safe facilities for non-automobile modes both along and across corridors being improved.
 - C. Development impact transparency and concurrency. Before any property is rezoned to facilitate new development (that receives state economic development assistance) or before any project to expand state roadway capacity is authorized, VMT- and GHG-impacts should be carefully evaluated. Projects that will cause a roadway to exceed its rated capacity – or will further strain a roadway already above capacity – are not eligible for state economic development unless capacity improvements will be completed within one year of the development’s opening – either through the course of scheduled transportation improvements or through a payment for the improvement by the developer over a period not to exceed 20 years.
 - D. Parking. A model parking ordinance should be developed by state and local stakeholders to institute market pricing principles, reconsider mandatory minimum requirements for retailers and pricing of street parking. This model ordinance should incorporate parking standards for technology and market changes, such as small parking spaces for microcars.
 - E. Planning methodology. DOT and Metropolitan Planning Organization planning should emphasize multimodal (i.e. automobile, pedestrian and bicycling) accessibility as the highest goal rather than roadway mobility. At the local and metro area level, modeling should be parcel-based, (rather than transportation analysis zones–based) across the street pattern, in order to capture walking and bicycling accessibility. Roadway capacity increases should be modeled for long-term “induced demand” and the resulting increase in GHG emissions, and their value as transportation solutions discounted accordingly.
 - F. Economic development. State economic development funding should consider project related VMT as a major factor. Projects that reduce or generate low levels of VMT should be given preference over those with high levels per employee. Rules on Tax Increment Financing (TIF) should be revisited to discourage use of TIF that increase GHG emissions.
 - G. Fix-it-first. Wisconsin should strengthen its fix-it-first policy on roadways to place a higher priority on rehabilitation of existing infrastructure over adding new lane-miles.
 - H. Growth accommodation. The Wisconsin Department of Commerce should develop incentives for local governments to allow compact development and redevelopment.
- 8. Timetables, Duration and Stringency Option:** All actions should be undertaken immediately and assessed against VMT targets annually. If targets are not being met, stringency must be increased, for example by replacing incentives to local government with mandates.
- 9. Explanation of Rough Estimate of GHG Reductions:** Population increases (post-2005) are anticipated to increase VMT under business-as-usual conditions. However, the policies described in this template can restrain sprawl and substantially decrease growth in VMT. The calculation factors used to estimate avoided emissions are from the following sources:
- Center for Clean Air Policy <http://www.ccap.org/trans.htm> emission calculator and a scan of literature on policy effect on VMT from new developments - VMT-from-growth by 50%, and the remaining VMT by 25%. Freight travel (~10% of VMT) is not anticipated to be affected by this policy.
 - DOT VMT and population (9.5% in 2020 and 11.9% in 2025) projections.
 - EPA Mobile 6.2 model emission factors.
- A spreadsheet has been developed to estimate the emission reductions under both the CAFE and CARB emission reduction scenarios.
- 10. Rough Estimate of Costs for Selected Years:** Transportation money should be redistributed from processes and programs that raise VMT to

those that lower VMT, so no major source of new funds should be required. If local governments enact market pricing for street parking, they should see small revenue gains.

11. Barriers to Implementation: This multifaceted policy faces a variety of barriers. Land use decisions are made by local units of government. The state currently has no agency committed to working with local units of government to assist in the implementation of these policies. The DNR and the Office of Energy Independence are logical agencies to help coordinate these policies and to assist local governments in becoming Energy Efficient Communities.

These policies will require the state to work cooperatively with private stakeholders, local governments and citizens to develop local land use and transportation planning policies that encourage low VMT developments. These policies should not pre-empt local decision-making that does not affect statewide GHG reduction goals. It should emphasize incentive-based approaches for local governments and private entities rather than add new requirements. Institutional resistance to altering transportation and land use planning paradigms that previously emphasized mobility (rather than accessibility) is anticipated. This institutional inertia (i.e., private and public sectors) should be addressed with strong leadership, bi-partisan analysis and open discussion with affected stakeholders.

12. Other Factors: The goals in this policy assume that reductions in VMT will be affected through other means as well. If this is not the case, the stringency and extent of actions here must be radically increased.

13. Related Policies:

- Carbon Audited Transportation Investment
- Transit Enhancement and Travel Demand Management

Transit Enhancement and Travel Demand Management

1. **Work Group:** Transportation
 - Regional Transit Authority: Granted authority to levy a local sales tax of up to one half cent
 - Voluntary Travel Demand Management: Employers bear costs
2. **Policy Name:** Transit Enhancement and Travel Demand Management (Transit Enhancement)
3. **Policy Type:** Legislation establishing three separate funding programs for transit and a voluntary program to promote transportation alternatives by employers of over 100 employees (in areas with mass transit and ride share capabilities – Milwaukee, Madison and Fox Valley metropolitan areas).
4. **Affected Sectors, Sub-Sectors and/or Entities:** Funding programs would provide financial assistance to state and local units of government that operate transit systems. Policies promoting transit usage could affect major employers (facilities with more than 100 employees) in designated urban growth areas.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Transit funding and travel demand management policies are anticipated to achieve annual reductions of 1.2 – 1.4 million metric tons (MMt) of CO₂ compared to business-as-usual in 2020.
6. **Estimated Costs:** Respective program costs:
 - Intercity Rail: Up to \$120 million, depending on federal support
 - Transit Trust Fund: Up to \$200 million
 - Regional Transit Authority: costs vary by region
 - Voluntary Travel Demand Management programs by employers of more than 100 employees: Estimated costs for employers may range from very little cost to distribute educational material to about \$1 - 2 per day to encourage an employee to switch workplace commute modes. Costs will vary depending on the extent and size of the program.

Funding Sources:

 - Intercity Rail: Additional 20 year state general obligation (GO) bonds
 - Transit Trust Fund: 20 year state general obligation (GO) bonds
7. **Specific Description of Policy Proposal:** This template integrates three transit alternatives to create and fund broader regional transit options. These transit funding options are Intercity Rail, Transit Trust and a Regional Transit Authority. These funds can be applied to both public and private transit alternatives within the affected areas. The fourth element of this template is a Travel Demand Management policy that applies to all employers with greater than 100 employees at a given facility in the affected regions. These rules apply to both private and public sector employers.
 - A. Intercity Rail. Currently, the federal government authorizes expenditures of up to 80% of the capital costs of eligible intercity Amtrak rail projects. Actual expenditures have been unable to meet demand for these projects. This proposal increases the non-federal share to a level that will provide greater leverage to access limited federal funding. Up to \$120 million is recommended to implement the proposed Chicago-Milwaukee-Madison high speed rail improvements to Eau Claire and the Twin Cities. (The state has already pledged \$80 million for the Amtrak improvements between Milwaukee and Madison.).
 - B. Transit Trust Fund. Currently, local commuter rail projects are eligible for a 50% federal matching grant. Limited funds have put most proposed projects out of reach in Wisconsin. This proposal provides local units of government with up to a 50% state match for local rail projects. Examples of projects that might be funded include the Kenosha-Racine-Milwaukee and Dane 2020 rail options.
 - C. Regional Transit Authority. Currently transit systems are funded by farebox recovery and limited state and federal funds. Those funds have not allowed transit systems to keep up with inflation. This proposal allows local units of government to fund transit operations through a local sales tax of up to one half cent.

- D. Travel Demand Management. Promote Commute Trip Reduction programs for employees to reduce single-occupant vehicle use for workplace travel. Key factors in successful programs include:
- Providing incentives for alternate modes
 - Consider parking supply constrictions/parking pricing mechanisms
 - Tailoring support and incentives to those suited for specific work site
 - Combining programs that inform employees of commuting options with supporting services and incentives
 - Making a wide range of commuting alternatives available
- 8. Timetables, Duration and Stringency Option:** All funding would need to be long-term and should be funded as soon as reasonably feasible to achieve the emission reduction and other transit improvement goals. Funding needs are estimated to be long-term to support the infrastructure and capitalization needs of mass transit programs. Employee commute option programs could be funded through existing programs (i.e. transit education efforts) or perhaps through other private or public revenue streams including global warming related initiatives.
- 9. Explanation of Rough Estimate of GHG Reductions:** These policies seek to displace approximately 5% of all automobile trips within their respective corridors (Milwaukee, Madison and Fox Valley Metropolitan areas). The total anticipated annual CO₂ emission reductions are 1.4 MMt in 2020. A breakdown of anticipated reductions for each element of the proposal follows:
- A. Intercity Rail. Wisconsin Department of Transportation (DOT) estimates 500,000 passenger rail trips are made annually in the Milwaukee - Chicago corridor. Expanding the rail system in Madison is projected to gain another 500,000 riders (displacing 500,000 auto trips of approximately 33 miles each). Annual CO₂ reduction of 190,000 metric tons by 2020 compared to business-as-usual.
- B. Transit Trust Fund. Annual CO₂ reductions up to 100,000 metric tons by 2020 compared to business-as-usual.
- C. Regional Transit Authority. This analysis assumed a 2% shift from single occupant vehicle to mass transit. The Kenosha-Racine-Milwaukee Connector is assumed to attract 1.6 million trips per year in southeast WI (out of 39,682,000 trips – Southeast Wisconsin Regional Planning Commission – SEWRPC) and result in a 50,000 ton CO₂ reduction by 2012. Annual CO₂ reduction of 110,000 metric tons by 2020 compared to business-as-usual.
- D. Travel Demand Management. Annual CO₂ reduction of 900,000 metric tons by 2020 compared to business-as-usual. The Center for Clean Air Policy (CCAP) on-line calculator tool was used to estimate CO₂ reductions <http://www.ccap.org/trans.htm>.
- 10. Rough Estimate of Costs for Selected Years:** Assumes continued federal support of existing transit programs to state and local governing bodies.
- A GO bond for \$320 million with 20 year repayment and a 5% interest rate would cost in total \$506.8 million (\$25.3 million annually). A local sales tax of one half cent devoted to a Regional Transit Authority could potentially yield \$60 - 65 million/year in Milwaukee County, \$40 - 45 million/year in Dane County, \$20 - 22 million/year in Brown County and \$16 - 18 million/year in Outagamie County.
- 11. Barriers to Implementation:** The barriers to implementation for the transit funding options include the availability of funding and political support for these funding options. Intercity Rail and Transit Trust would rely on state funding so broad state level support will be needed to implement. The Regional Transit Authority will require state passage of authorizing legislation and local support for the sales tax increases. Employment commuter traffic constitutes about 20% of all passenger vehicle trips. Employer policies of providing free/reduced fare parking

costs for employees will affect the success of employment based programs.

About 80% of all passenger vehicle trips are for family related activities (e.g. shopping, recreation, etc.). Creating attractive transportation options on weekends and evenings for these types of trips will be needed to reduce the preponderance of passenger vehicle trips, especially in cold weather periods. Reducing VMT and emissions from these trips will be critical for substantially reducing transportation emissions.

Education at schools, workplaces and home regarding specific activities (e.g. efficient trip management, telecommuting, etc.) and general awareness of the transportation implications on global warming (e.g. sustainability issues) will be an essential element for these policies to be successful.

Local units of government and businesses may embrace or ignore a voluntary travel demand management program depending on perceptions of costs compared to benefits. The specifics of the program requirements and funding mechanisms and incentives (e.g. grants, loans or tax breaks) will affect overall support.

12. Other Factors: A critical factor in the success of these policy options is the availability of a comprehensive and integrated set of transit alternatives (e.g. carpooling, Rideshare, bike/pedestrian, buses, light/commuter rail, trains, etc.). Regions lacking a full suite of transit alternatives have reduced potential to achieve the emission reductions noted above.

Funding for these proposals will depend in significant part on reallocation of existing funding sources or development of new sources. Incentives will also depend on tax policy and other state/local incentives. Federal rules and policies may also be a factor in the effectiveness of these initiatives.

These policies will have additional costs and benefits that may be difficult to estimate. Costs associated with increased public/private infrastructure and staff needed for these facilities and services need to be considered. A proportion of these costs may be met by reallocating existing

income streams though some new costs should probably be anticipated. Reduced emissions of other criteria air pollutants (e.g. VOC, NO_x, toxics), reduced traffic on roads and cost savings should also be considered.

13. Related Policies:

- Carbon Audited Transportation Investment
- Reform Planning and Funding Policies to Reduce VMT

Biomass and Biofuel

1. **Work Group:** Agriculture and Forestry
2. **Policy Name:** Advanced Biomass and Biofuel Commercialization and Utilization (Biomass and Biofuel)
3. **Policy Type:** Fiscal measure, legislation, market-based mechanism
4. **Affected Sectors, Sub-Sectors and/or Entities:** Forest products industry, transportation, recreation, utilities, agriculture, private landowners, government, small business
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Emission reduction estimates were not developed for this policy
6. **Estimated Costs:** Cost estimates were not developed for this policy

Funding Sources: Funding for this policy recommendation could come in the form of state and federal grants to support the supply based incentives and Energy Crop Reserve Program. Existing state funding would be utilized purchase biomass and other bioenergy sources.

7. Specific Description of Policy Proposal: Background

The goal of this policy proposal is to increase the availability and use of renewable bioenergy for electricity, heat, and transportation. Energy from biological sources can reduce lifecycle carbon emissions, if the amount of fossil fuel used in obtaining and processing the feedstock is not excessive.

Some bioenergy feedstocks, conversion technologies, and end uses have lower life-cycle carbon emissions than others. It is therefore the intent of this policy proposal to promote those bioenergy sources with the most favorable life-cycle carbon emissions. In crafting specific policies, the relative efficiency and carbon emission impact of biomass must be evaluated. For example, it is important to be careful not to provide undue incentives to new coal-fired generation, if it is

capable of co-firing biomass material with coal, unless such new generation results in substantially lower carbon and other emissions than other available technologies, such as natural gas facilities.

The carbon emissions, environmental effects, and market viability of bioenergy sources are uncertain and continue to evolve with technology, fossil energy prices, and markets. It is therefore also the intent of this policy proposal to encourage flexibility among researchers, regulators, and businesses.

Certain policies related to bioenergy are being considered by other workgroups, these include policies related to standards for low-carbon transportation fuels, availability of E85 fueling stations, carbon cap-and-trade programs (which may support demand for low-carbon bioenergy), industrial biomass utilization, and regulation of electricity generation in general. The agriculture and forestry workgroup is aware of these policies and supports their goal of increasing low-carbon bioenergy.

For the purpose of this policy, bioenergy is heat, electricity and other fuels produced from biomass.

Policies

This policy proposal recommends action in two main areas: (1) increasing the supply of low-carbon bioenergy and (2) increasing the use of bioenergy by state and local governments. This proposal includes various supporting recommendations including research and education.

- A. Supply of Bioenergy. To increase the supply of low-carbon bioenergy in Wisconsin, we recommend these steps:
 - Create a state Energy Crop Reserve Program. This program would pay an incentive to landowners to grow perennial grasses and energy crops on marginal land that would otherwise be at risk of intensive cropping. The program would target land previously enrolled in the federal Conservation Reserve Program

(CRP) and would have similar soil, water, and habitat standards, while allowing harvest of qualified energy crops. This program would have a target enrollment of 10% of the land that would otherwise come out of a CRP contract. This policy recommendation is further developed in the “Preservation of Existing Vegetative Cover Carbon Sinks on CRP Lands” template.

- Provide financial support to biomass producers for the purchase of new equipment and technology needed to harvest, process and transport biomass feedstocks. The support can take the form of direct grants, loan assistance, or tax incentives. This recommendation will also have a side benefit of replacing older equipment or introducing more energy efficient equipment and will result in reduced carbon emissions.
- Provide financial support to reduce risk and uncertainty for biomass producers, including modifications to crop insurance programs, direct grants and loan guarantees.
- Provide support for biomass aggregators and infrastructure such as transportation, storage and processing. Support can include:
 - Development of biomass harvesting guidelines
 - Pilot projects
 - Promotion of commodity markets and exchanges
 - Outreach to producers and users
 - Direct grants to cooperatives

Specific policies should be designed to ensure incentives are provided for all eligible entities with consideration of the tax liabilities each faces. For entities that have different tax liability structures, grants could be considered or the incentives could be designed with the ability to transfer the incentive through an intermediary.

B. State Bioenergy Use. The state should assume a leadership role in the use of biomass for heat and electricity production. This will provide

a showcase for advanced technologies, build technical expertise within the state, and bolster demand for biomass. We recommend three steps:

- Utilize solid/liquid/gaseous fuels derived from biomass to provide 25% of the energy needs for state owned or occupied facilities by 2025. This goal would be met through a tier approach of providing 10% of energy by 2010, 15% by 2015, 20% by 2020 and 25% by 2025. Facilities and agencies that are able to exceed these targets will receive special recognition.
- Provide incentives to school districts that use biomass for heat or electricity by excluding the capital cost of biomass systems, fuel, maintenance, and any purchase cost of heat or electricity from revenue limits under the school aid formula.
- Exclude the cost of biomass systems, biomass fuel, maintenance and any purchase cost of heat or energy from biomass from municipal and county levy limits.

C. Other Recommendations. We also recommend the following supporting policies:

- Encourage and support the UW System, through the Great Lakes Bioenergy Research Center, to research biomass technology for the production of heat, electricity, transportation fuels, chemicals, and other products. In particular, encourage research on advanced bioenergy sources - with greater carbon, energy, and environmental benefits - such as cellulosic ethanol and advanced hybrid trees and grasses.
- Develop new permitting standards and procedures to facilitate regulatory certainty, environmental safety, and rapid evaluation of new bioenergy technologies.
- Promote a wide ranging outreach and education program to educate landowners, businesses, cooperatives, regulators, and others about the production and use of bioenergy.

- Support the development of advanced biomass, biofuel, and related renewable energy degree programs by the UW System, UW campuses, and Technical Colleges.
- Develop awards and prizes for the innovations in the bioenergy. This will increase the visibility and offer credibility to new businesses and markets.

8. Timetables, Duration and Stringency Option:

The implementation and duration of the incentives should be somewhat flexible to facilitate the sun setting of ineffective incentives and the initiation of new incentives as the markets/conditions/requirements change. Initial incentives should focus on expanding the end markets and stabilizing the fuel supply. When demand for biomass for energy and biofuel production has grown to allow competitive market, the incentives are no longer necessary.

9. Explanation of Rough Estimate of GHG

Reductions: Emission reduction estimates were not developed for this policy

10. Rough Estimate of Costs for Selected Years: Cost estimates were not developed for this policy

11. Barriers to Implementation: Primary barriers to implementation are the difficulties in stabilizing the supply of adequate feedstocks and the high cost and risk associated with advanced biomass and biofuel technologies.

Additional barriers include:

- Potential conflict between various land uses
- Regulatory uncertainty regarding new technologies
- Lack of quality standards and classifications for biomass
- Uncertainty of supply and cost fluctuations
- High relative handling and transportation costs
- Lack of training technical workforce to construct, operate and maintain advanced biomass systems and processes.

12. Other Factors: Wisconsin is a biomass powerhouse with 15.9 million acres in forestland and 15.4 million acres in agriculture. Although the total amount of power or heat generated from biomass is currently fairly small, it has the opportunity to provide a growing source of energy. Biomass makes up the largest percentage of renewable energy providing 4% of the total electricity supply in Wisconsin versus 0.1% for wind and solar combined.¹ There are over 200 industrial and commercial systems in Wisconsin using wood or biomass fuels for power and/or space heat.

Changes in the wood marketplace's supply/demand equation present serious risks of disrupting existing and productive businesses in Wisconsin dependent on those supplies. Extraordinary caution needs to be invested by policy-makers, particularly, to assure that government created or endorsed programs encourage the availability of forest resources for bioenergy objectives without harming the availability of forest resources currently utilized by the state's forest products industry. The work group recognizes the benefit from providing demand side incentives to promote the use of biomass in addition to the supply side incentives within this template. The work group was not able to obtain consensus on the specific policy recommendations to address demand side incentives and encourages more discussion on this topic.

Nonetheless, the opportunity - perhaps once in a lifetime - to access currently non-utilized and under-utilized resources for the production of bioenergy is perceived by the forest and agricultural products industry not only as a contributor to global warming initiatives, but also as a significant opportunity to markedly improve forest health - through increased management for productivity and sustainability - in the state.

Co-Benefits. This policy would have the additional benefit of promoting small business within the state and assist in the development of the

1. Energy Information Administration, <http://www.eia.doe.gov> and Renewable Energy Policy Project <http://www.repp.org/bioenergy/link6.htm>

emerging Green Business and Green Technology sectors. Environmental co-benefits could be achieved with biomass. Some biomass production has a lower impact to wildlife habitat, and air and water quality than other land uses. Biomass production can also sequester carbon and may be compatible with the tourism industry and wood products industry if the incentives are targeted the right way.

13. Related Policies:

- State Government as Leader
- Low Carbon Fuel Standard
- Preservation of Existing Vegetative Cover
Carbon Sinks on CRP Lands
- Industrial Boiler Fuel Switching
- Wood Waste
- Co-Generation Incentives and/or Mandates
for Construction, Upgrades and Replacement

Afforestation and Reforestation

1. **Work Group:** Agriculture and Forestry
2. **Policy Name:** Incentives for Afforestation and Reforestation (Afforestation and Reforestation)
3. **Policy Type:** Legislation, market-based incentives, fiscal measure, public education
4. **Affected Sectors, Sub-Sectors and/or Entities:** Forest products industry, state, county, private forest programs, agriculture (example: idle agricultural lands, non-operating farms/pasture lands) and other private landowners, municipalities, utilities, industry
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** There is potential for a large amount of carbon sequestration to occur through afforestation. The actual amount of carbon sequestration achieved under this recommendation depends on participation and transaction costs. Further analysis is being conducted to refine the cost estimates associated with carbon driven afforestation in Wisconsin.
6. **Estimated Costs:** Cost of the program would be dependant upon the specific policy chosen and the participation rates. See further explanation below.

Funding Sources: See section 12 for a discussion of potential funding sources and implications.

7. **Specific Description of Policy Proposal:** This policy proposal involves a variety of recommendations designed to encourage afforestation and reforestation through a variety of incentives and education/assistance programs. There are many existing state and federal programs designed to encourage afforestation, reforestation and other forest management. These programs are mature and robust and have the additive benefit of promoting carbon sequestration among the many public values these programs provide. Opportunities exist to enhance these programs to promote additional participation and carbon sequestration.

The goal of the policy recommendations in this proposal is to encourage afforestation practices

through incentives and technical assistance until emerging carbon markets provide the economic environment where state sponsored financial incentives are no longer needed.

- A. Enhancement of existing state programs. Existing state programs may be enhanced to provide additional afforestation incentives for landowners. These enhancements may require legislative rule changes, fiscal measures, or manual code adjustments.
 - The Managed Forest Law (MFL) currently allows landowners to enter into this program without 80% of the involved land forested as required, as long as the 80% is achieved within a certain period of time. This policy would change that requirement and allow landowners that enroll into MFL the ability to enroll non-forested lands with a longer term requirement for mandatory afforestation practices within the first five years.
 - This policy proposes increasing the funding available to private landowners for a variety of management actions under the Wisconsin Forest Landowner Grant Program. This is a successful and flexible program that can be used for afforestation activities in addition to many of the other actions in the Forestry policy recommendations. This program is currently operating, but is fully subscribed with no additional capacity.
- B. Increased education and assistance. Additional afforestation and reforestation could be achieved through increased education and assistance. The increased effort would require direction through the development of a communication strategy and fiscal measures to provide the additional resources needed at the state level to implement this plan. Specific policy recommendations are:
 - Develop a statewide communication strategy for carbon sequestration efforts and opportunities. This recommendation should be combined with other similar recommendations to promote forest management, forest health and carbon sequestration.
 - Increase the amount of technical forestry assistance available to non-industrial private

landowners. This can be accomplished through increased public sector resources or through increased grants available to off-set the cost of private sector forestry assistance.

- Enhancement of existing programs, or creation of new programs, which provide education, outreach, and promotion of climate change programs and options to private landowners. This education and outreach program could be focused on the State Technical College system or using the UW Basin Educator model.
- Develop standards and protocols for monitoring and measurement of carbon sequestration on forests in WI. This would help to reduce the transaction cost associated with bringing carbon credits to market.

Specific policies should be designed to ensure incentives are provided for all eligible entities with consideration of the tax liabilities each faces. For entities that have different tax liability structures, grants could be considered or the incentives could be designed with the ability to transfer the incentive through an intermediary.

8. Timetables, Duration and Stringency Option:

New incentive programs, or incentives provided under existing programs, would need to provide long-term assurances to property owners and be eligible for any existing or emerging carbon market. These policies would need to be reviewed after 5 years to determine if the policy objectives are being met, or if adjustments need to be made. Attention should be paid to emerging carbon markets with respect to determining whether state sponsored financial incentives are no longer needed.

9. Explanation of Rough Estimate of GHG

Reductions: Reforestation is estimated to have a carbon sequestration rate of 0.3 – 2.1 metric tons of carbon per acre per year and afforestation is estimated to have a carbon sequestration rate of 0.6 – 2.6 metric tons of carbon per acre per year. ¹

1. Birdsey, R.A. (1996) regional Estimates of Timber Volume and Forest Carbon for Fully Stocked Timberland, Average Management After Final Clearcut Harvest. In *Forests and Global Change: Volume 2, Forest management Opportunities for Mitigating Carbon Emissions*, eds. R.N. Sampson and D. Hair, American Forests, Washington, DC.

10. Rough Estimate of Costs for Selected Years:

Further cost estimates are being developed. All costs are estimated in present value (2007) dollars.

11. Barriers to Implementation: Barriers to afforestation and reforestation include:

- Competing land-use (e.g. farming, development)
- Lack of funding available to assist with initial cost of planting
- Lack of awareness by landowners of existing programs and assistance
- Lack of professional assistance available to landowners
- Low price of carbon on existing carbon commodity markets and lack of mandatory cap and trade program

12. Other Factors: This policy option will need to be carefully compared and aligned with other policy options that address land-use issues. For example this policy may compete with policies and other market pressures to encourage conversion, or use of land, for corn based ethanol. Biomass for energy production and technologies such as cellulosic ethanol production are compatible with carbon sequestration practices.

A. Potential funding sources and implications. Several of the templates propose paying landowners and farmers to adopt practices that offset GHG emissions. These payments could come from the state directly, or from participants in a cap-and-trade program, who may need to buy offsets to meet their emissions limits. If a cap-and-trade program is available, using it to fund offsets would offer three benefits over a state-funded program (in addition to saving state taxpayer dollars).

First, if a cap-and-trade program were enacted, and as its cap were reduced to more stringent levels, the price paid for offsets would be likely to rise. In the long run, the benefits to landowners and farmers may be higher under a cap-and-trade program than under a state funded program. Second, paying for forestry and agricultural offsets through a cap-and-trade program would benefit emitters, who would be able to meet some of their obligations through a lower-cost option. This would enhance the primary benefit of a cap-and-

trade program, which is uncovering efficient and low-cost options to reduce GHG emissions. Finally, forestry and agriculture offsets provide additional environmental benefits, including surface water protection and wildlife habitat, which other offset methods may not. Making forestry and agriculture offsets eligible under a cap-and-trade program would bring the power of climate markets to support general environmental goals connected to the land.

- B. Co-Benefits. There are significant co-benefits associated with afforestation and reforestation. Forested lands provide ecosystem services such as increased water quality, soil stabilization and erosion control, biodiversity and habitat and other social benefits.

Estimates have shown that wood based industries and tourism sensitive sectors account for 12% of the Gross State Product and 18% of the jobs in Wisconsin. The wood products industry contributes approximately \$20 billion each year. The tourism sensitive sector has an estimated output of over \$13 billion and employs almost 450,000 people in the state. State residents alone spent over \$5.5 billion per year on goods and services associated with forest based recreation during 1996. The majority of this spending was done in local regions within close proximity to the recreational site.²

13. Related Policies:

- Sustainable Forest Management
- Urban Forestry

2. *Forests and Regional Development: Economic impacts of woodland use for recreation and timber in Wisconsin*. D. Marcouiller and T. Mace. 1999 University of Wisconsin System, Cooperative Extension Publications

Forest Loss Prevention

1. **Work Group:** Agriculture and Forestry
2. **Policy Name:** Develop a state-level program to prevent loss of forest through parcelization or conversion out of forestry (Forest Loss Prevention)
3. **Policy Type:** Legislation and changes to existing state programs and rules affecting forests
4. **Affected Sectors, Sub-Sectors and/or Entities:** Forestry land owners, tribes, land trusts, property developers, local government, and potential greenhouse gas (GHG) emitters
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Approximately 6.0 MMt (Million Metric tons) of avoided CO₂ by 2025. This figure does not include an estimate of increased carbon sequestration, which would also result from this policy.
6. **Estimated Costs:** The estimated annual cost of the proposed program is a minimum of \$4,000,000 annually for the acquisition of easements and additional program and administrative overhead. The cost would be reduced by administering this program in conjunction with existing programs.

Funding Sources: This funding could come from a variety of sources such as federal grants, private donations, and the state. An additional source could be funds raised from the sale of allowances under a cap-and-trade program and/or monies raised via a carbon tax. See section 12 for a discussion of potential funding sources and implications. Other options include the imposition of small fees against green-field developments or building permits, or requiring that developments off-set the carbon sequestration potential of the land parcel being developed, however these would most likely face significant opposition.

7. **Specific Description of Policy Proposal:** A number of methods could be used to help to decrease the loss of forests due to conversion and parcelization. For example, the state could require changes to local zoning and related requirements that discourage or prevent the conversion or

parcelization of forested land. However, these changes are likely to raise political concerns from local communities and citizens, as well as potential legal challenges.

- A. Incentives can also be used to reduce the loss of forest land through conversion and parcelization. This policy recommends that Wisconsin develop a Forest Legacy Program similar to the Federal USDA Forest Legacy Program. Under this state Forest Legacy Program, matching funds would be made available to land trusts and local communities to allow the voluntary placement of conservation easements for forest lands. This program would target 8,000 acres of forest a year for a total of 136,000 acres by 2025.

Consistent with the USDA Forest Legacy Program, the state Forest Legacy Program could provide 75% of the funding and require a 25% match by land trusts, local governments, or tribes. The match could also be from donated easements over a portion of the land. Also, the program could seek federal grants from programs such as the USDA Forest Legacy Program or the Natural Resources Conservation Service Environmental Quality Incentives Program (EQIP) to purchase conservation easements. The program could also accept donations and reduced-priced sales of conservation easements against forested lands.

The state Forest Legacy Program would determine the most effective use of its budget and, in particular, the sites that are most important to protect from conversion or parcelization. This program would provide many public benefits such as enhance water and air quality, wildlife habitat and public access for hunting and fishing. The additional and continual carbon storage capacity of these lands would be an additive benefit of this program. This program would need to be designed to allow participation by tribal entities through the creation of carbon sequestration contracts or similar mechanisms through the State.

- B. This policy also recommends the creation of a Forest Planning Grant Program which would assist local governments with ensuring that planned

growth maintains or increases forests. This would allow communities and municipal governments to have resources available to assess the cumulative public value of the forest lands within their jurisdiction and make appropriate planning and zoning decisions.

8. Timetables, Duration and Stringency Option: The programs would commence as soon as legislation gives authorization and funds are made available. Accordingly, its timing may likely be tied to the implementation of a cap-and-trade program, a carbon tax, or other funding sources. The Forest Legacy Program would not require any particular land owners to place conservation easements against their land, but would allow for voluntary transactions. Once easements are put in place, they would be legally enforceable against the property owner.

9. Explanation of Rough Estimate of GHG Reductions: The estimate of 6.0 MMT of avoided CO₂ by 2025 assumes that the forest that would otherwise be converted contain between 54 and 82 tons CO₂/acre. While this estimate is speculative, it provides a basis for decision making. This estimate is consistent with the estimate used by Winrock International in the Report Submitted to the DNR, Forest Carbon Baseline for Wisconsin, Draft Report November 2007.

10. Rough Estimate of Costs for Selected Years: The estimated annual cost of the proposed Forest Legacy Program is a minimum of \$4,000,000 annually for the acquisition of easements and additional program and administrative overhead. These costs could be minimized by having the program run in concert with the present State Stewardship Program and through partnerships with land trusts, which would both provide some matching funds and potentially help to enforce restrictive covenants against forestry parcels. These costs are estimated in present value (\$2007).

11. Barriers to Implementation: The largest barrier to implementation would be the determination of the appropriate method for funding the program.

12. Other Factors:

A. Potential funding sources and implications. Several of the templates propose paying landowners and farmers to adopt practices that offset GHG emissions. These payments could come from the state directly, or from participants in a cap-and-trade program, who may need to buy offsets to meet their emissions limits. If a cap-and-trade program is available, using it to fund offsets would offer three benefits over a state-funded program (in addition to saving state taxpayer dollars).

First, if a cap-and-trade program were enacted, and as its cap were reduced to more stringent levels, the price paid for offsets would be likely to rise. In the long run, the benefits to landowners and farmers may be higher under a cap-and-trade program than under a state funded program. Second, paying for forestry and agricultural offsets through a cap-and-trade program would benefit emitters, who would be able to meet some of their obligations through a lower-cost option. This would enhance the primary benefit of a cap-and-trade program, which is uncovering efficient and low-cost options to reduce GHG emissions. Finally, forestry and agriculture offsets provide additional environmental benefits, including surface water protection and wildlife habitat, which other offset methods may not. Making forestry and agriculture offsets eligible under a cap-and-trade program would bring the power of climate markets to support general environmental goals connected to the land.

B. Co-Benefits. Estimates have shown that wood based industries or tourism sensitive sectors account for 12% of the Gross State Product and 18% of the jobs in Wisconsin. The tourism sensitive sector has an estimated output of over \$13 billion and employs almost 450,000 people in the state. State residents alone spent over \$5.5 billion per year on goods and services associated with forest based recreation during 1996. The majority of this spending was done in local regions within close proximity to the recreational site.¹

1. *Forests and Regional Development: Economic impacts of woodland use for recreation and timber in Wisconsin.* D. Marcouiller and T. Mace. 1999 University of Wisconsin System, Cooperative Extension Publications

There are other significant co-benefits associated with Wisconsin's forest lands. In addition to supporting Wisconsin businesses and tourism there are a variety of ecosystem services that forests provide. Wisconsin's forests provide habitat for a diverse assortment of plants and animals, protect the state's soil from erosion, enhance water and air quality and provide hunting and fishing opportunities.

13. Related Policies:

- Sustainable Forest Management

Sustainable Forest Management

1. **Work Group:** Agriculture and Forestry
2. **Policy Name:** Engage Private Forest Landowners in Sustainable Forest Management Activities to Enhance Carbon Sequestration (Sustainable Forest Management)
3. **Policy Type:** Market-based initiatives, legislation, fiscal measures, program development
4. **Affected Sectors, Sub-Sectors and/or Entities:** Landowners, forest products industry, DNR, and small businesses
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This policy is expected to result in an increase of carbon sequestration on forest lands. Estimates for the potential of carbon storage increases are provided in the Report submitted to the DNR by Winrock International titled: "Terrestrial Carbon Sequestration in Wisconsin: Quantities and Costs."
6. **Estimated Costs:** Cost of providing incentives under this program will range with the participation and the extent of incentives provided to the landowners. See Winrock report for further details.

Funding Sources: See section 12 for a discussion of potential funding sources and implications.

7. **Specific Description of Policy Proposal:** This policy would create incentives for private landowners to engage in sustainable forest management techniques and other sequestration enhancement practices. These practices increase the carbon storage potential of their forests and provide significant benefits to water quality, wildlife habitat and other ecosystem services. An outreach and education program would be necessary to communicate with the many forest landowners in the state who could participate in this program. The success of this policy would also require the development of standards for participation in carbon sequestration programs and the appropriate silvicultural practices.

Outreach, Education and Technical assistance

Approximately 55% of Wisconsin forest land is owned by at least 260,000 individuals, families, and small non-commercial entities. There are many more who own from one to ten acres since the 260,000 figure includes only ownerships of ten acres or more. Technical assistance to such landowners is provided by DNR foresters, private consultants and foresters in the employ of the forest products industry. To better communicate with and engage these landowners this proposal recommends the following:

- A. Develop systems to contact private forest landowners with information about eligible programs, technical assistance and other resources.

The biggest challenge to engaging effectively with private forest landowners is the lack of systems and processes to contact these landowners. An outreach and education strategy which would include the creation of systems to identify, contact and reach-out to landowners is necessary to provide information and technical assistance on carbon sequestering forest management practices.

- B. Promote certainty and consistency of offset project transaction costs of marketing carbon credits by supporting and participating in the development of standards and protocols for carbon offset projects.

The transaction costs associated with marketing and selling carbon can be a significant hurdle for many private landowners. The state would help to off-set this transaction cost until the market can mature and support a higher cost of carbon. This would be accomplished by the state supporting the development standards and practices for monitoring and measurement of carbon sequestration and protocols for voluntary carbon accounting on forestlands. These standards, collectively known as "offset protocols" are being considered by various state, regional and national efforts. WI should provide leadership and assistance in developing these offset protocols with by participating in the Midwest Greenhouse

Gas Accord and The Climate Registry efforts.

- C. Increase technical resource availability to landowners through additional staff and grant funding.

The state could provide increased technical resources to landowners to encourage sustainable management practices consistent with carbon sequestration and provide assistance in marketing the associated carbon credits. Technical assistance would be provided directly by the DNR through the addition of committed staff, or through increased grant funding available through the Wisconsin Forest Landowner Grant Program (WFLGP).

Financial Incentives

This proposal suggests three forms of specific incentives for private landowners:

- A. Identify opportunities within existing programs such as Wisconsin Forest Landowner Grant program where incentives can be added.
- B. Development of a new short term incentive program called the Carbon Sequestration Tax Incentive Program (CSTIP).

This program would provide property tax relief similar to the Managed Forest Law (MFL), but would involve a “carbon lease” to the state for a short period than a contract under MFL. The program would require the landowner to develop a forest management plan and commit to sustainable forest management activities that increase the carbon sequestration potential of the forest.

- C. Allow property owners to take part in multiple programs by developing rules and guidance for landowners and the state.

Under this option, property owners that are enrolled in MFL would be allowed to also participate in a carbon sequestration incentive program. This hybrid approach would recognize additional carbon sequestration promoted by landowners and provide additional incentives that

each individual program could not.

Specific policies should be designed to ensure incentives are provided for all eligible entities with consideration of the tax liabilities each faces. For entities that have different tax liability structures, grants could be considered or the incentives could be designed with the ability to transfer the incentive through an intermediary.

8. Timetables, Duration and Stringency Option:

This program could be implemented immediately and would need to be reviewed after five years to determine if the policy objectives were being met, or if adjustments are necessary. Immediate tasks would involve the creation of appropriate silvicultural practices and standards, as well as an outreach and education program. In the second year of implementation, increased technical resources and assistance through state staff and grants would be made available based on funding. The development of the CSTIP would be dependent upon legislation and would likely begin in 2009.

9. Explanation of Rough Estimate of GHG

Reductions: Changes in forest management techniques are estimated to represent a carbon sequestration rate of 0.2 metric tons of carbon per acre per year.¹

10. Rough Estimate of Costs for Selected Years: Cost estimates were not developed

11. Barriers to Implementation: Once decisions are made on what sustainable forest management practices should be recommended, these could be incorporated into forest management plans. Requiring revisions to existing plans would impose an additional cost of property owners. Adoption of these practices, unless made mandatory, would then be up to landowners. The lack of direct contact between landowners, even those enrolled in MFL, Tree Farm, and professional foresters is the largest barrier to adoption of forest management activities.

1. IPCC (2000) Special Report on Land Use, Land-Use Change, and Forestry, R.T. Watson et al. (eds.), Intergovernmental Panel on Climate Change, Cambridge University Press, p. 184.

Creating an effective mechanism to reach the majority of landowners, not enrolled in MFL or Tree Farm, would be difficult, but crucial to success.

12. Other Factors:

- A. Potential funding sources and implications. Several of the templates propose paying landowners and farmers to adopt practices that offset GHG emissions. These payments could come from the state directly, or from participants in a cap-and-trade program, who may need to buy offsets to meet their emissions limits. If a cap-and-trade program is available, using it to fund offsets would offer three benefits over a state-funded program (in addition to saving state taxpayer dollars).

First, if a cap-and-trade program were enacted, and as its cap were reduced to more stringent levels, the price paid for offsets would be likely to rise. In the long run, the benefits to landowners and farmers may be higher under a cap-and-trade program than under a state funded program. Second, paying for forestry and agricultural offsets through a cap-and-trade program would benefit emitters, who would be able to meet some of their obligations through a lower-cost option. This would enhance the primary benefit of a cap-and-trade program, which is uncovering efficient and low-cost options to reduce GHG emissions.

Finally, forestry and agriculture offsets provide additional environmental benefits, including surface water protection and wildlife habitat, which other offset methods may not. Making forestry and agriculture offsets eligible under a cap-and-trade program would bring the power of climate markets to support general environmental goals connected to the land.

- B. Co-Benefits. Wisconsin's forestlands provide a wide variety of public value to the residents and businesses of the state. In addition to carbon sequestration, the forests provide many valuable ecosystem services including habitat, soil stabilization, water quality and recreation. Additionally, the increase in sustainable forest management activities would increase over all

health of the state's forests which would enable to better resist pests as Gypsy Moth, Emerald Ash Borer and Jack Pine Budworm and invasive species such as garlic mustard and glossy buckthorn. The forest industry in Wisconsin employed over 72,000 people in 2005 at over 1400 companies. The value of shipments from the forest industries in 2002 was over \$19 billion. Increasing the number of private landowners actively participating in sustainable forest management will help ensure a constant resource for the forest industry and the developing bioenergy and biofuel industries.

The tourism industry in Wisconsin is also affected greatly by Wisconsin's forest lands. It is estimated that in 1996 state residents alone spent over \$5.5 billion on goods and services associated with forest-based recreation.²

Co-benefits associated with this policy option include an increase in forest health around the state. Other benefits include the development of significant expertise within the state surrounding carbon sequestration practices and the promotion of economic activity supporting carbon sequestration.

13. Related Policies:

- Afforestation and Reforestation
- Forest Loss Prevention

2. Forests and Regional Development: Economic impacts of wood-land use for recreation and timber in Wisconsin. D. Marcouiller and T. Mace. 1999. University of Wisconsin System, Cooperative Extension Publications.

Urban Forestry

- 1. Work Group:** Agriculture and Forestry, Conservation and Energy Efficiency
- 2. Policy Name:** Enhance Carbon Sequestration and Energy Efficiency in Urban Environments Through Increased Tree Planting and Management (Urban Forestry)
- 3. Policy Type:** Fiscal measure, legislation, market based mechanism
- 4. Affected Sectors, Sub-Sectors and/or Entities:** Forestry and green industry, local governments, businesses/corporations, utilities, non-profits, sewerage districts, schools/colleges, private landowners, residents
- 5. Estimated Greenhouse Gas Emissions Reduction Impact:** Additional carbon storage from new urban trees is estimated at only 292,718 tons CO₂e in 2020, but increases to 6,985,322 million tons CO₂e in 50 years. The annual rate of carbon sequestration of the new trees is estimated to increase by 103,117 tons CO₂e per year in 2020, and increase to 153,012 tons CO₂e per year in 50 years. Annual avoided carbon emissions are estimated to increase 29,937 tons CO₂e by 2020 and would increase to 123,075 tons CO₂e in 50 years.¹ These estimates do not account for the increased carbon storage, increased carbon sequestration rates and avoided carbon emission that would result from managing and maintaining existing urban trees, which this policy also calls for.
- 6. Estimated Costs:** At 2007 prices, the value of heating and cooling savings to Wisconsin rate-payers owing to current urban trees is \$24.3 million annually. State costs associated with facilitating establishment of the proposed initiative, an increase in the Urban Forest Grant Program to provide incentives and startup cost-sharing to local governments and nonprofits, and additional support for monitoring and long-term success are estimated to be \$2,871,000 annually. This expenditure is offset by the estimated additional savings from the new trees on energy

1. The carbon storage and sequestration are estimates from UFORE model projections, and avoided emissions figures are proportional estimates based on UFORE canopy cover projections.

costs, carbon storage, and air pollution removal costs to Wisconsin residents of \$11,600,000 annually by 2020. This cost savings is estimated to increase proportionally with the increase in number and growth of urban trees. Managing just the new trees over 50 years will result in an estimated annual cost savings of \$91 million in carbon storage, energy and air pollution alone. Managing the existing trees as well, would more than double that savings.

Funding Sources: See section 12 for a discussion of potential funding sources and implications

- 7. Specific Description of Policy Proposal:** The Wisconsin Urban Forestry Council is proposing a “20 million by 2020” private-public initiative that would add 20 million urban trees on private and public land and preserve the estimated 27 million already in the state.

In support of this initiative this proposal recommends an increase in state funding of the Urban Forestry Grant Program to provide incentives and startup cost-sharing to local governments and nonprofits, and an increase in additional state support resources for monitoring and long-term success. The program will be incentive and market based with voluntary participation.

The statewide initiative would engage all sectors to plant and manage urban trees on private and public property to maximize urban forest contributions for greenhouse gas (GHG) reduction. On average, 85% of land in communities is privately held so the vast majority of the tree production, planting and maintenance would be done by private industry and private property owners through private investment. This initiative would target specific audiences (e.g. public officials, businesses, land owners, educators) and messages (e.g. 3:1 pay back for municipalities; you can do your part to address climate change). Planting urban trees could be used by industrial emitters as a carbon emission offset.

Increased Urban Forestry Grants and state level resources would facilitate and provide incentives for partnerships needed by local governments and urban property owners to accomplish the 20 Million by 2020 Initiative goals, foster integrated efforts between the Wisconsin Urban Forestry Council, UW Extension, teachers, professional associations, private sector, non-profit organizations, universities/tech colleges, nature centers, and local governments, monitor urban forest impact on carbon and energy reduction and expand research on improving urban forest contribution to reducing GHGs.

8. Timetables, Duration and Stringency Option: The Urban Forestry Grant Program is already in place within the DNR and within many communities around the state. This program would be evaluated every five years to determine progress towards goals and make adjustments if needed.

9. Explanation of Rough Estimate of GHG Reductions: Current estimates indicate that urban forests in Wisconsin have a 2002 base year carbon storage of 6,147,000 tons CO₂e. Additional carbon sequestration rates are estimated at 400,000 tons CO₂e annually. Avoided carbon emissions are estimated to be 50,000 tons CO₂e annually due to reduced energy demand for heating and cooling. Within the Midwest, large trees provide over 7 times the benefits of small trees.² The estimates of additional carbon sequestration and green house gas reduction resulting from the new trees are conservative, and based upon accepted and peer reviewed methodology developed by the USDA Forest Service.

10. Rough Estimate of Costs for Selected Years: Cost estimated based upon a statistically valid independent study conducted for the DNR Urban Forestry Program. This estimate includes the additional grants that would be provided directly to Wisconsin communities, an estimate of the additional resource needs to support the “20 million by 2020” initiative, and the development and continued implementation of an action

2. Calculated as a ratio from the Midwest Community Tree Guide: Benefits, Costs, and Strategic Planting, E.G. McPherson et al., United States Department of Agriculture, Forest Service, General Technical Report PSW-GTR-199, November 2006.

campaign. All estimates are in 2007 dollars and do not include any adjustment for inflation or other increases.

11. Barriers to Implementation: Barriers include a lack of diverse tree stock and a limited awareness regarding the benefits of urban forests and their need for management. Public officials often are not aware of the entire benefit/cost associated with the urban forest (the investment pays off at a 3:1 rate), the private sector does not yet associate urban forestry or tree planting programs with a positive impact on climate change or reducing energy demand and a commodity-based carbon offset value has not been established for urban trees.

12. Other Factors: This policy collaborates with forest health initiatives in preserving existing carbon stores through disease, pest management, and invasive species programs. In addition, the introduction or spread of forest pests, such as the emerald ash borer, could have significant negative impacts on carbon storage/sequestration capacity.

A. Potential funding sources and implications. Several of the templates propose paying landowners and farmers to adopt practices that offset GHG emissions. These payments could come from the state directly, or from participants in a cap-and-trade program, who may need to buy offsets to meet their emissions limits. If a cap-and-trade program is available, using it to fund offsets would offer three benefits over a state-funded program (in addition to saving state taxpayer dollars).

First, if a cap-and-trade program were enacted, and as its cap were reduced to more stringent levels, the price paid for offsets would be likely to rise. In the long run, the benefits to landowners and farmers may be higher under a cap-and-trade program than under a state funded program.

Second, paying for forestry and agricultural offsets through a cap-and-trade program would benefit emitters, who would be able to meet some of their obligations through a lower-cost option. This would enhance the primary benefit of a cap-and-

trade program, which is uncovering efficient and low-cost options to reduce GHG emissions.

Finally, forestry and agriculture offsets provide additional environmental benefits, including surface water protection and wildlife habitat, which other offset methods may not. Making forestry and agriculture offsets eligible under a cap-and-trade program would bring the power of climate markets to support general environmental goals connected to the land.

- B. Co-Benefits. Not included in the estimated cost savings are the savings to municipal sewerage districts due to the off-set in storm water discharge to sewer systems and treatment facilities and health care savings associated with increase air quality and specifically the reduction in urban particulate matter. In addition, benefits such as property value, aesthetics, tourism and business development have not been estimated. The policy would also provide economic stimulation in the form of jobs, sales and service to the expanding Wisconsin green industry, which currently has an annual impact of over \$2,700,000,000.

13. Related Policies:

- Afforestation and Reforestation

Methane Reduction through Ruminant Nutrition

1. **Work Group:** Agriculture and Forestry
2. **Policy Name:** Decrease Enteric Methane (CH₄) Emissions Through Ruminant Nutrition (Methane Reduction Through Ruminant Nutrition)
3. **Policy Type:** Creation of R&D and fiscal measures
4. **Affected Sectors, Sub-Sectors and/or Entities:** Cattle producers, nutritionists, feed & supplement producers, milk distributors, meat processors, UW System, Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP)
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Potential emission reductions resulting from modifying four management practices are identified below. Note that these reductions are not additive.
 - Grazed Livestock = 0.25 MMt (million metric tons) CO₂e/yr
 - Feed Adjustments = 1.0 – 1.5 MMt CO₂e/yr
 - Dietary Fats = 1.2 MMt CO₂e/yr
 - Growth accelerators = 0.27 MMt CO₂e/yr
6. **Estimated Costs:** \$950,000

Funding Sources: Funding may come from state general funds

7. **Specific Description of Policy Proposal:** Provide incentives for research into the development of best management practices for animal nutrition that will reduce the production of methane. Research financial incentives could be provided to the College of Agriculture and Life Sciences at UW-Madison, as well as UW-Platteville and UW-River Falls. This research should include analysis of appropriate forage crops that have a lower carbon impact and animal production management practices that are found to yield a relative carbon savings over existing practices. Promote management of intensive grazing and other best management practices on existing grazed animal operations to increase soil fertility, plant vigor, and quality. Creation of an education

and outreach program; technical resources and assistance through state staff; grants.

Provide financial incentives to cooperatively and privately-owned animal nutritionists to support the training of livestock managers in the use of best management animal nutrition practices. These incentives could be provided through a grant program at DATCP to specific feed supply cooperatives and privately-owned feed suppliers or to representatives of those suppliers.

Development of appropriate best management practices and standards including (1) forage and grazing; (2) feed adjustments to aid digestion efficiency; (3) feed adjustments to increase fatty acids; (4) increased use of growth hormones to reduce CH₄ production by ruminant animals. These practices would also improve animal health meaning cows stay in the herd longer and fewer replacements are needed.

8. **Timetables, Duration and Stringency Option:** This program could be implemented immediately with creation of discussed practices and standards, as well as the outreach and education program. In the second year of implementation, increased technical resources and assistance through state staff and grants would be made available based on funding. After five years the program would need to be reviewed to determine if the policy objectives were being met, or if adjustments would be necessary. The development of the research and incentives programs would be dependent upon legislation and would likely begin in 2009.

9. **Explanation of Rough Estimate of GHG Reductions:** Dairy cows typically produce 118 kg CH₄/year/cow (2.5 metric tons of CO₂e/yr/cow).¹ Beef cattle produce significantly less at approximately 40 kg CH₄/year/cow (0.84 metric tons of CO₂e/yr/cow).¹ Methods to reduce CH₄ production by ruminant animals and potential GHG impacts are listed below.

1. O'Mara, Frank. 2004. Greenhouse Gas Production from Dairying: Reducing Methane Production. *Advances in Dairy Technology*. 16:256.

- A. **Grazed Livestock.** High quality forages obtained through managed grazing or proper timing for hay cutting, increases feed efficiencies and reduces CH₄ emissions by about 20%.² Beef cattle grazing on grass-alfalfa pasture produce 25% less CH₄ per cow than cattle grazed on grass-only pasture.² = 0.25 MMt CO₂e/yr
- B. **Feed Adjustments.** Potential adjustments include manipulating the crude protein and energy (carbohydrate and fat) content of the diet to enhance the availability of amino acids, reducing dietary protein and supplementing amino acids, or implementation of phase feeding and/or split-sex feeding can all increase productivity and have positive impacts on CH₄ emissions. Increasing a cow's consumption of fermented brewer and distillery grain results in 33%-50% less CH₄ production per cow than animals fed common feedstuffs.² = 1.0 – 1.5 MMt CO₂e/yr
- C. **Dietary Fats.** Additions of unsaturated fatty acids to ruminant diets may reduce CH₄ by up to 40%.² Increasing dietary fats by adding 4% canola oil to animal diets can reduce CH₄ by 33%.² = 1.2 MMt CO₂e/yr
- D. **Growth accelerators** decrease the time between birth and slaughter of beef cattle, and therefore reduce the amount CH₄ each animal produces. Likewise, growth accelerators may reduce the time required to bring dairy cattle up to the size desired for calving, and therefore reduce CH₄ production per animal. Recombinant bovine somatotropin (rBST) can increase milk production by 13%, which can result in decreased CH₄ emissions for that herd by 9%. = 0.27 MMt CO₂e/yr

10. Rough Estimate of Costs for Selected Years:

An annual state allocation of \$950,000 for research and incentive payments. (\$450,000 for a competitive research grants program; \$500,000 for the incentive payments program).

2. Boadi D. and K. Wittenberg. 2004. Feeding Practices can reduce CH₄ production from cattle operations. Farmers Independent Weekly. University of Manitoba. Department of Agriculture and Food Sciences. March 4, 2004.

11. Barriers to Implementation: There are interaction effects from changing animal diets that the research and on-farm use of practices will help elucidate.

12. Other Factors: Concentrates and additives have a CO₂ production/emission cost for their manufacture that is unquantifiable for this template.

Increased productivity and/or growth rate through the use of growth accelerators can cause increased feed requirements and manure production and the associated GHG concerns related to N₂O and CH₄ emissions from manure handling, storage and land application.

Increased productivity may also mean a higher feed requirement to sustain the animal, resulting in greater nutrient inputs to cropland, nitrogen volatilization, and energy expenditure to grow and harvest the feed.

13. Related Policies: None

Production, Capture and Use of Animal Methane

1. **Work Group:** Agriculture and Forestry
2. **Policy Name:** Production, Capture and Use of Animal Methane
3. **Policy Type:** Multiple options including market based mechanisms, fiscal measures and regulatory action
4. **Affected Sectors, Sub-Sectors and/or Entities:** Animal operations, electric utilities and cooperatives (particularly those serving rural areas), transmission line owners, digester, generator, and related equipment manufacturers, Department of Agriculture, Trade and Consumer Protection (DATCP)
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Reduction estimates depend on the breadth of operations contributing feed stock (methane) to the digesters and range from 0.43 Million Metric tons (MMt) CO₂e/year to 3.0 MMt CO₂e/year. An estimate for emissions reduction based on methane flaring yields 0.78 MMt CO₂e/year.
6. **Estimated Costs:** Direct costs to the state may reach approximately \$132.5 million annually. Indirect costs for manure digesters range from \$139.5 million to \$890 million (includes only capital costs of digesters; does not consider varying market prices, profitability of digesters, federal grants, etc.)

Funding Sources: Direct costs may be funded by state general revenues. See section 12 for further discussion of funding sources. Indirect costs may be borne by digester owners.

7. **Specific Description of Policy Proposal:** The goal of this policy is to increase the production, capture, and use of animal methane for electricity or heat, and to reduce current methane emissions. Existing animal-agriculture operations release methane into the atmosphere. Capture and use of currently generated methane would directly reduce greenhouse gas (GHG) emissions. This is true even if the methane is only flared and not

used to produce energy. Generation of additional methane through digesters or similar technology, if used to offset fossil fuel use, would reduce GHG emissions from avoided fossil fuel combustion. This proposal suggests the following policy options

A. Demand Generation

- Establish a cap-and-trade program to increase demand for electricity and biogas from digesters.
- Establish a voluntary consumer payment program for electricity or biogas produced from manure. Allow consumers to pay a higher rate and require the additional funds be paid for electricity or biogas from digesters. This program could be adopted by each utility and structured similarly to current renewable energy programs.

B. State Payments

- Grant a tax credit for production of electricity or biogas from manure.
- Propose a new 50% state tax credit for the construction of a manure digester up to \$1 million that can be carried forward up to eight (8) years.
- Provide a state subsidy for digester capital costs, interest costs, or to cover risk incurred by private lenders for digester projects; establishing the new state subsidy program through the PSC or DATCP (likely the latter since electric cooperatives are not regulated by the PSC). Additionally, create a 90% loan guarantee program at DATCP for the construction of manure digesters – these guarantees would be provided to the Farm Credit System and private banks that provide financing for the digesters.
- Create a state fund for incentives for utilities to pay a higher rate for electricity or biogas supplied from manure digesters.

C. Research

- Increase the economic viability of waste-to-energy systems generally. In particular, research to develop digesters systems that are economical for livestock operations

and to allow use of other carbon sources (such as yard waste, food waste, and cheese production) and research on how to efficiently bring waste-to-energy systems to the market including through farmer-owned cooperatives. Provide \$500,000 in annual research funding over three years to the UW-Madison College of Agriculture and Life Sciences to research the application of manure digester technologies to smaller livestock operations.

8. Timetables, Duration and Stringency Option:

The amount of GHG offset possible from animal methane can grow only as fast as manure digesters and methane capture technology can be installed. This rate will increase with research. Installation of digester systems is time consuming, requiring at least one year for completion of a single system. There are currently under 30 manure digesters in Wisconsin. Given the need for more efficient and cost-effective digester technology, installation of more than 60 new digesters in the next five to ten years is unlikely. For illustration, to install 242 new digesters (the number of dairy operations with over 500 head in section 9 below) in 10 years would require construction of 24 digesters per year. Installation of digesters on 12,000 dairies (most dairies in Wisconsin) in 50 years would require construction of 240 digesters per year. Once installed, digesters' productive lives are limited by equipment and maintenance issues and can continue a stable rate of offset indefinitely. All of the policy options proposed would rely on existing regulatory and tax administration mechanisms. None would involve monitoring or enforcement of prohibited behavior.

9. Explanation of Rough Estimate of GHG

Reductions: Use of methane would affect GHG emissions by (1) offsetting use of fossil fuels in electricity or heat generation; and (2) reducing direct emissions of methane. In order to develop the upper bound of GHG emission reduction potential from use of methane, the reductions from offsetting use of fossil fuels in electricity or heat generation (which would yield greater GHG emission reductions than

simply reducing the direct emission of methane) is estimated using high figures for biogas, electricity generation and other numbers.

- A. Assuming Use of Manure from All Dairy Cows. Wisconsin has roughly 1.2 million dairy cows and the manure from a single cow can generate up to 109 ft³ of biogas per day¹, or up to 65,400 Btu/day. When burned, up to 35% of this energy can be recovered as electricity, yielding 6.7 kWh/day of electricity. All Wisconsin dairy cows could therefore generate 2.93 million MWh of electricity/year. Coal-fired electricity generation in the United States yields an average of 2,249 lbs of CO₂/MWh.² Therefore, offsetting coal by digester electricity would reduce CO₂ emissions by 3.0 MMT/year.³ This is 2.4% of the 123.1 MMT of CO₂e emitted in WI/year.
- B. Assuming Use of Manure on Operations Over 500 Head. According to Alliant Energy's 2006 study,⁴ the nearly 200,000 animals in the 242 Wisconsin herds over 500 head could generate 39 MW of electricity per hour through manure digestion. Operated at 100% capacity collectively, these units would generate 423,597 MWh of electricity/year⁵,⁶ and offset CO₂ emissions by 0.43 MMT CO₂e/year or 0.35% of WI's annual CO₂ emissions.

10. Rough Estimate of Costs for Selected Years:

Establishment of the 50% state tax credit will reduce state revenues by \$132 million annually. Research grants will be funded at \$500,000/year for each of three (3) years for a total of \$1.5 million.

1. Larry Krom, Focus on Energy Renewable Energy Program. "Biogas Production on Wisconsin Farms," 2nd Annual Bio-Conversion Conference, Madison, Wisconsin.
2. U.S. Environmental Protection Agency, Air Emissions. Available at <http://www.epa.gov/solar/emissions.htm>.
3. There are 2,200 pounds in a metric ton.
4. Alliant Energy. Anaerobic digesters and methane production in the agricultural sector of states served by Alliant Energy. Technical report, Alliant Energy, 2006. <http://www.alliantenergy.com/docs/groups/public/documents/pub/p013122.pdf>
5. 273,312 = 0.8 × 39 MW × 24 hours per day × 365 days per year.
6. For comparison, applying the method of parts a and b, but using low end productivity estimates, we estimate annual electricity generation from herds over 500 head at 287,700 MWh per year.
7. Methane combustion yields some CO₂. Net savings are a factor of 1.15 smaller than gross savings.

A. Methane Digesters. The costs of digester and generator installation vary, but a recent rough estimate is \$700 per animal for installations on operations of over 1,000 head.⁴ The cost per head is likely to be much higher on smaller operations. At that price, installing digesters to handle the nearly 200,000 animals on operations over 500 head would cost \$139.5 million. A per-animal cost for all 1.2 million dairy cows would amount to \$840 million.

B. Methane Flaring. Work group members estimate that it costs \$1.00–1.50/ft² to cover a lagoon. This is roughly consistent with the amount of cost-sharing offered under the federal EQIP program (\$0.70/ft²).⁷

11. Barriers to Implementation: Manure digesters are capital and maintenance intensive, particularly when coupled with a generator to produce electricity from the biogas generated. The large initial capital costs must be covered either through grants or through sale of electricity or biogas. The largest barrier to adoption of manure digesters at present is the gap between the cost of installation on the one hand and the revenue from electricity sales on the other.

In addition, some installations would require extension of three-phase power lines or gas pipelines to the installation, another large capital cost.

Finally, current regulations on animal waste storage and use of other waste streams as digester inputs limit flexibility of digester operation. (These rules were established before interest in digesters and could be modified.)

12. Other Factors:

A. Co-Benefits. Numerous co-benefits exist in regard to methane digesters including: odor reduction and numerous value-added products derived from solids (compost for resale, bedding for on-farm or resale use, others).

7. EQIP cost-share policy 367, waste facility cover. Cost-sharing is one-time, but requires a 15-year commitment to maintain the cover.

B. The energy offset quantified here could be counted twice if the energy sector also takes these offsets to fossil fuel energy generation.

C. Nutrient management and storage issues are still present. The overall volume of animal waste is not reduced significantly and land disposal of liquid fraction must still occur. There is potential for farmers to irrigate with the liquid effluent and therefore be able to apply during the growing season, however public/neighbor perception of brown water irrigation may inhibit this practice from becoming mainstream.

D. Chicago Climate Exchange is currently trading credits from methane digesters at a rate equal to the amount of methane that would be emitted in the absence of the capture system.

E. Potential funding sources and implications. Several of the templates propose paying landowners and farmers to adopt practices that offset GHG emissions. These payments could come from the state directly, or from participants in a cap-and-trade program, who may need to buy offsets to meet their emissions limits. If a cap-and-trade program is available, using it to fund offsets would offer three benefits over a state-funded program (in addition to saving state taxpayer dollars).

First, if a cap-and-trade program were enacted, and as its cap were reduced to more stringent levels, the price paid for offsets would be likely to rise. In the long run, the benefits to landowners and farmers may be higher under a cap-and-trade program than under a state funded program.

Second, paying for forestry and agricultural offsets through a cap-and-trade program would benefit emitters, who would be able to meet some of their obligations through a lower-cost option. This would enhance the primary benefit of a cap-and-trade program, which is uncovering efficient and low-cost options to reduce GHG emissions.

Finally, forestry and agriculture offsets provide additional environmental benefits, including surface water protection and wildlife habitat,

which other offset methods may not. Making forestry and agriculture offsets eligible under a cap-and-trade program would bring the power of climate markets to support general environmental goals connected to the land.

13. Related Policies: None

Nutrient and Manure Management

1. **Work Group:** Agriculture and Forestry
 2. **Policy Name:** Nutrient and Manure Management to Reduce Nitrous Oxide (N₂O) and Methane Emissions (Nutrient and Manure Management)
 3. **Policy Type:** Government incentives and mandates
 4. **Affected Sectors, Sub-Sectors and/or Entities:** Farmers, county land conservation departments, Department of Agriculture, Trade and Consumer Protection (DATCP), DNR, Natural Resources Conservation Service, Cooperatives, private agricultural consultants, the UW System, fertilizer dealers and manufacturers
 5. **Estimated Greenhouse Gas Emissions Reduction Impact:**
 - Nutrient Management Planning: 0.97 Million Metric tons (MMt) CO₂e/yr
 - CO₂ emissions eliminated by not manufacturing the amount of nitrogen (N) that is over applied in Wisconsin annually: 0.62 MMt CO₂e/yr
 6. **Estimated Costs:** Costs to the state for the incentive program to optimize fertilizer application are estimated to be \$44.8 million annually for 5 years or a total of \$224 million. Savings from optimizing fertilizer application are estimated to be \$229,706,000 annually.

Funding Sources: funding may come from state general funds
 7. **Specific Description of Policy Proposal:** The goal of this policy is to reduce over application of N to fields (whether from manure or chemical fertilizers) and reduce the overall use of chemical fertilizers. Reduction of N application would reduce emissions of N₂O from fields. Reduced use of chemical fertilizers would reduce emission of CO₂ in the manufacturing process.
- proposals do not contemplate reducing crop yields significantly.
- A. Increase state cost-sharing for nutrient management planning to increase adoption of nutrient management plans by farmers.
 - B. Require the adoption and implementation of nutrient management plans. (A mandate would need to be tied to adequate funding and incentives.)
 - C. Increase funding for education on manure handling, nutrient management, use of N inhibitors, and other practices that reduce N₂O emissions.
8. **Timetables, Duration and Stringency Option:** At the funding rate suggested in this template, the goal of achieving nutrient management compliance would occur within 5 years from the date of initiation of the policy.
 9. **Explanation of Rough Estimate of GHG Reductions:** N₂O emissions from fertilizer application (both commercial and manure) to crop soils range from 1% to 5% of applied N.¹ Most research in the Midwest identifies an emission rate of 1.5% N₂O loss of N applied.¹ Wisconsin livestock produce a large amount of manure (~64.5 million tons) which should be utilized as a nutrient source for crops. Legumes are often grown in Wisconsin crop rotations and the N those plants fix from the atmosphere is available to the next two years of non-legume crops. This N is credited the crop year after the legume is killed.
- Additional N fertilizer is needed above this amount of manure to sustain the crops Wisconsin grows each year, however, a considerable amount of N is over applied. While approximately 600 million pounds of N is needed to sustain each year's crop, over 1 billion pounds of N is provided to agricultural lands either as manure N, commercial fertilizer, or through biological fixation of N by legumes.

This proposal suggests three options, the first two of which could be combined. Note that the

1. Grant et al. 2006. Modeling the effects of fertilizer application rate on nitrous oxide emissions. Soil Science Society of America Journal. 70:235-248.

This results in an estimated over-application of nearly 460 million pounds of N per year in Wisconsin. If 1.5% of available N is lost as N₂O, then 0.97 MMt CO₂e/yr are emitted from Wisconsin agricultural soils due to over-application of N.

In addition to N₂O losses from over-application, manufacturing of N fertilizer generates large amounts of CO₂. Approximately 3 pounds of CO₂ are generated per pound of N fertilizer produced (includes emissions generated from processing, manufacturing, and transporting the fertilizer).² If N over application was eliminated, the CO₂ emission reduction by not manufacturing that quantity of N fertilizer would be 0.62 MMt CO₂e/year.

10. Rough Estimate of Costs for Selected Years:

With respect to nutrient management planning, Wisconsin Administrative Code ATCP 50 requires all cropped acres to have a nutrient management plan by January 1, 2008; however enforcement is contingent on an offer of cost sharing at a rate of \$7/acre/year for 4 years (\$28/acre). In order to achieve total compliance in 5 years, annual funding would need to be \$44.8 million and would increase nutrient management plan adoption by 1.6 million acres each year.

This estimate includes only state costs of cost-share funding. It excludes private costs and does not consider net gains to farmers from avoiding fertilizer waste.

11. Barriers to Implementation: Nutrient management planning is viewed by some producers as too complicated, however most producers find that a nutrient management plan actually saves them money through reduced fertilizer inputs.

Under current law, nutrient management plan adoption is cost-share contingent, making state funding a requirement for full participation.

12. Other Factors: The efficient use of N fertilizer reduces N runoff into surface water and reduces the amount of N entering ground water. Avoiding

excessive N applications can significantly reduce the operating cost on farms especially at times when N fertilizer is expensive.

Reduced synthetic N application to farmland may result in revenue loss for fertilizer dealers; however dealers have the potential to sell other nutrient related services, such as soil sampling and nutrient management plan development. Nutrient management plans require reduction of soil loss to tolerable levels which will thus conserve soil and sequester carbon.

Other supporting practices:

- Injecting or incorporating manure soon after application can reduce N₂O volatilization by about 90% compared to normal surface spreading
- Manure stacking or composting: Between 20 - 30% of N is lost when manure is hauled daily. Piling manure results in 10 - 20% N losses, while composting of manure results in the least N loss at 5 - 15%. Currently 7% of Wisconsin dairy manure is stacked and 45% is put directly in the spreader.²
- Nitrification inhibitors reduce N₂O emissions by 50 - 72%.

13. Related Policies: None

2. Turnquist, A., J. Foltz, and C. Roth. Manure Management on Wisconsin Farms. PATS Report No. 15. January 2006.

Encourage Prairie Plantings

1. **Work Group:** Agriculture and Forestry
2. **Policy Name:** Increase Carbon Sequestration Through Prairie Restoration (Encourage Prairie Plantings)
3. **Policy Type:** Fiscal measures and voluntary R&D
4. **Affected Sectors, Sub-Sectors and/or Entities:** Landowners, developers, DNR, Department of Agriculture, Trade and Consumer Protection (DATCP), the UW System, Natural Resources Conservation Service (NRCS), county land conservation departments, Resource Conservation and Development (RC&D) programs, researchers, EPA
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** 7.2 MMt (million metric tons) CO₂ over 25 years
6. **Estimated Costs:** The estimate of prairie restoration cost-sharing ranges from \$11.5 - 70 million. The proposal recommends annual prairie carbon sequestration research funding of \$450,000.

Funding Sources: State funds

7. **Specific Description of Policy Proposal:** This policy proposes two complementary programs to incentivize the expansion of Wisconsin's native prairies. Initiation of a tax credit program for establishment and maintenance of prairie plantings would be administered as an annual credit through the state income tax system, similar to the homestead tax credit or farmland preservation tax credit. Additionally, supplementation of the existing NRCS cost-share grant program, which reimburses landowners for a portion of the establishment and maintenance costs to prairie plantings, with state dollars would effectively increase the rate of prairie establishment and therefore substantially increase carbon sequestration. Lastly, this policy proposes providing \$450,000/year toward a competitive research grant program for investigation of carbon sequestration rates and longevity in prairie

systems. This grant program could be administered by the DNR or DATCP.

8. **Timetables, Duration and Stringency Option:** Tax incentives would occur annually with a sunset on the program of 20 years. Cost share reimbursements would be administered as a lump sum payment with the amount equal to 70% of the cost of the project and dependent on the duration of the contract period, which is typically 10 years for current programs. Lesser contract periods of 5 years could be established under the cost-share program as well. Extended contract periods of 25 years would also be a new alternative to further increase carbon storage pools and lifespan. The competitive grant program would be funded annually on a continuing basis through the legislature appropriations process.
9. **Explanation of Rough Estimate of GHG Reductions:** Carbon storage in soils decreases over time as the soil builds its carbon pool. The first 5 years of prairie restoration sequester carbon at a higher rate than the subsequent 5 years.¹ For prairies that are 1 - 5 years old (or years since the restoration was initiated), a rate of sequestration of 70g carbon/m²/year can be assumed (1.04 metric tons CO₂/acre); 6 - 10 years old, 45g carbon/m²/year (0.67 metric tons CO₂/acre); for 10+ years old, assume 15g carbon/m²/year (0.22 metric tons CO₂/acre). Converting soil carbon to CO₂ requires a 3.667 conversion factor. There are currently 600,000 acres of land enrolled in Conservation Reserve Program (CRP) in Wisconsin. Retaining this land in prairie is a reasonable goal for prairie planting acreage. These assumptions allow for the following estimations of prairie restoration sequestration. A maximum contract length of 25 years is suggested; contracts could also be structured for 10 or 5 years. Estimated sequestration amounts are arranged by length of contract:
 - 25 year contract: 12 metric tons CO₂/acre over 25 years * 600,000 acres = 7.2 MMt CO₂
 - 10 year contract: 8.5 metric tons CO₂/acre over 10 years * 600,000 acres = 5.1 MMt CO₂

1. Kucharik. Personal Communication. September 4, 2007.

- 5 year contract: 5.2 metric tons CO₂/acre over 5 years * 600,000 acres= 3.1 MMT CO₂

10. Rough Estimate of Costs for Selected Years: Cost-share is available through the federal Natural Resources Conservation Service Wildlife Habitat Improvement Program (WHIP) and Grassland Reserve Programs. WHIP will reimburse \$40/acre for brush management, \$85 or \$170/acre for cool and warm season plant mixtures respectively, and \$60/acre for prescribed burning, all of which are potentially necessary for proper prairie site preparation, restoration and maintenance. The cost-share available through WHIP totals \$185/acre for cool season plantings and \$270/acre for warm season plantings. In Fiscal Year 2007 WHIP cost-sharing was \$590,562 for all WHIP practices. The Grassland Reserve Program will cost-share up to 90% of the restoration if the land has never been plowed and up to 75% if the land was once in crops (cost-share based on actual receipts generated during project).

At WHIP cost-share rates for 100,000 acres, the cost would range between \$18.5 - 27 million. The current WHIP program would only support cost share on approximately 3,000 acres/year. Adding \$1.3 million dollars of annual state funding to this pool would allow for 10,000 acres of prairie establishment each year, over a 3-fold increase in establishment and maintenance.

11. Barriers to Implementation: Landowners are often reluctant to sign long term contracts. Consequently the proposal suggests maximum contract duration of 25 years. Contracts could also be structured for 10 or 5 year time frames. There is a concern that working lands would be taken out of production for prairie restoration projects, or that these projects may compete with land use for energy crop production.

12. Other Factors: Prairie plantings provide excellent wildlife habitat and numerous water quality benefits. Prairies provide permanent vegetation cover which reduces soil erosion. The long rooted nature of prairie species increases water infiltration, thereby reducing the likelihood of stormwater runoff issues such as flooding.

Prairies require significantly less maintenance than conventional lawns; mowing frequency and herbicide and fertilizer inputs are significantly reduced if not eliminated.

There are a few factors to consider with the acreage estimate. Currently, there are 600,000 acres of CRP land in Wisconsin. This land is already in prairie, and a reasonable public policy goal would be to retain it in prairie. (Note that the longest lived CRP land is probably showing a lower rate of annual sequestration than for newly established prairie.)

A higher, but more costly goal would be to convert currently cropped highly erodible land to prairie. There are 1.8 million acres of cropped land with an erodibility index over 15 and 1.3 million acres with an erodibility index between 8 and 15. Converting this land to prairie would yield sequestration of 3.2 MMT CO₂ per year for the first five years, a total that is seven times higher than the total for CRP only land. An even higher goal would be to convert *all highly erodible land* to prairie, not just that currently being cropped.

13. Related Policies:

- Preservation of Existing Vegetative Cover Carbon Sinks on CRP Lands

Soil Management Practices

1. **Work Group:** Agriculture and Forestry
2. **Policy Name:** Increase Carbon Stores in Agricultural Soils Through Adoption of Soil Management Practices (Soil Management Practices)
3. **Policy Type:** Four alternatives: (1) Government payment for adoption of practices; (2) Tradable emissions cap (see comment on last page); (3) Mandate adoption of practices; (4) Research
4. **Affected Sectors, Sub-Sectors and/or Entities:** Farmers, county land conservation departments, Department of Agriculture, Trade and Consumer Protection (DATCP), DNR, manure haulers, National Resource Conservation Service, private agricultural consultants, the UW System
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** 0.5 to 5.0 Million Metric tons (MMt) CO₂/year
6. **Estimated Costs:**
 - Placeholder cost range: \$18.5 million to \$185.0 million per year for a state program.
 - No estimate made for costs to purchasers under a cap-and-trade program.
 - No estimate made for enforcement costs under a mandate.
 - No estimate made for costs of research or negotiation with CCX.

Funding Sources: See section 12 for a discussion of potential funding sources and implications.

7. **Specific Description of Policy Proposal:** The goal of this policy is to increase carbon stores in agricultural soils by 10% over the next 25 years, or by an average of 0.5 metric ton CO₂/acre/year. In the opinion of the work group members, and with the support of current research, that is a high but physically attainable goal. For this per acre rate to have a large total carbon sequestration, a significant number of farmers must adopt agricultural practices such as reduced tillage, no-tillage, cover cropping, incorporation of organic matter, and other practices demonstrated to be

effective by research.

Specific policies should be designed to ensure incentives are provided for all eligible entities with consideration of the tax liabilities each faces. For entities that have different tax liability structures, grants could be considered or the incentives could be designed with the ability to transfer the incentive through an intermediary. The proposal is to make adoption of such practices financially worthwhile through one or more of three policies:

- A. Increase government payments to farmers for adoption of the practices. (Various federal, state, and local programs already provide such payments; increasing payment amounts available through all programs would bolster this practice.)
- B. Establish a general carbon cap-and-trade system to increase market demand for carbon-sequestering soil management practices from participants in the Chicago Climate Exchange (CCX) or similar entities.
- C. Require farmer compliance with the practices. (State law includes a set of required practices, which are only enforceable if cost-sharing is offered. A mandate would need to be tied to adequate funding and incentives)

In addition to these methods, the state should:

- D. Increase funding for research on the most effective soil management practices for sequestering carbon, particularly the role of manure incorporation and dairy rotations.
- E. Negotiate with the CCX to allow credits for increasing of organic matter in soils. (Currently, CCX offers credits for tillage practices independent of measured soil organic matter. Dairy rotations are ineligible for extended no-till, even though some reduced till manure injection practices may be able to increase soil organic matter.)
8. **Timetables, Duration and Stringency Option:** Soil carbon sequestration begins in the first year of modified tillage, progresses rapidly for roughly

ten to twenty years, and eventually plateaus. Unfortunately, soil carbon loss occurs over only a few years when soil is disturbed. Since Wisconsin dairy rotations require some soil disturbance periodically (see section 11), more research is required to determine how much and what form of soil disturbance would be acceptable. Note that existing state soil conservation programs do not include significant penalty provisions for intermittent tillage.

Existing soil sequestration programs, such as that run by the CCX, require specific tillage *practices* and monitor compliance on a random sample basis. This approach would be acceptable for a state payments program. However, it would be preferable to base payments on actual organic matter increases. This would require research into sampling and analysis methods, particularly research into soil sampling error rates.

9. Explanation of Rough Estimate of GHG

Reductions: Wisconsin agricultural soils average about 2% organic matter content, roughly 50% of pre-settlement levels. Increasing soil organic matter content, and thus soil carbon, can only occur gradually over several decades. Sequestration is most rapid in early years and eventually plateaus.

UW researchers estimate that a 10% increase in soil carbon is possible in 25 years, equivalent to an average of 0.5 metric ton CO₂/acre/year. Note that this estimate is within the range accepted by the CCX: 0.2 to 0.6 metric ton CO₂/acre/year.¹ Roughly 15% of agricultural fields are now under no-till, and a significant increase in acreage is possible, especially in western and south-central Wisconsin because of topography, soils, and cropping patterns. Sequestration practices could reasonably be extended to an additional 1.0 million acres.

The highest rate possible would require extending sequestration tillage practices to all of Wisconsin's roughly 10 million acres that are currently either cropped or grazed. At an average rate of sequestration of 0.5 metric ton CO₂/acre/year, Wisconsin's agricultural soils could sequester between 0.5 and 5.0 MMT CO₂/year.

10. Rough Estimate of Costs for Selected Years:

A. State payment program. The cost to the state of a voluntary state payment program depends on the reservation price of those who would participate in the program. Participation carries various possible costs to participants including yield losses, capital costs for new equipment, pesticides costs, and opportunity costs of alternative land-use practices. Sequestration tillage can carry benefits to the participant including reduced equipment use, which would offset these costs. Furthermore, the payment rate would need to increase as the number of participants increases (those most willing and able to adopt sequestration practices will do so first, at lower payment rates). An estimate of the cost curve for sequestration practices will be made as part of Winrock International's work. Note that Winrock's estimate will only reflect direct costs of farmer participation, not aggregate social costs, estimation of which requires general equilibrium modeling of the type performed by ICF.

In the interim, a rough estimate for the cost of a state payment program can be drawn from payments under existing state and federal programs. Cost-sharing from federal and state programs for conservation tillage ranges from \$15/acre/year for a three-year contract under the federal EQIP program to \$18.50/acre/year for a four-year contract under the Wisconsin program. Extending sequestration tillage practices to an additional 1.0 million to 10.0 million acres at \$18.50/acre/year cost-sharing would require payment to farmers totaling from \$18.5 million to \$185.0 million dollars per year. However, despite current payment rates, the conversion of existing lands to no-till is relatively small, approximately 10,000 acres/year in WI. This implies that even \$18.50/acre/year will be inadequate to hasten the adoption of sequestration tillage practices to achieve the 1.0 million to 10 million acres sought under this policy proposal, and that the actual cost will be higher.

In addition to payments to participants, a state program would entail administrative expenses. The existing federal National Resource Conservation Service conservation program, EQIP, along with the Wisconsin non-point source pollution program, provides the administrative support for local implementation of soil

1. Christopher Kucharik, personal communication.

conservation practices through County Land and Water Conservation programs and local NRCS offices.

- B. Payments induced by a cap-and-trade program. Establishment of a cap-and-trade program would create demand for carbon sequestration from carbon emitters, such as power plants. Those entities with carbon emissions limited by the cap-and-trade program would purchase sequestration (or other offsets) from various sources, including farmers engaged in sequestration practices. The total amount paid to farmers, and indeed the amount of sequestration bought from farmers, would depend on market conditions that cannot be predicted in isolation. Currently, the price of agricultural soil sequestration on the CCX is roughly \$1.60/acre/year. This value has been as high as \$2.10 in the last nine months. As is the case with a state payment program, the price paid by offset-purchasers would have to rise dramatically before significant voluntary sequestration practices would be adopted.
- C. Requirements, research and CCX. No estimate is made of the cost enforcement, of additional research, or of negotiation with the CCX.

11. Barriers to Implementation: The Wisconsin agriculture sector includes nearly 16,000 dairy operations, whose crop rotation most often includes four years of corn grain/silage followed by three or more years of alfalfa hay. The main nutrient source for these crops is the animal waste those operations generate. The need to turn over the alfalfa hay at the end of its productive “life” and to incorporate manure to increase nutrient uptake and reduce nutrient losses to water and atmospheric resources are why some Wisconsin dairy operations may be reluctant to practice conservation tillage, especially no-till. Additionally, the CCX payment of between \$1.60-2.20/acre may not be high enough to offset the cost for new equipment and potential lower yields during conservation tillage establishment. More limiting is the CCX requirement for no-till, strip-till, or ridge-till, and a minimum 5 year continuous commitment.

12. Other Factors:

- A. Co-Benefits. Practicing conservation tillage and incorporating organic matter has considerable environmental co-benefits. Conservation tillage results in dramatically reduced soil erosion and phosphorus run-off to water resources. Soil quality is increased through increased soil organic material. Incorporating manure has considerable surface water quality benefits.
- B. Potential funding sources and implications. Several of the templates, including this one, propose paying landowners and farmers to adopt practices that offset GHG emissions. These payments could come from the state directly, or from participants in a cap-and-trade program, who may need to buy offsets to meet their emissions limits. If a cap-and-trade program is available, using it to fund offsets would offer three benefits over a state-funded program (in addition to saving state taxpayer dollars).

First, if a cap-and-trade program were enacted, and as its cap were reduced to more stringent levels, the price paid for offsets would be likely to rise. In the long run, the benefits to landowners and farmers may be higher under a cap-and-trade program than under a state funded program. Second, paying for forestry and agricultural offsets through a cap-and-trade program would benefit emitters, who would be able to meet some of their obligations through a lower-cost option. This would enhance the primary benefit of a cap-and-trade program, which is uncovering efficient and low-cost options to reduce greenhouse gas emissions.

Finally, forestry and agriculture offsets provide additional environmental benefits, including surface water protection and wildlife habitat, which other offset methods may not. Making forestry and agriculture offsets eligible under a cap-and-trade program would bring the power of climate markets to support general environmental goals connected to the land.

13. Related Policies: None

Preserve Existing Carbon Sequestration in CRP

1. **Work Group:** Agriculture and Forestry

2. **Policy Name:** Preservation of Existing Vegetative Cover Carbon Sinks on Conservation Reserve Program (CRP) Lands (Preserve Existing Carbon Sequestration in CRP)

3. **Policy Type:** Incentive programs

The Agriculture and Forestry work group recommends only the consideration of financial incentives for this template because of the inability of agricultural producers to shift potential mandate-related costs on to commodity purchasers. Given this, mandating producer actions through greater regulatory burdens on producers would result in vertical and horizontal integration of Wisconsin agriculture in corporate operations and the loss of the Wisconsin family farm.

4. **Affected Sectors, Sub-Sectors and/or Entities:** Landowners currently enrolled in CRP, NRCS, Department of Agriculture, Trade and Consumer Protection (DATCP), DNR, Wisconsin Department of Revenue (DOR).

5. **Estimated Greenhouse Gas Emissions Reduction Impact:** No emission reductions would occur as a result of this proposal. Instead, the proposal aims to avoid the release of CO₂.

Avoided release amounts would range from approximately 0.76 - 1.9 MMt (Million Metric tons) of CO₂ through roughly 2028.

6. **Estimated Costs:** No estimate has been prepared of the cost of avoided emissions under this proposal. Winrock International prepared estimates of the cost of sequestering carbon through converting cropland to grassland. This estimate is a first approximation of the cost of maintaining vegetative cover against alternative land uses.

Winrock's estimate of the cost of converting cropland to grassland in Wisconsin averages around \$19.20 per ton of CO₂ per year for a ten-year conversion period and \$17.90 per ton per year for a twenty-year period. The cost varies by county from a high of \$50 per acre per year to \$10 per acre per year. See the Winrock report for details.

Funding Sources: Funding for these programs may be obtained from state general funds, treated as an offset under a cap and trade program or from the proceeds of an auction of greenhouse gas (GHG) emissions credits under a cap and trade program, if applicable.

7. **Specific Description of Policy Proposal:** This proposal suggests the following policies:

A. Create a state Energy Crop Reserve Program. This program would pay an incentive to landowners to grow perennial grasses and energy crops on marginal land that would otherwise be at risk of intensive cropping. The program would target land previously enrolled in the federal CRP and would have similar soil, water, and habitat standards, while allowing harvest of qualified energy crops.

B. Provide a tax incentive for maintenance of existing vegetative cover on CRP lands or other agricultural lands, including native grasslands, perennial grasses, and prairies, administered as a credit through the state income tax, similar to the homestead tax credit or farmland preservation tax credit.

C. Modify the use-value assessment law and/or rules to allow grasslands to be eligible for lowered assessments even if no longer enrolled in the CRP. (Under use-value, productive agricultural land is assessed for property tax purposes at its agricultural value, rather than its development value. Land enrolled in CRP is treated as agricultural land under Department of Revenue rules. However, other grassland apparently is subject to higher assessments.)

D. Establish a Carbon Conservation Easement Program within DATCP to purchase easements restricting the disturbance of existing vegetative cover carbon sinks.

8. **Timetables, Duration and Stringency Option:** Program creation(s) would occur immediately. Contract terms for the Energy Crop Reserve Program and the Carbon Conservation Easement Program would be 10 years.

9. **Explanation of Rough Estimate of GHG Reductions:** No emissions reductions would occur as a result of these policies. Instead, the policies are aimed at avoiding release of stored carbon.

Estimating CO₂ emissions from CRP land converted to crops is difficult. There are two unknowns: (1) the amount of carbon released per acre, which depends on how long the CRP land in question has been in vegetative cover; and (2) the number of acres of CRP land converted to crops. Additionally, incomplete and limited land use and land cover data about Wisconsin complicate the exercise further.

A rough estimate of the carbon emission rate has been suggested by Dr. Chris Kucharik of the UW - Madison Nelson Institute. Assume a long term rate of sequestration on CRP land of 0.3707 metric tons of CO₂ per acre per year.¹ Assume also that CRP land with expiring contracts has been enrolled for at least 10 years. Disturbance of CRP land with these assumptions will release 9.1605 metric tons of CO₂ per acre, gradually over a period of roughly ten years.

As of January 25, 2008, the USDA Farm Service Agency reports that Wisconsin has 533,830 acres enrolled in CRP.² Of these acres, the following are scheduled to expire over the next ten years.

How many of these acres will be reenrolled is unclear. Nor is it clear how many released acres will be disturbed. If all of the expiring acres were disturbed, the total release of CO₂ would be roughly equal to 1.9 million metric tons within a few years after 2018.

On the low end, if half of expiring acres are reenrolled, and if 80% of the remaining acres are disturbed (both approximations suggested by county conservation experts in Wisconsin through

<u>Year</u>	<u>Acres Expiring</u>
2008	83,171
2009	43,848
2010	58,192
2011	44,464
2012	69,058
2013	76,284
2014	22,239
2015	33,302
2016	18,326
2017	51,816
<u>2018</u>	<u>15,349</u>
Total	516,049

personal communication) then approximately 0.76 million tons of CO₂ would be emitted over the same period.

10. Rough Estimate of Costs for Selected Years:

The cost figures below are based on the figures presented above, assuming a rate of 50% of expiring acres are reenrolled in any of the above programs.

11. Barriers to Implementation: Sufficient funding must be provided to incentivize a landowner of sensitive or highly erodible land that it is economically feasible to not place the land back into active commodity crop production, but rather enroll it in the state Energy Crop Reserve Program or Carbon Conservation Easement Program. This funding amount will vary depending on the price of commodities and the value that can be obtained by producing perennial grasses and energy crops.

12. Other Factors: Wisconsin, like other places, already has a significant quantity of carbon sequestered in soil organic matter, below-ground plant material (both living and dead), and above-ground plant material (living only). When above-ground plant materials are destroyed or when organic soils are disturbed, the sequestered carbon is released to the atmosphere through decomposition. The rate and magnitude of this release depends on the nature of the plant material and of the disturbance. Total releases can be significant if large land areas are affected.

1. Dr. Kucharik estimates a long term rate of sequestration of 0.25 metric tons of carbon per hectare per year. This is equivalent to 0.1012 metric tons of carbon per acre per year (one hectare equals 2.4711 acres) and to 0.3707 metric tons of CO₂ per acre per year (release of one unit mass of carbon yields 3.6642 units mass of carbon dioxide; the additional mass provided by oxygen from the atmosphere).

2. USDA FAS report available at <http://content.fsa.usda.gov/crp-storpt/rmepegg/MEPEGGR1.HTM>.

The lands in question are privately owned, and therefore the disposition of those lands is a private decision. Some of the factors that influence a landowner are the returns available from alternative use (such as sale prices offered by developers or rental prices offered by crop growers), incentive payments available (such

Year	Acreage Goal	10-yr Contracts	20-yr Contracts
2008	41585.5	\$910,722.45	\$715,270.60
2009	21924	\$480,135.60	\$377,092.80
2010	29096	\$637,202.40	\$500,451.20
2011	22232	\$486,880.80	\$382,390.40
2012	34529	\$756,185.10	\$593,898.80
2013	38142	\$835,309.80	\$656,042.40
2014	11119.5	\$243,517.05	\$191,255.40
2015	16651	\$364,656.90	\$286,397.20
2016	9163	\$200,669.70	\$157,603.60
2017	25908	\$567,385.20	\$445,617.60
2018	7674.5	\$168,071.55	\$132,001.40
Total	258024.5	\$5,650,736.55	\$4,438,021.40

as payments under the federal CRP), and the landowner's nonmonetary goals such as recreation and habitat preservation.

The returns available from alternative uses are subject to market forces and are continually changing. However, the prices available for land development and for crop production have risen in recent years. One of the changes of greatest public concern is the increase in rental rates offered for cropland. Growing demand for corn and soybeans due to ethanol production and world demand; and a reduction in U.S. harvested crop acres in 2006, have raised the returns to crop production and thus the value of land used for cropping.

In general, rising crop prices will draw currently fallow land into crop production. This includes CRP land whose contracts are expiring. (Land in CRP receives an annual rental payment for a limited term, in exchange for the landowner limiting disturbance of the land through grass planting and other practices.)

The amount of fallow land drawn into crop production is difficult to project. Harvested cropland varies significantly year-to-year and is in a long-run downward trend. However, it is likely that some fallow land will be drawn in to production, including land currently in conservation programs. Preliminary estimates from conservationists in Wisconsin project that roughly one-third to one-half of expiring CRP contracts will not be renewed. Of those that are not renewed, roughly 80% will be planted in row crops. In addition, there is substantial uncertainty over program details for CRP under the next federal budget.

The four policies recommended here rely on incentive payments to landowners. Landowners in Wisconsin have broad latitude to control the management and use of their land, whether as forest, prairie, pasture, or cropland. Any policy that mandated a particular land use would face significant political and constitutional challenges. Regarding CRP land, enrollment in CRP is voluntary and contractual. Participants in the program agreed to certain temporary land use practices in exchange for rental payments from the federal government. The goal of the policies in this template is to expand the benefits of this voluntary program.

13. Related Policies:

- Advanced Biomass and Biofuel Commercialization and Utilization
- Encourage Prairie Plantings

Boiler Efficiency Improvements

1. **Work Group:** Industry
2. **Policy Name:** Incentives for Industrial Boiler Efficiency Improvements (Boiler Efficiency Improvements)
3. **Policy Type:** Regulatory and financial incentives
4. **Affected Sectors, Sub-Sectors and/or Entities:** Industrial facilities
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Evaluation of six boiler efficiency options covering a range of fuels and boiler types showed potential CO₂ emission reductions of between 6,000 and 25,000 metric tons per year for a model facility. Actual reductions may be higher or lower, but would probably be lower because most boilers are smaller than assumed in the model facility. The estimated universe of industrial boilers in Wisconsin is approximately 3,000. Due to the facility-specific nature of the boiler efficiency options, it is not possible to accurately predict potential statewide CO₂ emission reductions. However making some assumptions allows for a very rough estimate. These assumptions include: (1) 20% program utilization (600 boilers); and (2) average reduction of 15,000 metric tons of CO₂ per year per facility. The result is a very rough statewide emission reduction estimate of 9 million metric tons of CO₂ annually.
6. **Estimated Costs:** Evaluation of six boiler efficiency improvement options showed:
 - A. Capital costs are variable because they are dependent on site-specific conditions, which are variable.
 - B. Operational cost savings range between \$205,000 and \$845,000 annually for a model facility. Actual cost savings could be higher or lower.
 - C. Regulatory compliance costs could range from insignificant for small boilers at minor sources to significant for boilers at major sources regulated by the Prevention of Significant Deterioration / New Source Review program.

Funding Sources: Financial incentives should be provided through the Focus on Energy Program¹

1. This template assumes that both the Enhanced Conservation and Energy Efficiency Program template and the Non-regulated Fuels Efficiency and Conservation template are implemented as recommended by the Conservation and Energy Efficiency

7. Specific Description of Policy Proposal:

- A. **Regulatory Incentives.** To the extent allowed under federal regulations, permit streamlining incentives (e.g. expedited permit approvals) should be provided to offset the regulatory barriers that could be associated with boiler efficiency projects.
 - B. **Financial Incentives.** Annual funding of \$5 million for grants and loans should be provided through the Focus on Energy Program. Funding purposes should include technical assistance, equipment purchases and installation costs. Alternatively, a larger one-time revolving low-interest loan program could be established.
- ## 8. Timetables, Duration and Stringency Option:
- Regulatory incentives could take several years to put in place, depending on the need to modify rules and statutes, and to address any legal challenges to regulatory incentives. The duration is dependent on future federal regulatory actions, but should be permanent, if possible. Financial incentives, if provided through the Focus on Energy Program, could be accomplished within a year.
- ## 9. Explanation of Rough Estimate of GHG Reductions:
- Estimates are based on analysis of several boiler efficiency improvement options which included: (1) preheating demineralized water with secondary heat before steam heating; (2) installation of a steam accumulator to facilitate efficient control of steam header pressure; (3) installation of an ash reinjection system in a hog fuel boiler; (4) installation of a bark press or dryer to increase utilization of biofuels; (5) installation of additional heat recovery systems to lower losses with flue gases; and (6) implementation of an energy management system. This information came from "Technologies for Reducing Carbon Dioxide Emissions: A Resource Manual for Pulp, Paper, and Wood Products Manufacturers," December 2001, NCASI and EKONO, Inc. The estimate in section 6 of statewide boiler base came from Department of Commerce records.

work group. These two templates would help provide for: (1) an adequately funded Focus on Energy program dealing with boilers utilizing regulated fuels (e.g. natural gas) for projects such as efficiency improvements or fuel switching; and (2) an adequately funded non-regulated fuel (e.g. propane, coal) program (presumably an additional part of Focus on Energy, and as such sharing the name) dealing with boilers utilizing these fuels.

10. Rough Estimate of Costs for Selected Years:

Annual funding of \$5 million for grants and loans

11. Barriers to Implementation:

- Potential limitations on regulatory incentives for major sources due to federal pre-emption
- State government costs for incentives
- Availability of engineering contractors and equipment suppliers if initiative is expanded to a larger scale

12. Other Factors: Focus on Energy should examine whether a single project should be eligible for funding from multiple programs, specifically, the Boiler Fuel Switching and Boiler Efficiency Improvement programs.

13. Related Policies:

- Industrial Boiler Fuel Switching
- Non-Regulated Fuels Efficiency and Conservation
- Enhanced Conservation and Energy Efficiency Program
- General Incentives for Industrial Energy Conservation and Efficiency
- Co-Generation Incentives and/or Mandates for Construction, Upgrades and Replacement

Industrial Efficiency Incentives

1. **Work Group:** Industry
2. **Policy Name:** General incentives for (1) industrial conservation and energy efficiency; (2) to help Wisconsin companies transition to become suppliers to the new energy economy (Industrial Efficiency Incentives)
3. **Policy Type:** Incentives: monetary, tax, and environmental permitting, loan program and bond program
4. **Affected Sectors, Sub-Sectors and/or Entities:** Industrial sector
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Reductions will depend upon the breadth and scope of implementation of industrial conservation and energy efficiency projects. If conservation and efficiency incentives were able to achieve a total net 5% reduction in both direct and indirect industrial emissions by the year 2020, that would result in an annual reduction of 1.84 million metric tons (MMt) of CO₂ equivalents.
6. **Estimated Costs:** Unknown, as funding levels would be determined by the Legislature. Funding level of \$15 million per year suggested.

Funding Sources: State budget appropriation

7. **Specific Description of Policy Proposal:** Establish incentives for industrial sector businesses to implement conservation and energy efficiency projects, practices and measures resulting in reduced energy consumption from non-renewable sources, with an emphasis on funding for projects that are not feasible within the constraints of existing programs such as Focus on Energy. The following incentives are intended to achieve these goals, as well as assist Wisconsin companies transitioning to become suppliers in a “new energy economy.”
 - A. Monetary incentives. These could take the form of cash grants for the purpose of (1) conducting comprehensive energy audits and implementing corresponding measures to improve energy efficiency or to conserve energy; or (2) purchasing replacement or retrofit equipment that is more energy efficient.
 - B. Tax incentives. Provide a refundable tax credit for the purchase of equipment or other capital

expenditures that will result in quantifiable energy savings. The percentage of the credit could be flat, or set to a sliding scale based upon the expected efficiency savings, or a combination thereof. In addition, provide manufacturing transition tax credits to assist companies that redesign production facilities to produce new, cutting-age technologies. Tax credits would be given for a percent of the value of the equipment bought or facilities built to produce the new product, and would be targeted to companies that transition to the manufacturing of technology with fewer greenhouse gas (GHG) emissions. Similarly, these credits could be used to provide incentives for component part manufacturers that already produce parts that can be used in clean energy systems to transition to producing mainly for those industries.

- C. Environmental permitting incentives. Provide fast track permitting for retrofit and/or equipment replacement projects that would otherwise proceed on a traditional permitting path, if the equipment will result in conservation or energy efficiency savings. Examples might include the expanded use of commence construction waivers, expanded application of Registration Construction Permits and Registration Operation Permits for sources above 25 tons per year actual emissions, and exemptions from construction permitting at true minor sources. Emphasis should be given to providing permitting incentives on a project basis.
- D. Loan program. Create an energy efficiency loan program to offer low-interest or no-interest loans for large capital expenditures intended to reduce energy consumption, and thereby make possible projects that may otherwise be economically infeasible.
- E. Industrial development bonds. There are huge potential benefits in manufacturing and other heavy industrial firms as we move into a new energy economy, because these firms are in a good position to produce the component parts that are the backbone of many renewable energy and energy efficiency systems. Industrial development bonds (IDBs) are a form of conduit financing whereby private investors provide loans to companies through the state or local government. Under the arrangement, the government sells bonds to investors and uses the proceeds to make loans to private businesses,

generally for the acquisition, construction, or expansion/rehabilitation of manufacturing facilities. Interest income from the bonds is tax free, allowing the loans to be low interest. These loans require some showing of public benefit – though this is usually expressed in economic terms, the benefits can also be measured through clean energy production. For example, Wisconsin could target a portion of existing IDB financing to businesses that do any of the following:

- Begin manufacturing energy efficient fixtures, metering equipment and/or appliances
- Begin manufacturing renewable energy products and/or components
- Install renewable power generators in their facilities
- Begin manufacturing component parts for renewable fuel or hybrid/flex-fuel vehicle operations
- Transition from manufacturing traditional vehicles to manufacturing hybrids, advanced diesel, flex-fuel and other advanced drive train vehicles and related components.

8. Timetables, Duration and Stringency Option:

Implementation of incentive policies is dependant upon legislative approval, and the availability of state revenue. Under a very optimistic scenario, legislation could be passed in the 2009 legislative session and funding appropriated for the fiscal year beginning July 1, 2009. To maximize effectiveness, the incentives should be considered as continuous ongoing appropriations. To be effective, these programs should be relatively long term – perhaps a 10 year lifespan with the possibility of renewal.

9. Explanation of Rough Estimate of GHG

Reductions: The estimated emission reductions, based on energy savings of 5% below baseline levels by 2020, represents an estimate of what can occur given that many industrial energy users have already undertaken conservation and energy efficiency measures that were driven by the rising cost of energy.

It is assumed that the availability and attractiveness of the incentives will directly impact the extent to which conservation and efficiency projects are implemented.

The estimated reduction of 1.84 MMt of CO₂ equivalents is based on the following:

- World Resources Institute data suggests 21 MMt of CO₂ equivalents are attributable to the industrial sector annually as indirect emissions due to electricity consumption, and 15.9 MMt of CO₂ equivalents are attributable annually as direct emissions.
- A 5% reduction in indirect emissions yields 1.05 MMt of CO₂ equivalents (21 MMt X .05 = 1.05 MMt).
- A 5% reduction in direct emissions yields .795 MMt of CO₂ equivalents (15.9 MMt X .05 = .795 MMt).
- 1.05 MMt + .795 MMt = 1.84 MMt of CO₂ equivalents

10. Rough Estimate of Costs for Selected Years: To maximize the attractiveness and energy-saving potential of the incentives, and to provide a broad spectrum of incentives available to meet the need of small, medium and large companies, a funding level in the range of at least \$15 million per year should be considered.

11. Barriers to Implementation: The incentives would require legislative approval, including the appropriation of state revenue during a time when the budget is tight. There would also need to be an administrative component to each of these incentives, including, in some cases, the likelihood of a competitive application process or the certification of tax credits. Also, as noted above, the incremental benefit of conservation and energy efficiency is uncertain given that lean manufacturing and other market-driven forces have caused many industrial sector businesses to implement conservation and energy efficiency measures already.

12. Other Factors: None

13. Related Policies:

- Enhanced Conservation and Energy Efficiency Program
- Industrial Boiler Efficiency Improvements
- Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions

Boiler Fuel Switching

1. **Work Group:** Industry
2. **Policy Name:** Incentives for Industrial Boiler Fuel Switching (Boiler Fuel Switching)
3. **Policy Type:** fiscal, regulatory, or technical assistance incentives
4. **Affected Sectors, Sub-Sectors and/or Entities:** Industrial facilities, primarily in the forest products industry
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** A recent analysis set the amount of forest residues generated in Wisconsin at between 609,000 and 2,325,000 dry tons per year. Every 100,000 tons of forest residues that displace coal yield an emission reduction of almost 120,000 metric tons of CO₂ equivalents. A 50% recovery and use goal, if realized and if displacing coal, would reduce GHG emissions by between approximately 365,000 tons and 1,400,000 tons of CO₂ equivalents annually. However, this figure would be reduced by the amount of GHG emissions associated with collection and transport for use (life-cycle analysis).
6. **Estimated Costs:** Costs for incentives would be dependent on available government funds and legislative will to provide additional funding.

Funding Sources: possibilities include the Focus on Energy Program¹

7. Specific Description of Policy Proposal:

- A. **Supply-side Incentives.** Provide incentives intended to increase the supply of non-wood biomass and noncommercial forest residues available for use as biofuels. A goal of 50% recovery and use of forest residue for biofuels is recommended. Forest residues include defective portions of trees, unmerchantable trunks, trees removed for purposes of thinning, and materials

1. This template assumes that both the Enhanced Conservation and Energy Efficiency Program template and the Non-regulated Fuels Efficiency and Conservation template are implemented as recommended by the Conservation and Energy Efficiency work group. These two templates would help provide for: (1) an adequately funded Focus on Energy program dealing with boilers utilizing regulated fuels (e.g. natural gas) for projects such as efficiency improvements or fuel switching; and (2) an adequately funded non-regulated fuel (e.g. propane, coal) program (presumably an additional part of Focus on Energy, and as such sharing the name) dealing with boilers utilizing these fuels.

left behind during logging and management operations. Forest residues do not include pulpwood, saw logs, and other wood used as raw material in the forest products industry. Non-wood biomass would include switchgrass and other similar crops, but not wood. Financial assistance could be provided in the form of grants and low-interest loans to loggers for the purchase of equipment to collect and transport forest residues to market, and for other technical assistance. It is also recommended that voluntary best management practices for the recovery of forest residues be developed between the DNR and the forest products industry.

- B. **Demand-side Incentives.** Provide incentives to industrial boiler owners to increase the amount of non-wood biomass and noncommercial forest residues used as fuel. Financial assistance could be provided in the form of grants and low-interest loans to industrial owners of wood-fired boilers to make physical plant changes necessary to increase the utilization of forest residues or non-wood biomass as fuel (increase wood handling capacity, etc.). Financial assistance could also be provided in the form of a fuel cost subsidy for industrial owners of wood-fired boilers. It is important that market supply and demand balance be maintained in order to avoid driving up the price of commercial stem wood used as raw material in the pulp, paper, and wood products industries. In addition, to the extent allowed under federal regulations, permit streamlining incentives should be provided to offset the regulatory barriers that could be associated with boiler projects.

8. **Timetables, Duration and Stringency Option:** Incentives could take about one year to put in place, if through the Focus on Energy Program. It would likely take a couple of years to put incentives into place through other mechanisms. It would then likely take some time before companies began to utilize the incentives and make related changes.

9. **Explanation of Rough Estimate of GHG Reductions:** Conversion factor developed by National Council for Air and Stream Improvement based on commonly used emission factors. From the study: "Technologies for Reducing Carbon Dioxide Emissions: A Resource Manual for Pulp, Paper, and Wood Products Manufacturers," December 2001, NCASI and EKONO, Inc.

10. Rough Estimate of Costs for Selected Years: For supply-side incentives the recommended funding level is \$1 million per year for three years, with future funding determined by the Focus on Energy Program based on demand. For demand-side incentives the recommended funding level is \$1.5 million annually in grants for three years and \$1.5 million in low interest loans for three years. Future funding levels should be determined by the Focus on Energy Program based on demand.

11. Barriers to Implementation:

- State government costs for incentives
- Environmental permitting and compliance costs that could negatively impact the cost-effectiveness of projects. For example, federal Prevention of Significant Deterioration / New Source Review and New Source Performance Standard regulation could come into play.

12. Other Factors: The operation of environmental emission controls would result in the combustion of fossil fuels or additional energy usage, which would need to be subtracted from total GHG reduction estimates.

Two additional options were examined: (1) a mandate that all fossil fuel boilers switch to biofuels; and (2) a mandate that all coal-fired boilers switch to natural gas. These options are not recommended because of the significantly implementation costs, operational costs, and the potential lack of available biomass and natural gas to support a statewide conversion in fuel use. It is understood that other policy decisions could drive fuel switching on a site-specific basis. The costs and benefits of fuel switching should be evaluated further within the context of that policy discussion.

Mandate that all fossil fuel boilers switch to biofuels

- The following is a very rough, ballpark estimate of the general magnitude of emission reduction that might be expected with 100% implementation of this mandate. Based on a rough estimate in the pulp and paper industry, the maximum statewide reduction might be in the vicinity of 50% from 2005 levels, or approximately 5 million tons. (Total industry sector CO₂ emissions in 2005 were approximately 10 million tons (DNR

AEI). Pulp and paper industry is almost 70% of total, or somewhat under 7 million tons. About 70% of pulp and paper CO₂ emissions are associated with fossil fuel combustion, or a little under 5 million tons. Assume more reductions if extrapolated to all industry. Assume less reduction due to a boiler size limit below which conversion would not be required. Assume the increases and decreases offset, resulting in an approximate 5 million ton maximum reduction potential.)

- The following are very rough, ballpark estimates of the general magnitude of costs that might be expected with 100% implementation this mandate. Based on a rough estimate in the pulp and paper industry, the capital costs for boiler conversions alone might be expected to approach \$2 billion. The capital costs for related facility changes and pollution controls are unknown, but could approach \$1 to \$2 billion, based on anecdotal evidence. This would bring total capital costs into the \$3-4 billion range, subject to other caveats noted below. Operation costs could increase or decrease, depending on site-specific conditions. (There were 83 pulp and paper industry boilers listed in the 2005 DNR AEI. Assume 15 boiler replacements at \$33 million each and 45 boiler rebuilds at \$23 million each. Total pulp and paper costs would exceed \$1.5 billion. Extrapolate to all industry and costs could be expected to approach \$2 billion. Costs are in 2001 dollars, so actual costs would be higher. Costs are for a model boiler based on steam demand. The model boiler is toward the small end of the boiler size spectrum, so costs must be scaled (most likely up) to account for actual steam demand.)

Mandate that all coal-fired boilers switch to natural gas

- The following is a very rough, ballpark estimate of the general magnitude of emission reduction that might be expected with 100% implementation of this mandate. Based on a rough estimate in the pulp and paper industry, the maximum statewide reduction might be in the vicinity of 18% from 2005 levels, or approximately 1.8 million tons. (Approximately 55%, or about 3.8 million tons, of pulp and paper CO₂ emissions

in 2005 associated with coal combustion. Assume natural gas emissions are 59% of coal emissions, adjusted for efficiency. Paper industry maximum potential reduction of approximately 1.6 million tons. Extrapolate to all industry, but assume few coal-fired boilers outside of pulp and paper, resulting in approximately 1.8 million ton maximum reduction potential. This would need to be adjusted for life-cycle emissions (e.g., if CHP units lose efficiency, then purchased power may increase.)

- The following are very rough, ballpark estimates of the general magnitude of costs that might be expected with 100% implementation of this mandate. Capital costs are unknown, but would be substantial. Energy operation costs could be expected to increase by a factor of about 3.5, based on the average annual price differential between coal and natural gas in 2005 as reported in Wisconsin Energy Statistics 2006. More specifically, according to Wisconsin Energy Statistics 2006:

- Industry used 47.2 TBtu of energy from coal
- The price premium for natural gas is \$6.86/MBtu (\$9.41 - \$2.55)
- The total cost of switching from coal to gas would be \$323,792,000
- The paper industry accounts for 93.5% of industry coal purchases
- \$302,745,520 of the total cost would be born by the paper industry
- This does not include consideration of a boiler efficiency penalty of 2-4% for switching to gas

13. Related Policies:

- Advanced Biomass and Biofuel Commercialization and Utilization
- Co-Generation Incentives and/or Mandates for Construction, Upgrades and Replacement
- Non-regulated Fuels Efficiency and Conservation
- Enhanced Conservation and Energy Efficiency Program

- General Incentives for Industrial Energy Conservation and Efficiency
- Waste Materials Recovery and Disposal – Wood Waste

Energy Intensity Reduction with Feebates

- 1. Work Group:** Industry and Task Force Co-Chairs Through the Strawman Proposal
- 2. Policy Name:** Sector Based 2% Energy Intensity Reduction with Feebate Provision (Energy Intensity Reduction With Feebates)
- 3. Policy Type:** Exploratory action
- 4. Affected Sectors, Sub-Sectors and/or Entities:** Make available to a broad range of sectors and entities
- 5. Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy and would not result in any direct greenhouse gas (GHG) reductions. An estimate of potential shows that if Wisconsin industrial facilities reduced electric energy use by 2%, it would result in an estimated 408,234 metric ton reduction in GHG emissions.
- 6. Estimated Costs:** No additional costs in exploring the level of interest in establishing Feebate agreements under Green Tier.
Funding Sources: Exploration of this policy would be completed within the DNR operating budget.
- 7. Specific Description of Policy Proposal:** The DNR should explore the Sector Based 2% Energy Intensity Reduction with Feebate Provision proposal, as described below, with its advocates and Green Tier participants. If there is significant interest among Green Tier participants in pursuing the proposal, they, together with the DNR, should develop the program as part of Green Tier. This proposal essentially combines two ideas: First, that “everyone does their part” through a minimum sector-wide 2% annual reduction in energy intensity. Second, that we accommodate growth in sector energy demand with further investments in energy efficiency, renewable technologies and other carbon footprint reducing activities.

Each participating sector business or entity will be required to reduce its energy intensity/electricity/natural gas use per unit of output by at least 2% per year on a continuing basis. The unit of output/

business metric can be expressed as a production factor, dollar of sales, number of employees or some other agreed upon standard within each sector. The goal is to reduce energy intensity for each sector by 2% each year. In addition, a feebate would be structured so that below average performers pay a fee that would be fed back to above average performers (or the sector) to reimburse clean energy portfolio and carbon footprint reduction costs.

“Feebates” are economic instruments based upon the principle that efficient use of resources should be rewarded by the inefficient. Under this policy option, a fee and a rebate would be combined in such a way that the incentive drives reductions in energy intensity while generating a source of funds for clean energy portfolio investments that help offset growth in sector energy demand. It is important to note that feebates are revenue-neutral, with sector fees paying the rebates, rather than as a tax or budgetary item.

A sector based feebate might work something like this: Each sector business or entity would establish its’ baseline energy intensity per unit of production (expressed as a ratio). This ratio is adjusted each year by the average overall percent reduction among all companies in the sector. Companies whose ratio is below the average percentage pay the feebate rate and those funds are fed back to above average performers (or the sector). The feebate “rate” might be based on the state average electricity and natural gas rates. For example, if the average overall percentage reduction among all companies in a sector is 4% and a company’s reduction is only 3%, the company pays a feebate equal to the difference (1%) of their total annual energy bill.

If the average overall percent reduction among all companies in a sector in a particular year is less than 2%, then each company would pay a feebate equal to the difference between their performance and the 2% reduction requirement. Again, feebates would be earmarked to fund clean energy and carbon footprint reduction projects within each sector.

Specific Policy Options:

- Implement based upon 2007 benchmarked energy use and production outputs.
- Provide a “Good Actor Clause” for those sector companies with an exemplary track record of energy efficiency so as to opt out of the 2% requirement.
- Moreover, credit those companies that already meet some threshold of energy efficiency performance including: provisions for energy audits, process efficiency improvements, lighting retrofits and continuous improvement.
- Provide opportunities for energy efficiency mentoring by large companies for small companies within sectors. Provide participating companies with additional regulatory flexibility or incentives for their mentoring efforts.
- Provide marketing, promotion and branding benefits for participating sectors and for the state as a whole because of innovative energy management and superior environmental performance.
- Eventually fold into Midwestern Governor’s Association goal requiring 2% in energy efficiency improvements each year after 2015.

8. Timetables, Duration and Stringency Option:

The DNR should explore the proposal as soon as practical.

9. Explanation of Rough Estimate of GHG

Reductions: This is an enabling policy and would not result in any direct GHG reductions. However, an estimate of potential GHG reductions can be found looking at a theoretical 2% reduction in 2003 Wisconsin industrial electricity use. According to the Energy Information Administration 2003 Wisconsin Industrial Electricity Sales were 25,821,248 MWhs. 2% of this total is roughly 516,425 MWhs. (That’s $25,821,248 \text{ MWhs} \times .02 = 516,424.96 \text{ MWhs}$) Best practice for GHG estimates from electricity consumption is to multiply total consumption by the EPA eGrid electricity sub region emissions rate average. An average of Wisconsin’s 3 sub region averages generates an emissions factor of approximately 0.7905 metric tons/MWh. Therefore, we have the following calculation: $0.7905 \text{ metric tons/MWh} \times 516,425 \text{ MWhs} =$

408,233.9625 metric tons. So, a 2% reduction in 2003 Wisconsin Industrial electricity sales would yield an estimated 408,234 metric ton reduction in GHGs.

10. Rough Estimate of Costs for Selected Years: Any costs associated with DNR exploration of this proposal will likely be limited to the near term.

If interest in the proposal warrants Green Tier agreements, costs would include the administration costs to negotiate sector agreements, program start-up and ramp-up. Sector management of goal setting, performance tracking and reporting requirements will reduce public administration costs. Utility feebate collection and distribution would also reduce public costs. Some third-party oversight of sector performance will be required. A portion of the fees collected may be allocated for public outreach, marketing and promotional activities to highlight best practices and recognize top performers within sectors. An annual feebate payment will be required for below average performers. As an example: 1% - 2% of all industrial electricity expenditures were \$13 - \$26 million in 2005. 1% - 2% of all industrial natural gas expenditures were also about \$13 - \$26 million in 2005.

11. Barriers to Implementation: Any barriers will likely be identified during the exploration of this proposal. These may include the following: (1) some sectors may resist the idea of a feebate that raises the price of below average performance and lowers the price of above average performance; (2) sectors must make **energy** efficiency determinations that are meaningful and account for large and small businesses within each sector.

12. Other Factors: If any Green Tier agreements are developed utilizing this proposal, attention should be given to any mandatory cap and trade program that includes industrial sources to ensure that no industrial sources are subject to both the cap and trade policy and this policy over the same time period.

13. Related Policies: None

Training for Green Jobs

1. **Work Group:** Industry
2. **Policy Name:** Training for Green Jobs
3. **Policy Type:** Enabling policy
4. **Affected Sectors, Sub-Sectors and/or Entities:** Industry, labor, educational institutions and state agencies
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy to help transition the state's economy from carbon-based to carbon-constrained. It does not result in any direct greenhouse gas (GHG) emission reductions.
6. **Estimated Costs:** Costs were not estimated for this policy

Funding Sources: Reallocation of funds for work force training and possible funding through the Governor's Clean Energy Wisconsin Plan's proposed Business and Job Development initiatives. These include the Wisconsin Energy Independence Fund, the Emerging Industry Skills Partnerships, and Technical College Grants.
7. **Specific Description of Policy Proposal:** The thrust of this policy proposal is to coordinate workforce development for the emerging green jobs sector. This proposal complements the initiatives put forth in the Governor's Plan for Energy Independence, Clean Energy Wisconsin.
 - A. Direct the Secretary of the Department of Workforce Development (DWD) to convene a group to assess future training needs for the emerging green jobs sector and to report back to the Governor by January 2009.
 - The group should include members from employers, technical colleges, University of Wisconsin-Extension, DWD Job Centers, unions and other representatives
 - The group should assess what "green collar" jobs exist and are emerging, the skills and training needed to secure or advance into these jobs, the readiness of the labor force to fill these jobs (are there labor shortages, who is looking for work and what skills do they have and need).
 - B. Direct the Secretary of the DWD to assess the proposed Federal Green Jobs Act, or other such legislation, to determine whether the Wisconsin Congressional delegation should be asked to support the bill. If legislation is enacted, efforts should be made to access funds for green job training.
 - C. Request the Secretary of the Department of Commerce to expand the focus of the existing Customized Labor Training Program to expend at least 10% of its funds for "green collar" training and for support of converting manufacturing operations to the production of renewable and efficiency components.
8. **Timetables, Duration and Stringency Option:**
 - By September 2008, the Customized Labor Training Program should be expending at least the 10% targeted amount on green collar training and job development.
 - By January 2009, the report on Green Job Training Programs should be submitted to the Governor.
9. **Explanation of Rough Estimate of GHG Reductions:** This is an enabling policy and does not result in any direct GHG emission reductions.
10. **Rough Estimate of Costs for Selected Years:** Costs were not estimated for this policy
11. **Barriers to Implementation:** The major barriers in workforce development involve the level of organization, facilitation and ongoing support that is required for a successful program. Defining job types and career ladders can be difficult; however, convening groups under an appointee will help ensure accountability.

12. Other Factors: The transition from a carbon-based to a carbon-constrained economy is likely to create dislocations. By anticipating some of these dislocations and being proactive, Wisconsin may emerge as an economic leader.

13. Related Policies:

- Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions
- Enhanced Conservation and Energy Efficiency Program
- Enhanced Renewable Portfolio Standard

Cap and Trade Program

1. **Work Group:** Task Force Co-Chairs, building on Carbon Tax / Cap and Trade Work Group's template
2. **Policy Name:** Broad-based, Multi-sector Cap and Trade Program (Cap and Trade Program)
3. **Policy Type:** Legislation with regulatory implementation and enforcement
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sectors: Electric generation, industrial, commercial, residential, transportation, and petroleum fuel industries.
Entities: Those with annual emissions of 25,000 metric tons of carbon dioxide equivalents (CO₂e) or greater.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Will be determined based on the stringency of the cap, the sectors that are covered, and the schedule.
6. **Estimated Costs:** Compliance costs will depend on the stringency of the cap, the sectors that are covered, and the schedule. The design of the program will also affect costs. Design choices affecting costs include:

- Geographic scope of program (international, national or regional)
- Linkage with other cap and trade programs (RGGI, Western Climate Initiative, international)
- Availability of offsets
- Allowance distribution method
- Flexibility options, such as banking and borrowing
- Other cost containment mechanisms, such as "off-ramps"
- Compliance Period

Funding Sources: Administrative costs will need to be funded through either program revenues or state operating budgets.

7. Specific Description of Policy Proposal: The Task Force recognizes that a broad based multi-

sector cap and trade program (C&T Program) that establishes a price for greenhouse gas (GHG) emissions is essential to meet the emission goals recommended by the Task Force. The Task Force also recognizes that the C&T program should cover the largest possible market. The most preferable alternative would be a federal program with a target effective date of 2012, that is designed in a way that treats Wisconsin fairly and recognizes that states such as Wisconsin, which are highly dependent on coal for electricity and have energy intensive industries, are likely to be disproportionately affected, particularly during the transition period to a low-carbon economy.

The Task Force also recommends that Wisconsin continue to participate and provide leadership in the development of a Midwest Regional Cap and Trade Program. Furthermore, Wisconsin should promptly initiate the process for the state to review, consider and take necessary and appropriate action when a cap and trade agreement and model rule are completed through the MGA process. The Task Force recommends against a Wisconsin-only cap and trade market, since it is unlikely to have adequate diversity and liquidity and would create competitive issues with neighboring states.

With respect to a federal cap and trade program, Wisconsin should advocate for the following, subject to protecting the environmental integrity of the program:

- Any revenues realized by the federal government from Wisconsin as a result of allowance auctions – after a reasonable contribution to federal R&D for GHG reductions – should be returned to Wisconsin to mitigate the disproportionate economic impacts to Wisconsin consumers and businesses.
- Any free distribution of allowances and any distribution of auction proceeds should favor states that will be disproportionately impacted by the program.
- There should be substantial offset opportunities which would enable Wisconsin to reduce emissions from non-covered sources and significantly increase its terrestrial sink capacity.

- States should be granted reasonable flexibility on program implementation and should share in its administration.
- Provisions should be developed to protect industry from unfair competition from competitors whose GHG emissions are not regulated.

Continued focus on development of a regional cap and trade program is important for a number of reasons:

- In the event that a federal program fails to be adopted in a timely manner, participation in a regional cap and trade program will provide Wisconsin with the ability to meet the statewide emission reduction targets.
- The development of a regional C&T program will increase pressure for prompt development of a federal program, will better inform the state and its stakeholders about the key policy issues related to a cap and trade program and will help to build consensus within Wisconsin and the larger Midwestern stakeholder community on regional interests and needs. This will enable the region to more effectively influence the design of a federal program.

Design Elements for a Regional or Federal Cap and Trade Program that Includes Wisconsin

The Task Force recommends that the design of a cap and trade program involving Wisconsin, whether it be part of a regional or a federal program, include the features described below. These recommendations are based on the premise that the Enhanced Conservation and Energy Efficiency Program is fully funded through utility rates, that the Enhanced Renewable Portfolio Standard has been enacted, and that the revenues from the allowance fees and auction proceeds are used as in the section “Use of Revenues” described below. Furthermore, key elements described below are not intended to compromise the integrity or stringency of the cap in any material way. Below are the recommended key elements for a cap and trade program.

A. Scope of program.

- Include all 6 greenhouse gases
- Covered sources include existing and new point-source direct emitters of greenhouse gases in the electric generation and other industrial sectors as well as natural gas, diesel fuel, and gasoline. The threshold level for inclusion in the program would be annual emissions of 25,000 metric tons of CO₂e.
- All electric energy imported to the state would be subject to this cap.
- The point of regulation should be the emission source for the power and industrial sector, the point of first sale for natural gas, and the point where petroleum inspection fees are applied for diesel fuel and gasoline.
- Any regional program should be linked to RGGI and the Western Climate Initiative.

B. Level of cap.

- The cap, and the rate of decrease of the cap, should be set to be science-based, challenging but achievable, and set to reach the state’s emission reduction goals taking into account the reductions that are reasonably expected to be achieved by the other recommendations of the Task Force.

C. Program structure, including the allocation methodology for allowances.

- The program should be designed to (not in order of priority):
- Avoid windfalls, including but not limited to those that would arise from over-allocation,
- Prevent significant leakage,
- Minimize speculation and prohibit and prevent market manipulation,
- Protect the environmental integrity of the program and cost mitigation objectives, and
- Reward efficiency and promote reductions of emissions from existing sources.
- The PSC should be required to ensure that the value of all allowances provided to utilities

flow through to customers, not shareholders. The fee for allowances should be regarded as a recoverable cost of providing service.

D. Distribution of allowances.

- For a transition period of up to the first ten (10) years, a substantial majority of available allowances (such as 90 percent) needed by industry and Wisconsin utilities (including municipal and cooperative utilities) should be allocated to such entities in Wisconsin at a fixed fee (such as \$2 per allowance) adjusted annually for inflation and the remainder of the allowances should be auctioned.
- The percentage of allowances allocated to energy intensive industry subject to global competition may be somewhat higher than the percentage used for allocation to the utilities for the first five (5) years of the transition period. Alternatively, the level of the fee may be somewhat lower for such industry for such period.
- Carbon dioxide emissions from biomass facilities should not require allowances under the program for all or a portion of the transition period.
- After the transition period, there should be a gradual increase in the amount of allowances to be auctioned.

E. Use of revenues from allowance fees and auction proceeds.

- All fees for allowances and auction revenues should be held in trust and be legally available to be used solely to (1) fund programs and investments to reduce GHG emissions that lower the overall cost of achieving emission reduction targets, including conservation and efficiency investments; and (2) to support climate change adaptation strategies. These programs should include, but not be limited to, the Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions that was recommended in the Interim Report, and the existing housing retrofit and rehabilitation, job training and industrial competitiveness programs recommended in the Final Report.

F. Use of offsets.

- The program should provide for broad availability of offsets for emission reductions from sources not covered by the program and to significantly increase Wisconsin's terrestrial carbon sink capacity.
- There should be stringent verification, additionality, scientific credibility (i.e. the reductions are "real") and permanence requirements (accounting for years of effectiveness and insurance, etc.) pursuant to a detailed set of offset protocols.
- Wisconsin should begin developing such offset protocols.
- Some members of the Task Force believe that limits should be set on the extent of offsets that can be used to meet compliance requirements.

G. Other cost containment measures.

- Early action credit should be provided, subject to clear verification requirements.
- Unlimited banking, a compliance period of three years, and a smooth annual step-down of the cap to reach the Task Force targets should be included.
- A reasonably high allowance price cap, or other cost containment measure, should be included to provide protection against price spikes.
- None of these cost containment measures should compromise the integrity or stringency of the cap in any material respect – that is, the emission reductions required by the C&T program.

The above measures are intended to mitigate what may be substantial initial cost impacts on Wisconsin's consumer and industrial base as a result of uncertain GHG emission allowance prices, particularly during the transition period while low-carbon technologies are under development. These design features are also intended to ensure that the allowance value is retained in Wisconsin, and not diverted to financial firms or other jurisdictions, and to enhance Wisconsin's ability to achieve GHG

emissions in non-covered sectors, thus enhancing the state's terrestrial sequestration capacity. In addition, these features are intended to help garner the political support necessary for the adoption of challenging emission reduction caps.

Also, this recommendation recognizes that (1) the allocation versus auction issue is highly contentious and that Task Force members have divergent, strongly held views on it; and (2) positions taken on this issue by members of the Task Force in the federal and MGA debates will depend on other aspects of the program as they develop, as well as positions that develop through coalitions with which Task Force members may ally. The purpose of this recommendation is to recognize and emphasize the importance of cost mitigation for Wisconsin consumers and industry and to stimulate debate on ways to both protect the environmental certainty of a cap and trade approach and also provide funding for programs needed to reach targets, with cost certainty and protection, given the considerable uncertainty as to prices and impacts of a large auction regime.

- 8. Timetables, Duration and Stringency Option:** The Midwestern Governors Association timetable is to have the development of a proposed cap and trade agreement and a model rule completed by November 2008. Wisconsin should promptly initiate the process for the state to review, consider and take such actions on the agreement and model rule as are required and determined to be appropriate.

The timetable for a federal cap and trade program is uncertain.

- 9. Explanation of Rough Estimate of GHG Reductions:** The emission reductions will be determined by the cap.

- 10. Rough Estimate of Costs for Selected Years:** The administrative costs for this program are likely to be significant, especially in the early years, to establish the program.

For covered entities, the costs will include the allowance fee (for example, \$2 per allowance) and any funds expended for auctioned allowances. Compliance costs will be affected by the factors described in section 6 as well as the nature and effectiveness of other requirements and incentives to reduce emissions.

- 11. Barriers to Implementation:** Wisconsin is one of many stakeholders involved in the design of a regional and/or federal cap and trade program. The state's role is one of advocating for our interests in a larger political setting. Wisconsin is one voice, among many, that will be trying to influence the design of a federal cap and trade program. While Wisconsin will have a stronger voice in the development of a regional cap and trade program, the challenge in advocating for a program along the lines described in this template will still be great.

- 12. Other Factors:** In drafting a regional program, consideration should be given to policies to minimize the potential for leakage which could result through the shifting of generation to non-cap and trade states.

It is also important to note that other requirements and incentives for GHG reductions in the covered sectors may reduce the financial impact of the cap and trade programs. For example, if the renewable portfolio standard is substantially enhanced as proposed, GHG emissions from electric generation would be reduced, thereby decreasing the amount of additional reductions needed to meet the cap. Also, the use of monies raised by the allowance fee and auction for GHG reducing activities should further help Wisconsin meet its statewide emission reduction goals.

- 13. Related Policies:** All other recommendations of the Task Force

Offset Program Design

1. **Work Group:** Carbon Tax / Cap and Trade
2. **Policy Name:** Recommended Design
Elements for an Offset Program as part of Cap and Trade Regulatory Framework (Offset Program Design)
3. **Policy Type:** Recommended design elements for a program to track offset allowances (credits) from certified emission reductions or carbon sequestration projects that take place outside the regulated program and meet specific requirements.
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric, Industry (all entities not captured in the cap and trade program)
Sub-Sector: All Sectors
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This is an enabling policy which will not result in any direct emission reductions.
6. **Estimated Costs:** An offset program has administrative costs. A project-by-project evaluation could be quite costly, but these administrative costs could be reduced through the development of eligible project protocols.

Funding Sources: Administration costs could be covered through fees paid by program participants
7. **Specific Description of Policy Proposal:** Design elements for a voluntary offset program through which non-regulated sources reduce, avoid or sequester CO₂ equivalent (CO₂e) emissions. When offsets are certified through the program they can be purchased to be used as credits by regulated entities participating in a trading program. By monetizing offsets, the program encourages emissions reductions from non-regulated sources that otherwise would have little incentive to change behaviors/processes. Further, by bringing additional credits into the regulated program, an offset program offers emitters in a trading program increased compliance flexibility and the opportunity to meet compliance targets at a lower cost. As with other greenhouse gas (GHG)

reductions, the offset program is believed to result in “co benefits” – other environmental or societal benefits beyond CO₂e emission reductions. The Clean Development Mechanism (CDM) program under the Kyoto Protocol is an example of a voluntary offset program. The European Union Emissions Trading Scheme relies on the Clean Development Mechanism under the Kyoto Protocol for offset opportunities.

The work group recommends specific aspects of the design elements of the program include:

- A. Administration. Offset projects can be implemented by a party outside the regulated cap and trade program. Offset projects can also be implemented by a regulated entity through activities outside their regulated portfolio.
- B. Criteria. A project must demonstrate that emission reductions would not otherwise have occurred. Emissions reductions from a project must be verified, quantified, enforceable and permanent. The overarching program objective is to have projects that result in certified offsets that are compatible with and “recognized” by other programs. It should be recognized that as GHG policies develop, an increasing share of reductions previously made voluntarily may become mandatory and therefore no longer qualify as offsets. Offset buyers must be aware of and plan for this risk.
- C. Limitations. This issue is more fully addressed in the Cap and Trade template.
- D. Scope. The offset program should be as geographically broad as possible -- at a minimum within the Midwest region. There should be linkages to other existing programs such as RGGI to expand the scope of the program. Protections must be put in place to prevent double counting of offsets in more than one program. Qualifying offset projects for all six greenhouse gases are allowed and will be adjusted based on their respective global warming potentials (GWP). The table below shows the GWP for the recognized greenhouse gases: CO₂, CH₄, N₂O,

hydrofluorocarbons, perfluorocarbons and SF₆. World Resources Institute uses IPCC 1996 100 year global warming potentials, but as there may be a migration to the more recent 2001 data in the future, both are listed in the table below.

E. Project Eligibility. Wisconsin currently has a voluntary registry program that could serve as an initial platform (with modification) to launch a stand alone offset program.¹

A set of protocols for determining project eligibility based on existing standards and scientific recommendations should be adopted through a formal rulemaking process. Specific projects not covered by the protocols would be deemed eligible through an administrative process overseen by the appropriate state authority

Comparison of 100-Year GWP Estimates from the IPCC's Second (1996) and Third (2001) Assessment Reports

Gas	1996 IPCC GWP ²	2001 IPCC GWP ³
Carbon Dioxide	1	1
Methane	21	23
Nitrous Oxide	310	296
HFC-23	11,700	12,000
HFC-125	2,800	3,400
HFC-134a	1,300	1,300
HFC-143a	3,800	4,300
HFC-152a	140	120
HFC-227ea	2,900	3,500
HFC-236fa	6,300	9,400
Perfluoromethane (CF ₄)	6,500	5,700
Perfluoroethane (C ₂ F ₆)	9,200	11,900
Sulfur Hexafluoride (SF ₆)	23,900	22,200

1. Chapter NR437, Wis. Admin. Code
 2. Intergovernmental Panel on Climate Change, Climate Change 1995: The Science of Climate Change (Cambridge, UK: Cambridge University Press, 1996).
 3. Intergovernmental Panel on Climate Change, Climate Change 2001: The Scientific Basis (Cambridge, UK: Cambridge University Press, 2001).

(similar to the RGGI protocol process). Likewise, as new environmental regulations are adopted and previously unregulated activities become regulated, this administrative process would be used to remove certain projects from the eligibility list (similar to CDM).

In adopting protocols and making project determinations, existing programs such as the Kyoto Protocol CDM, RGGI, and the Chicago Exchange should be considered. As an example, the following types of projects have been deemed eligible by RGGI:

- Reforestation, Afforestation and other land use management changes;
- Landfill gas – methane capture and destruction;
- Sulfur hexafluoride – reduction in fugitive emissions from electricity transmission and distribution equipment;
- Farming operations – avoided methane emissions.

F. Equivalency. Offsets for certified CO₂e emissions reductions should be awarded on a one-to-one ton basis.

8. Timetables, Duration and Stringency Option: In order to encourage early emissions reductions, there is a desire to rapidly implement an offset program. Assuming some type of offset program is in place for new emission sources prior to implementation of a mandatory cap and trade program, or as part of a voluntary program, implementation issues should be limited. The program would continue indefinitely.

The program can be more or less stringent based upon project eligibility and other characteristics such as banking.

A key stringency issue will be whether there is a limit placed on the percentage of offsets a regulated entity can use to meet its emissions reduction requirement.

9. Explanation of Rough Estimate of GHG

Reductions: Reductions will depend on the availability of offsets and associated costs.

verification/ownership must be balanced against program costs and industry confidentiality needs.

10. Rough Estimate of Costs for Selected Years:

In general, offsets will be pursued by entities regulated under the cap and trade program to the extent that offsets are available at a cost that is lower than the cost of reducing emissions at those sources. That cost will be reflected in the allowance or credit cost.

13. Related Policies:

- Cap and Trade Program

11. Barriers to Implementation:

An offset program as part of a mandatory cap and trade program will require authorizing legislation or modification of existing rules. The major barrier to implementation of this policy is developing a strong verification, measurement and tracking program. There will be policy disagreements with respect to some key issues such as what constitutes additionality, whether offset must be permanent, and what percentage of offsets can be used by a regulated entity to meet mandatory reduction requirements.

12. Other Factors: An offset program can be complex to design. The workgroup did not attempt to reach consensus on, or develop specific recommendations, with respect to the following implementation issues:

- **Monitoring and Measurement:** Eligible project under the program must have emissions reductions that are verified and quantified, which will require monitoring and measurement.
- **Additionality:** Ownership rights must be clarified to encourage program participation and to minimize double counting.
- **Ownership Rights:** Policy decisions must be made with respect to the vintage (when an offset was created) of offsets and retrospective/prospective use.
- **Vintage:** Banking of offset created under the program allows participants more compliance flexibility. Banking may speed overall aggregate emissions reductions.
- **Transparency and Confidentiality:** The desire for transparency of offset measurement/

Incentives for Voluntary Programs

1. **Work Group:** Carbon Tax / Cap and Trade
2. **Policy Name:** Incentives for Voluntary Programs
3. **Policy Type:** Fiscal measure, financial incentives
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Use of voluntary programs can extend across a broad range of sectors and entities.
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Actual greenhouse gas (GHG) reductions will be dependent upon the voluntary program selected, the implementation of incentives or goals, and level of participation.
6. **Estimated Costs:** Direct costs will be a result of any tax or other financial incentives to increase participation in voluntary programs. Indirect costs may include program administrative costs. In addition, some voluntary programs require third party verification, as well as program enrollment fees and annual membership fees. Actual costs can vary significantly depending on the program, sector and entity.

Funding Sources: Direct costs for fiscal measures, financial incentives or other governmental action may come from state revenues. Indirect costs would be borne by program participants.

7. **Specific Description of Policy Proposal:** Specific recommendations include:
 - A. Wisconsin should implement financial incentives (such as tax incentives) to encourage organizations in the state of Wisconsin to participate in voluntary emission registry programs to track and reduce green house gas (GHG) emissions.
 - B. Wisconsin should explore taking a leadership role by participating in the Chicago Climate Exchange for the emissions of the State owned and operated facilities and activities. Any credits obtained by the State for reductions could be retired.
 - C. The State should create a fund that could be used to purchase and retire GHG emissions. Funding

would come from voluntary contributions from citizens via a check off box on state tax forms and/or on gas and electric utility bills.

- D. Currently, uncertainty exists regarding the federal tax deductibility for an entity that generates GHG credits (e.g. emission credits and offset credits) and permanently retires these allowances instead of selling the allowances. The State, perhaps working with the other Midwestern Governors, should request an IRS ruling to eliminate this tax uncertainty.

There are several existing voluntary emission registry programs, each with different requirements and characteristics. These programs can be categorized into three categories: (A) Registry; (B) Reduction Commitments; and (C) End User Participation.

- A. **Registry Programs**
A registry program provides a platform to report emissions and projects to reduce emissions. The table on page 206 summarizes the voluntary registry programs that we are aware of:
- B. **Programs Requiring Reduction Commitments**

The table on page 207 summarizes the voluntary programs with binding reduction commitments that we are aware of:
- C. **End User Participation Voluntary Programs**
End use customers could be provided opportunities to voluntarily pay a fee or donation that could be used to reduce emissions. An example of this would be Pacific Gas and Electric's (PG&E) recent launching of "ClimateSmart" a voluntary program where PG&E's residential and business customers can help to fund environmental projects aimed at removing GHGs from the air or avoiding the emissions in the first place. Customers who enroll will pay a separate amount on their monthly utility bills to remove or avoid the equivalent CO₂ associated with their energy use - thus making them "climate neutral". The amount a customer will pay for ClimateSmart will be determined after a calculation of exactly

	<u>DOE 1605(b) Program</u>	<u>WDNR Voluntary Emission Reduction Registry</u>	<u>The Climate Registry</u>	<u>Business Environmental Leadership Council</u>	<u>U.S. Climate Action Partnership</u>
Website	www.eia.doe.gov/oiaf/1605/frntvrvg.html	http://dnr.wi.gov/air/vol/registry/	www.theclimateregistry.org	www.pewclimate.org/companies_leading_the_way_belc	www.us-cap.org
Reported Quantity	Total emissions and/or emission reductions	Emission reductions	Total emissions	Not specified	N/A
Reporting Scope	Direct emissions; indirect emissions from electricity purchases	Avoided emissions	Direct emissions; indirect emissions from electricity purchases (optional if for resale)	Not specified	N/A
Baseline	Optional reporting of 1987 – 1990 baseline	Average annual emissions for 2 years prior to reduction (for efficiency and renewables – average WI generating system emission rate)	To be selected by reporting organization	N/A	N/A
Target	N/A	N/A	Considering “sector-specific metrics” to be developed in the future.	Organizations encouraged to set reduction targets	N/A
Inventory Protocol	Program-specific protocol based on WRI/WBCSD1	Various acceptable protocols, including WRI/WBCSD1	Program-specific protocol being developed. Draft expected in late October.	Not specified	N/A
Third-Party Verification	Optional	Optional	Required	N/A	N/A
Offsets	N/A	N/A	N/A	N/A	N/A
Reporting Requirements	Annual reports	Annual reports	Annual Reports	Not specified	N/A
Membership Fee	No	No	Annual fee required. Fee based on revenue/budget of reporting organization.	No	No
Other Administrative Costs			Third party verification costs.		
Comments	Original 1994 program guidelines replaced with more-stringent 2007 guidelines. Revised reporting software being developed.		Newly-formed organization of 40+ states, etc. Expects to begin accepting reporting data in January, 2008.		

	<u>EPA Climate Leaders</u>	<u>Chicago Climate Exchange (CCX)</u>	<u>DOE Climate Vision</u>
Website	www.epa.gov/climateleaders	www.chicagoclimateexchange.com	http://www.climatevision.gov/
Reported Quantity	Total emissions	Total emissions	GHG intensity
Reporting Scope	Facility wide inventory including all direct emissions and indirect emissions from purchased electricity and steam. Can opt-in other indirect sources.	Direct emissions from fossil fuel combustion. Can opt-in reporting of indirect emissions.	Sector identifies scope. Can include direct emissions, avoided emissions, sequestered emissions, etc. converted to GHG intensity.
Baseline	Most recent year available when organization joins program	1998-2001 or 2000	2002
Target	Individualized goal (absolute or intensity) developed by organization and EPA – must be aggressive relative to EPA sector benchmarks. Longer term goal to be achieved over 5 to 10 years.	New member reduction (absolute) from baseline: 2007: 1.5% 2008: 3% 2009: 4.5% 2010: 6% Allowance credits awarded if reductions exceed targets. Allowances purchased if reductions do not meet targets.	Target of 18% reduction in GHG intensity by 2012 from 2002. Sectors identify commitment level.
Inventory Protocol	Program-specific protocol based on WRI/WBCSD1	Program-specific protocol based on WRI/WBCSD1	Work plan identifies protocols and methodologies used to determine GHG intensity and action to reduce emissions.
Third-Party Verification	Optional. If conducted is at partner's expense.	Third party verification of baseline and annual emissions included as part of membership	N/A
Offsets	Optional	Can be included if an approved offset project.	N/A
Reporting Requirements	Inventory Management Plan for EPA approval; annual inventory reports	Annual reporting	Develop work plans and provide periodic reports to DOE when requested.
Membership Fee	No	Enrollment fees and annual membership fee Membership fee based on size of emission baseline.	No
Other Administrative Costs	Third part verification costs, if conducted.	Third party verification for offset projects is the responsibility of the project sponsor.	
Comments	Program will provide up to 80 hours of technical assistance to develop and document inventory management plan. Can include an on-site visit. After completion of base year inventory, EPA can provide up to 10 hours of technical assistance in subsequent years.	- Market based trading scheme. - Associate membership available to small businesses, office-based firms and non-governmental organizations.	Voluntary sector initiative. Implementation can be coordinated for a sector by business organizations and/or trade groups.

how many pounds of GHG emissions the customer's electricity and natural gas usage produces. PG&E estimates that the cost for the average residential customer will be less than \$5 per month. Prior to enrolling, all customers can view an estimate of their carbon emissions via a new carbon footprint calculator on PG&E's ClimateSmart website.

8. Timetables, Duration and Contingency Option:

Due to a number of voluntary programs that are currently operational, some WI entities are already participating in these programs. Development of incentives, goals and/or activities to increase awareness of such programs could likely be started within 6 months. Duration of this initial implementation phase would be dependent upon actual incentives and/or goals that may be used and the nature and intensity of awareness activities.

Long term duration range is flexible. Use of voluntary programs could be used a long term tool or could be used as a transition mechanism to allow actions to be taken in Wisconsin while a regional or national program is developed and implemented.

9. Explanation of Rough Estimate of GHG

Reductions: Reductions are difficult to project at this time. Existing voluntary programs have demonstrated varying success with reductions. Reductions will vary based on individual programs, sectors, and entity. Reductions can be impacted positively with incentives and or goals and greater awareness of the existing voluntary programs. For example, the actual emission reductions received under the CCX program compared to the reduction target is summarized in the table below.

10. Rough Estimate of Costs for Selected Years: With several voluntary programs already operational, start up costs would be relatively limited; the administrative costs for participating in various programs are borne by the participant. There could be costs to the state should incentives be implemented to encourage participation in a voluntary programs, such as tax incentives. Costs could also be incurred to increase awareness of

voluntary programs in the state/region. Actual costs for reduction can vary significantly depending on the program, sector and entity and will likely change over time.

11. Barriers to Implementation: Some major barriers to implementation at this time are: lack of incentive to participate, lack of awareness of the existing voluntary programs, concern of internal records/data to be able to demonstrate emissions and subsequent reductions, and risk of early actions not being counted in subsequent mandatory program.

- A. Lack of incentives. There are no direct financial incentives to participate in a voluntary program at this time. Direct financial incentives would likely increase participation and the amount of GHG reductions that could be obtained via a voluntary program. An example of a direct financial incentive would be a state tax incentive.
- B. Lack of awareness. Most of the programs are relatively new and interest in green house gas emissions has historically not been wide spread and the awareness and familiarity with the various voluntary programs is limited. Recently, interest has increased and is expected to continue to increase with national and regional debates taking place on green house gas policies. Participation in the voluntary programs would likely increase with more education and awareness of the various voluntary programs. State outreach efforts to increase awareness of voluntary programs may result in increased interest and participation across all sectors.
- C. Concern with increased administrative burden. If facilities have not had a need to track certain activities and/or retain certain records, the information is often either not available, difficult to obtain, and possibly not complete or accurate. Minimizing the amount of history required and creating awareness of record keeping requirements would help minimize these concerns.
- D. Early action. Risk of early actions not being credited under a Federal mandatory program,

however this may be mitigated to some degree with large enough financial incentives. In order to further mitigate any concerns with early actions, The State of Wisconsin should engage in the debate and stand behind early action programs to encourage recognition of early actions in a Federal Program.

12. Other Factors: The use of existing voluntary programs would seem to be a good transition mechanism to allow actions to be taken in Wisconsin almost immediately while a regional or national program is developed and implemented. Voluntary programs could be used to support and facilitate potential solutions that may arise from other task force subcommittees.

Other positive aspects of voluntary programs are:

- A. Allow for actions to be implemented in a relatively short time frame since programs are currently available.
- B. Minimize the cost impacts of the reducing emissions for those entities that would have difficulty absorbing increased costs at this time.
- C. Aid in creating awareness and education of the public on green house gas issues and solutions.
- D. Reduces State resources needed for the development and implementation of a State-run regulatory/mandatory program.
- E. Create initial incentives for sources to participate.

13. Related Policies: None

Co-Generation Incentives and/or Mandates

1. **Work Group:** Ad-hoc Co-Generation into the planning forum recommendation from the Electric Generation and Supply Work Group.
2. **Policy Name:** Incentives and/or mandates for Co-Generation / Combined Heat and Power (CHP) construction, upgrades, and/or replacement (Co-Gen) Specific components of the policy proposal include the following:
 - A. Conduct a review of applicable statutes and regulations for provisions that might preclude or inhibit the entry by electric utilities into contractual arrangements with large customers located in their service territories for the sale of electricity and steam from CHP systems. This review, to be conducted by the PSC, would include Wis. Stat. §196.192 (market-based compensation, rates and contracts). If necessary, amend statutes or regulations to remove such obstacles to the development of CHP systems.
 - B. Fund site specific feasibility studies through Focus on Energy regarding industrial boiler retirement and/or installation of CHP systems.
 - C. Consider incentive programs through Focus on Energy to provide funding for the installation of CHP systems.
 - D. To provide information for utilities and developers considering CHP or district heating projects, conduct and publish the results of a statewide survey of large users of thermal energy. To provide information for industries with thermal energy requirements seeking to site new facilities, this survey would also report on existing and potential generating facilities capable of supplying thermal energy. The information obtained in the survey would be made available to local economic and infrastructure planning entities. In order to keep the information current, establish a voluntary registry in which industries can report their thermal needs and owners of generating facilities can report their capabilities for providing cogenerated thermal energy.
 - E. Conduct an evaluation of regulatory obstacles to the installation of CHP systems and other projects to improve utility plant efficiency and maximize the utilization of biomass fuel. This evaluation, to be conducted by the DNR, would focus on air permitting requirements such as New Source Review and Best Available Retrofit
3. **Policy Type:** Incentives, information and regulatory changes to encourage investment in CHP generation and distribution systems.
4. **Affected Sectors, Sub-Sectors and/or Entities:**
Sector: Electric utility and industry
Sub-Sector: Distribution utilities and industrial facilities
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This policy is estimated to result in the deployment of 250 MW of CHP by 2020 and an additional 250 MW of CHP by 2030. The deployment of these CHP units will result in a reduction of 1.1 million metric tons of carbon dioxide equivalents (CO₂e) by 2020 and 2.1 million metric tons of CO₂e by 2030 compared to business-as-usual.
6. **Estimated Costs:** The increase in annual cost (in 2007 \$) to deploy the CHP policy is estimated to range from \$53 million/yr to \$71 million/yr by 2020, and \$106 million/yr to \$143 million/yr by 2030. These estimates are based on the projected costs for deploying 5 units of 50 MW by 2020 and an additional 5 units of 50 MW by 2030. In addition, feasibility studies are expected to cost up to \$250,000 per industrial site.

Funding Sources: State government operating budgets and Focus on Energy programs
7. **Specific Description of Policy Proposal:** Establish policies, incentives and information to identify and install new CHP systems and to facilitate the decommissioning of older, high emission sources and the replacement of these units with CHP systems. Emphasis should be on projects that maximize the thermal host load in order to maximize efficiencies. Potential candidates include the cyclone boiler installations within Wisconsin. This policy does not include the retirement and replacement or repowering of electrical utility boilers, an option incorporated

Technology requirements that might discourage a plant owner from considering or proceeding with projects of this nature.

- F. Establish tax incentives to encourage the siting of industrial facilities at locations from which they can utilize thermal energy cogenerated by existing generating facilities. These generating facilities would include existing CHP plants that are capable of supplying additional thermal output, power plants that are capable of being retrofitted to supply cogenerated thermal output, and unutilized utility plants at industrial facilities (such as paper mills) that have been shut down.
- G. As part of the Enhanced Renewable Portfolio Standard (RPS) policy, expand the definition of renewable resources to encourage the installation of CHP systems and other clean technologies.
- H. Conduct a study of Wisconsin Department of Administration steam generating facilities to attempt to identify one or more sites at which existing steam facilities can be replaced with CHP plants. The economic analysis of the potential replacement of existing facilities should consider the risks and costs of compliance with future GHG regulations.

8. Timetables, Duration and Stringency Option:

Funding for individual feasibility studies should be made available as soon as possible. Implementation of policies and investment in projects take place over the following 10 - 20 years.

9. Explanation of Rough Estimate of GHG

Reductions: Emission reductions are based on an assumption of the installation of 500 MWs of CHP projects with a capacity factor of 85% and an effective heat rate of 4,900 Btu/kWh.

10. Rough Estimate of Costs for Selected Years: Costs are based upon estimated capital costs for 50 MW combined-cycle CHP facilities adjusted for increased efficiencies due to co-generation (4,900 Btu/kWh heat rate). Incremental administrative costs of implementing CHP policies are estimated to be negligible.

11. Barriers to Implementation: Policies to encourage the installation of additional CHP facilities must overcome a number of inherent barriers:

- A. **Capital Cost.** Compared to an electric-only facility, a CHP facility has a higher capital cost. This additional cost results from a number of factors, including (1) the direct cost of the thermal production and delivery facilities; (2) the need to locate the plant near the thermal host, limiting siting options; and (3) the need to match the plant's electrical output to the thermal demand in order to maximize efficiency, generally resulting in a smaller than optimal electric generating facility. Recovering this additional capital cost as part of the price charged to a thermal host would likely make the thermal energy price uncompetitive if the thermal host would otherwise obtain thermal energy from an existing plant. A potential thermal host contemplating the installation of a new facility, or required to replace or retrofit an existing thermal energy plant, would likely be willing to pay a higher price for thermal energy in order to avoid these capital expenditures. However, limiting the potential thermal hosts to those with such circumstances significantly reduces the number of sites available for CHP facilities.
- B. **Operating Cost.** Despite its higher efficiency, a gas-fired CHP facility would be unlikely to produce thermal energy at a cost that would be competitive with a coal-fired thermal plant, or to produce electricity that would be competitive with the market price of electricity during off-peak periods. The CHP facility owner would be required either to operate at an economic loss on the production of electricity during off-peak periods, or to install a backup thermal energy source, such as an auxiliary boiler, to supply thermal energy and allow the CHP facility to be shut down during these periods. Doing so, however, would increase the capital cost of the facility and reduce its average efficiency advantage relative to separate electricity and thermal energy production. A coal- or biomass-fired CHP facility would have a lower operating cost than a gas-fired facility, allowing economical operation during off-peak periods, but would have a higher capital cost than a gas-fired facility. In addition, the GHG reduction benefit of a coal-fired CHP facility displacing gas-fired thermal energy production would likely be marginal, at best.
- C. **Thermal Host Risk.** The economics of a CHP facility depend upon the continued viability of the facility's thermal host. The loss of a thermal host would make a CHP facility a relatively inefficient

electric generating facility. A utility or developer contemplating the installation of a CHP facility must take the risk that the thermal host's facility will remain in operation throughout the life of the CHP facility. A CHP facility with multiple thermal hosts, such as a district heating system, would face less risk from the loss of any single thermal host, but the additional thermal energy distribution infrastructure required to serve multiple thermal hosts would result in higher capital costs for such a facility.

12. Other Factors: None

13. Related Policies:

- Enhanced RPS
- Advanced Biomass and Biofuel Commercialization and Utilization

Enhanced Water Efficiency and Conservation

1. **Work Group:** Ad Hoc Water Conservation
2. **Policy Name:** Enhanced Water Efficiency and Conservation
3. **Policy Type:** State agency-initiated efforts to coordinate water conservation and efficiency with energy efficiency programs to reduce greenhouse gas (GHG) emissions.
4. **Affiliated Sectors, Sub-sectors and/or Entities:** Public water and wastewater utilities, water-intensive industries, agriculture, and residential
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** Preliminary estimates suggest emission savings of 16,800 tons of CO₂ equivalents per 1% reduction in water use by water utility customers statewide.
6. **Estimated Costs:** To be determined

Funding Sources: A small scale pilot program could be funded by individual water utilities, with the approval of the PSC. Alternatively, funding options for a broader statewide effort include:

- Requesting funding through the biennial budget process as part of the Great Lakes-St. Lawrence River Basin Water Resource Compact
 - Assessing a fee on water and wastewater utility customers, similar to the model used by the Focus on Energy program
 - Collecting a one-time fee from persons constructing residential, agricultural, industrial, and municipal wells
 - Allocating a portion of Focus on Energy funds specifically for water projects, if the Task Force recommends an increase in program funding
 - Establishing a sales tax on bottled water and similar products
 - No new funding
7. **Specific Policy Description:** Water conservation and use efficiency is an important component of long-term water supply planning. However, funding to assist with water efficiency efforts is limited. Furthermore, there has been little effort to evaluate the energy and GHG implications of

various water supply and wastewater treatment options. Finally, the energy savings that could be achieved through water conservation and efficiency efforts have not traditionally been considered in energy efficiency programs.

The State of Wisconsin is already implementing water conservation and efficiency measures. Specifically, the PSC is assisting water utilities in developing water conservation and efficiency programs, including using innovative rate structures to promote water efficiency. In addition, 2003 Act 310, the Groundwater Law, and the Great Lakes-St. Lawrence River Basin Water Resources Compact will require water conservation and efficiency measures for new or increased water withdrawals. Finally, the DNR, the PSC, and the Wisconsin Department of Commerce are working with the Council of Great Lakes Governors to develop water conservation goals and objectives for the Wisconsin portion of the Great Lakes basin.

Policies and programs that encourage enhanced coordination among water and energy efficiency programs would lead to measurable water savings, protect important water resources, and reduce GHG emissions. Thus, GHG emission reductions attributable to water conservation efforts should be considered as part of the Task Force's recommendations. The types of activities that could be incorporated into an enhanced effort include:

- Rebates or other incentives to utility customers to purchase, install, and use water-efficient products and services
- Technical and financial assistance to water utilities in developing water conservation and efficiency plans
- Technical and financial assistance to large water users to assist with identifying solutions for reducing their water and energy use
- Technical and financial assistance to wastewater utilities to capture energy from anaerobic digestion
- Education and outreach materials, including K-12 educational programs
- Research on water efficient technologies and practices

The Task Force could consider a number of recommendations to implement such activities. Some of these may require statutory changes, while others could be implemented by state agencies under existing authorities. These options include:

- Creating an independent, statewide Focus on Water program
- Implementing a Focus on Water program as one component of the Focus on Energy program
- Establishing a limited, regional program in an area of water supply concern, such as southeastern Wisconsin
- Establishing water conservation and efficiency programs as a pilot project at an individual water or wastewater utility

The Task Force could also recommend that state agencies continue their efforts to coordinate existing water and energy efficiency programs. One option is to incorporate water conservation into Focus on Energy program planning and potential studies. Another option is to continue to identify opportunities to use Focus on Energy funds for water-related projects that result in GHG reductions, such as capturing methane from wastewater anaerobic digesters, or projects that result in both energy and water savings, such as rebates for dishwashers and clothes washers. A third option would be for Focus on Energy advisors to incorporate water efficiency elements into the checklists that are used when exploring opportunities for residential, commercial, and industrial energy efficiency projects. In addition, the PSC could improve its tracking of water savings generated by these types of projects. Finally, the PSC could explore options for allowing the Focus on Energy program to consider off-site and secondary energy benefits, such as reduced pumping costs, for projects that have a water use reduction component.

8. Timetable, Duration and Stringency Option:

Concerning stringency, none of the options included in this policy proposal recommend mandatory end-user water restrictions. A pilot water conservation program at one or more utilities could begin within a year and continue for a long enough period of time to study its effectiveness. Changes to the existing Focus on

Energy program could potentially be implemented in the next program year, unless statutory changes are required. Any of the proposed options that require statutory changes could not be expected to start in the next year.

9. Explanation of Rough Estimate of GHG

Reductions: The production, distribution, use, collection, treatment, and disposal of water requires significant energy inputs to power motors, pumps, and other infrastructure. The U.S. Environmental Protection Agency (EPA) estimates that 3.0% of national energy consumption - or approximately 56.0 billion kWh per year - is used for drinking water and wastewater.¹ The amount of energy required to produce drinking water or treat wastewater varies depending on system characteristics.

Figure 1 provides a conceptual model for the water and wastewater system. National studies estimate that the extraction, treatment, and conveyance of drinking water require about 1.5 kWh² to 2.0 kWh³ per 1,000 gallons. Similarly, one EPA estimate suggests that the collection, treatment, and discharge of wastewater requires approximately 11.75 kWh/1,000 gallons.²

Based on annual reports filed with the PSC, energy costs represent approximately 10.5% of overall operation and maintenance expenses for public water utilities. From 2001 through 2006, Wisconsin water utilities pumped an average of 212.5 billion gallons per year, using 374.4 million kWh, for an average of 1.8 kWh/1,000 gallons. The Milwaukee Metropolitan Sewerage District estimates that it uses approximately 7.8 kWh/1,000 gallons of wastewater. Based on these data, it is reasonable to conclude that the entire water system from source to discharge requires about 10 kWh/1,000 gallons in Wisconsin.

Reductions in energy use and GHG emissions may be readily attainable through existing water-saving technologies. For example, EPA estimates that retrofitting just one out of every 100 American homes with water-efficient fixtures would save about 100 million kWh of electricity

1. EPA, 2008, http://www.epa.gov/waterinfrastructure/bettermanagement_energy.html.

2. "Ensuring a Sustainable Future: An Energy Management Guidebook for Water and Wastewater Utilities," EPA, January 2008.

3. Pacific Institute, 2004, Water to Air Models, http://www.pacinst.org/resources/water_to_air_models/index.htm

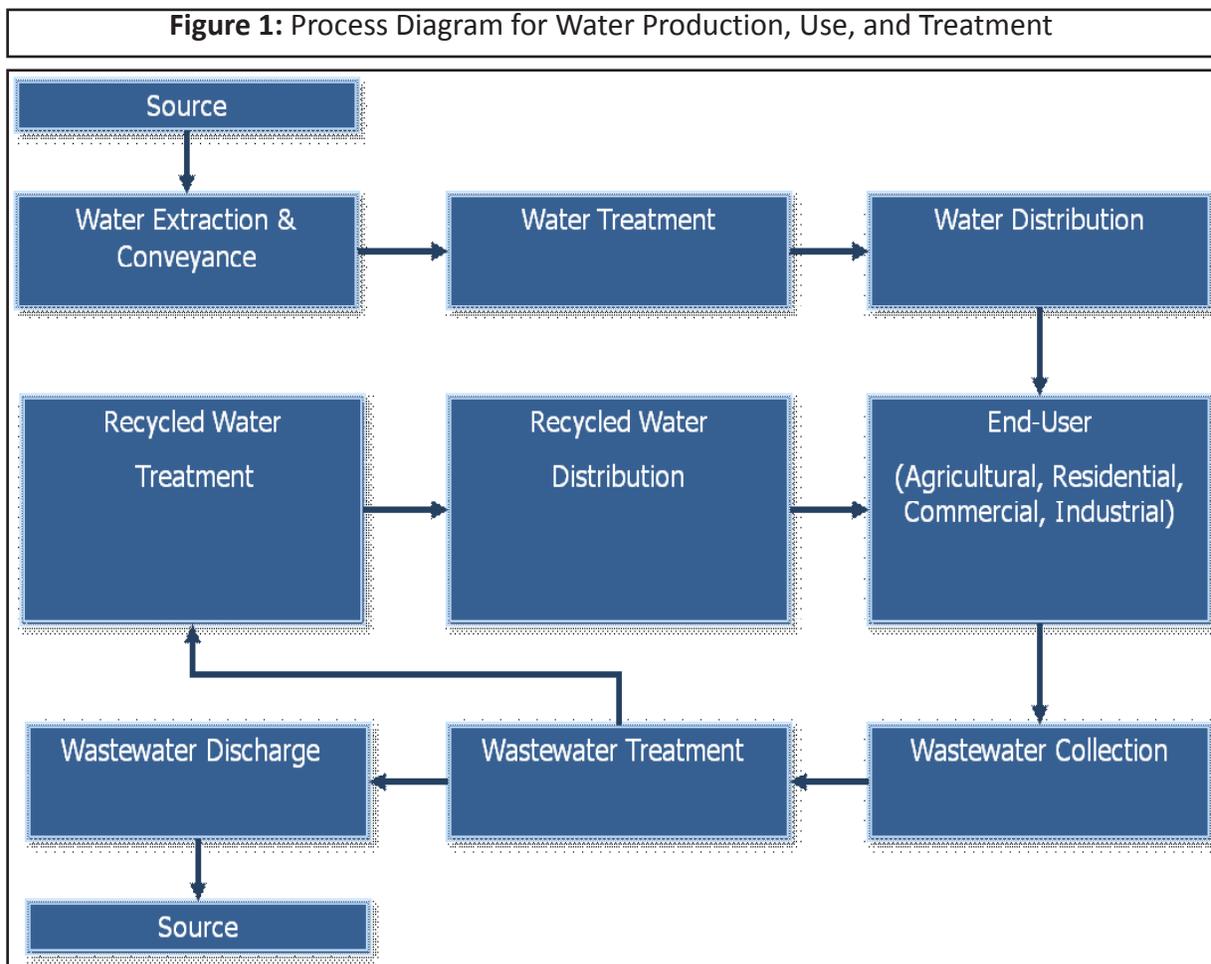
per year and avoid 80,000 tons of CO₂ equivalent emissions.⁴ Using these figures proportionately based on Wisconsin's share of the 2007 national population,⁵ this modest level of water conservation in Wisconsin could result in savings of 1.9 million kWh of electricity per year and avoid 1,520 tons of CO₂ equivalent emissions.

Looking more broadly at all water uses, a 1% reduction in water pumped by Wisconsin utilities would equate to savings of approximately 2 billion gallons per year. Based on the 10 kWh/1,000 gallons estimate cited, each 1% reduction in water use would translate into savings of roughly 20 million kWh and 16,800 tons of CO₂ equivalent emissions.

In addition, the processes commonly used to treat wastewater contribute to GHG emissions.

Carbon dioxide is produced in both aerobic and anaerobic wastewater treatment processes. Methane is produced in the anaerobic treatment of wastewater. In many cases, this methane leaks to the atmosphere or is burned without recapturing its energy benefits. Addressing these sources may be another effective strategy for reducing GHG emissions related to water and wastewater utilities. For example, reductions in GHG emissions could be achieved by reducing the biologic oxygen demand of wastewater flowing to the treatment plant and by capturing energy from methane generated by the treatment process.

Actual GHG reductions that could be expected as a result of ongoing or enhanced water conservation and efficiency programs in Wisconsin require further evaluation.



4. EPA, 2008, <http://www.epa.gov/watersense/water/benefits.htm>
 5. U.S. Census Bureau, 2007, <http://factfinder.census.gov/>. Wisconsin's estimated 2007 population was 5.6 million, or 1.9% of the U.S. total of 301.6 million.

10. Rough Estimate of Costs for Selected Years: To be determined

11. Barriers to Implementation: Statewide implementation of enhanced water conservation and efficiency efforts may be hindered by the fragmentation of the Wisconsin water and wastewater industry. Currently, more than 580 public water utilities and 600 municipal sewer systems serve only half of the state's residents. The rest of the state's residents are served by private wells and septic systems. As a result, identifying an equitable source of funding may be controversial.

Public utilities and municipal sewer systems likely will oppose efforts to assess fees on their customers. Private well and septic system owners are not currently charged an ongoing rate or fee, making collection of additional funding from these users controversial. Further, well permitting fees collected by the DNR are used to fund existing programs. Finally, electric utilities might oppose using Focus on Energy dollars to pay for water conservation and efficiency projects that result in only indirect energy savings.

Some water utilities have expressed concern that water conservation programs, if successful, will result in reduced revenues and increased water rates. These utilities may not support a statewide water conservation program. However, the PSC could explore options for mitigating the negative revenue effects of conservation, including more frequent rate cases or innovative rate-making policies.

Current law may not allow the Focus on Energy program to consider the energy saved by utilities as a result of reduced water use. As a result, legislation to allow the Focus on Energy program to account for off-site or secondary energy benefits may be needed. Development of new, dedicated funding sources for any of the recommended initiatives would also require legislation.

12. Other Factors: Some models show that global warming could contribute to water shortages in Wisconsin. Water conservation practices implemented throughout the state will help Wisconsin adapt to any climatic changes. Because many homes and businesses get their water from wells and are not water utility customers,

Wisconsin should not rely solely on utility-focused programs to promote water conservation. Research, technology transfer, and education are also needed. A public education campaign could raise awareness about the benefits of water conservation and efficiency and the availability of useful information about best practices and technologies from sources such as EPA's WaterSense program.

13. Related Policies: The Task Force could consider minor expansion of other templates to encompass water-related opportunities. These include the Enhanced Conservation and Energy Efficiency Program template and both of the building code templates developed by the conservation and efficiency work group. Opportunities for energy recovery at wastewater treatment plants could be included in the Advanced Renewable Tariff template.

Paper Waste

1. **Work Group:** Ad-hoc Waste Materials Recovery and Disposal
2. **Policy Name:** Increased paper recycling (Paper Waste)
3. **Policy Type:** Regulation/legislation, incentives
4. **Affected Sectors, Sub-Sectors and/or Entities:** Landfill operators, waste and recycling haulers, municipalities, residents, businesses, paper industry
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** The following table presents a rough estimate of the savings in GHG emissions if 50 or 75% of recyclable paper generated in Wisconsin and currently going to Wisconsin landfills were recycled instead. The calculations are based on a 2002 DNR study and U.S. EPA life-cycle analysis of waste management alternatives.

when more materials were recycled instead of landfilled.

Funding Sources: Any incremental DNR and municipal costs would be absorbed in operating budgets. All other costs would be borne by the private sector and/or consumers.

7. **Specific Description of Policy Proposal:** This policy would reduce GHG emissions by diverting more recyclable paper from Wisconsin landfills through a graduated expansion of existing landfill paper bans in conjunction with increased outreach, enforcement and incentives.

Unrecovered paper represents 20.8% by weight of the in-state municipal solid waste stream in Wisconsin, or about 990,000 tons per year. While some of this paper is either non-recyclable or too contaminated to be recycled, the majority is recyclable cardboard, newspapers, magazines, office paper and mixed paper, all of which are commodities with active markets and high market

6.

Annual reductions in GHG emissions from paper diverted from landfills to recycling				
Material	Tons ¹ Landfilled	Emissions factor ² (MTCO ₂ e/ton)	Total savings (MTCO ₂ e) if 50% recycled	Total savings (MTCO ₂ e) if 75% recycled
Mixed recyclable paper	201,715	-3.89	380,908	571,355
Recyclable cardboard	188,176	-3.51	331,225	496,786
Newspaper	92,270	-1.92	87,963	131,949
High-grade paper (office paper)	65,585	-4.79	157,516	236,273
Magazines	47,381	-2.77	66,018	99,026
TOTALS	595,127		1,023,630	1,535,389

Estimated Costs: Costs for landfill operators, waste and recycling haulers, municipalities and businesses could increase if additional equipment or changes to administrative procedures to divert paper from landfills to recycling centers are needed. Some of these costs could be recovered through the sale of recyclable paper. DNR costs would increase due to expanding its inspection and enforcement program. The state (and some local governments) would lose tipping fee revenue

demand.

Wisconsin law currently bans several types of recyclable paper from landfill disposal or incineration. However, mixed recyclable paper is not included in the bans, and the ban on office-type paper does not apply to households. While the recycling rates (ranging from 28 to 72%) for the banned paper materials are high compared to many other states, significant amounts are still going into landfills each year.

The Governor’s Task Force on Waste Materials Recovery and Disposal recommended increased recovery of scrap (recyclable) paper in Wisconsin.

1. From DNR 2002 Waste Characterization Study, <http://dnr.wi.gov/org/aw/wm/recycle/studies/index.html>

2. From *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks* (3rd ed.), U.S. Environmental Protection Agency, <http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html>

The Task Force urged that the paper recycling requirements be expanded to include mixed waste paper and be more strongly enforced, especially for the business/commercial sector and for office paper coming from households. With that in mind, in order to increase the recycling rates for paper and thus reduce GHG emissions, this proposal would:

- A. Add “mixed recyclable paper” to the list of paper categories required to be recovered by effective recycling programs in Wisconsin (i.e. add it to the list of banned items in s. 287.07(3) and (4), Wis. Stats.) and remove the exception for office paper coming from households.
- B. Increase education and outreach on paper recycling to households and businesses, improve collection services in areas or business sectors that are underserved, and create incentives and enforcement strategies for paper recycling.
- C. After implementing the above measures, if a new waste characterization study shows that significant amounts of paper are still being landfilled, consider stronger measures to recover paper, such as a prohibition of landfill disposal of more than incidental quantities of recyclable paper.

8. Timetables, Duration and Stringency Options: Development and passage of legislation would take at least one year. The expanded landfill bans would need to be phased in to allow local governments time to educate residents and landfills and the DNR to design and implement an inspection and enforcement program. Ideally, the initial expansion of the bans and associated incentives and penalties could be implemented by 2011-2012, with significant GHG reductions by 2014-2015. Duration would be indefinite.

9. Explanation of Rough Estimate of GHG Reductions: The GHG reductions from this policy come both from reducing landfill methane emissions and from reducing the need for virgin materials in paper production. In particular, the

reductions are due to increased forest carbon sequestration as forests are left intact rather than harvested for paper production. Because of the life-cycle approach, not all emissions reductions would occur within Wisconsin, though the state would share in global benefits from reduced GHGs and there would be a potential to incorporate credits for waste management alternatives into a cap-and-trade system.

The estimates are based on data from the DNR’s 2002 Waste Characterization Study, which estimated the amounts of materials generated and landfilled in Wisconsin each year. Estimates of 50% and 75% of landfilled recyclable paper were used to represent increased recycling as expanded landfill bans on paper were phased in. Next, these tonnages were multiplied by emissions factors calculated by the U.S. EPA using a life-cycle analysis for each category of recyclable paper. These emissions factors represent the difference, in metric ton carbon dioxide equivalents (MTCO₂e), of recycling compared with landfilling a material.

10. Rough Estimate of Costs for Selected Years: With paper being diverted from landfills to recycling, the state would lose tipping fee revenues. Currently, the state receives \$4/ton from a recycling tipping fee and \$1.90/ton from other fees (principally an environmental repair fee) for solid waste disposed of at Wisconsin landfills. The table below shows the lost revenue under the 50 and 75% recycling scenarios. Aggregate annual revenue generated by the fees is approximately \$45 million.

Certain local governments that receive tipping fee revenues under local negotiated agreements would also lose a small proportion of these revenues as tonnages decreased.

11. Barriers to Implementation: Local recycling programs, landfills and waste haulers, and the DNR would need some additional resources to implement and maintain the expanded paper bans. Landfill operators, waste haulers, businesses

Annual loss in state tipping fee revenue due to diversion of paper from landfills to recycling			
Additional recycling of current tons landfilled	Lost recycling tipping fee revenue	Lost environmental repair and other fee revenue	Total revenue loss
50% (297,565 tons)	\$1,190,260	\$565,374	\$1,755,634
75% (446,346 tons)	\$1,785,384	\$848,057	\$2,633,441

and municipal recycling programs would all likely have to add equipment, training and/or other resources to comply with the stricter bans, and thus might oppose the change. Landfill operators (including local governments) would also lose tipping fee revenue due to less waste being landfilled. On the other hand, portions of the paper industry in Wisconsin would likely support expanded landfill bans as a means of increasing the supply of scrap paper available for use by recycle mills in Wisconsin.

12. Other Factors: None

13. Related Policies:

- Enhanced Recycling (for purposes of quantification)

Wood Waste

- 1. Work Group:** Ad-hoc Waste Materials Recovery and Disposal
- 2. Policy Name:** Recovery of untreated wood wastes (Wood Waste)
- 3. Policy Type:** Regulation/legislation, incentives
- 4. Affected Sectors, Sub-Sectors and/or Entities:**
- 5. Estimated Greenhouse Gas Emissions Reduction Impact:** The following tables present a rough estimate of the savings in GHG emissions if 50% of recoverable untreated wood (modeled as

Landfill operators, incinerator operators, waste and recycling haulers, construction industry, municipalities, manufacturers, distributors, retailers

Annual reductions in GHG emissions, in metric ton carbon dioxide equivalents (MTCO ₂ e), from untreated wood (dimensional lumber) diverted from landfills to recycling					
Untreated Wood Type/ Type of Landfill Source (LFs)	Tons ¹ Landfilled	Estimated percent recoverable ²	Recoverable tons	Emissions factor ³ (MTCO ₂ e/ton) if recycled	Total savings (MTCO ₂ e) if 50% recycled
Mixed/Multi-material (MSW) LFs	607,650	25%	151,913	-1.97	149,634
Mixed/ Construction & Demolition (C&D) LFs	8,800	25%	2,200	-1.97	2,167
Pallets/MSW LFs	76,926	100%	76,926	-1.97	75,772
Total	693,376		231,039		227,573

Annual reductions in GHG emissions, in MTCO ₂ e, from untreated wood (dimensional lumber) diverted from landfills to combustion					
Untreated Wood Type/ Type of Landfill Source (LFs)	Tons Landfilled	Estimated percent recoverable ¹	Recoverable Tons	Emissions factor (MTCO ₂ e/ton) if combusted	Total savings (MTCO ₂ e) if 50% combusted
Mixed/MSW LFs	607,650	25%	151,913	-0.29	22,027
Mixed/C&D LFs	8,800	25%	2,200	-0.29	319
Pallets/MSW LFs	76,926	100%	76,926	-0.29	11,154
Total	693,376		231,039		33,500

1. Untreated wood and pallets at multi-material municipal solid waste (MSW) landfills from DNR 2002 Waste Characterization Study, <http://dnr.wi.gov/org/aw/wm/recycle/studies/index.html>. C&D landfill tonnage based on estimated disposal in 3 active intermediate-size and 19 active small-size construction and demolition landfills located around the state.

2. Unpainted and usable for recycling or processing into wood-based products

3. From *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks* (3rd ed.), U.S. Environmental Protection Agency, <http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html>. Emissions factor is for dimensional lumber.

dimensional lumber) currently generated and landfilled in Wisconsin each year were instead recycled or combusted in waste-to-energy facilities.

6. Estimated Costs: Construction companies, manufacturers, distributors and retailers could incur costs for equipment and labor to divert discarded wood and pallets to processing centers

or waste-to-energy combustion facilities. Some of these costs could be offset by reduced landfill costs. Local governments could incur costs to adopt and enforce wood recovery ordinances. DNR would also incur costs to coordinate the introduction of local wood recovery ordinances. The state, landfills and some local governments would lose tipping fee revenue if less wood were landfilled.

Funding Sources: State funding and incentives for development of wood waste recycling and reuse infrastructure could be derived from an appropriation from the Recycling and Renewable Energy Fund, which would receive additional revenues from the imposition of state recycling fees on waste disposed of at Construction and Demolition (C&D) Waste landfills. Other incremental state and local government costs would be absorbed in operating budgets. All other costs would be borne by the private sector and/or consumers.

- 7. Specific Description of Policy Proposal:** This policy would reduce GHG emissions by diverting untreated dimensional lumber to either recycling/reuse or waste-to-energy combustion through a combination of local ordinances, financial incentives and reduced regulatory barriers.

Though recycling and reuse of discarded wood has been increasing, untreated wood makes up about 13% of all materials disposed of in Wisconsin landfills each year.¹ While this lumber represents carbon that is essentially stored in landfills (because the decomposition process is very slow), a greater climate benefit can be realized by either combusting the wood to recover energy (displacing generation by fossil fuels) or recycling/reusing it in products such as landscape mulch or engineered wood (i.e., chipboard and particle board), thus reducing the need to harvest new trees and allowing forests to grow and sequester more carbon. While this policy concerns wood from new construction, the state should also promote reusing wood and other materials recovered during demolition of existing structures, a practice that can achieve similar if not greater reductions in GHG emissions.

1. Based on the 2002 Waste Characterization Study, which included only waste going to regular solid waste landfills and not the approximately 30 smaller, C&D-specific landfills.

The Governor's Task Force on Waste Materials Recovery and Disposal urged increased recovery of clean, untreated wood waste for recycling/reuse and the further development of a market infrastructure to collect and process the materials. Based on those recommendations, the State of Wisconsin should:

- A. Require local governments to adopt ordinances requiring the recycling of wood waste generated in new construction as part of the building permit process. Authorize DNR to waive this requirement for a local government that demonstrates that compliance would result in a net increase in GHG emissions due to transporting discarded wood greater distances or other local factors.
 - B. Provide state-level funding and/or incentives (e.g. tax breaks and grants) to encourage development of the wood waste recycling/reuse infrastructure.
 - C. Remove policy/regulatory barriers to increased recycling and reuse. (e.g. replace the current requirement that a builder get a low-hazard exemption to recycle untreated, new construction wood with a self-implementing notification).
 - D. Consider imposing a landfill ban on untreated wood if significant amounts continue to enter landfills.
 - E. Revise policies that create financial incentives to dispose of wood in C&D landfills (e.g. subject wood and other wastes accepted at C&D landfills to state-imposed disposal taxes that now apply only at municipal solid waste (MSW) sites).
- 8. Timetables, Duration and Stringency Options:** Development and passage of legislation would take at least one year. If incentives and local ordinances don't achieve significant increases in diversion, implementation of the ban would need to be phased in. This would allow time to educate builders and set up a more comprehensive collection infrastructure, and for the DNR to design and implement an inspection and enforcement program. Ideally, the ordinance requirement could be implemented by 2011, with significant GHG reductions by 2014. Duration would be indefinite.
- 9. Explanation of Rough Estimate of GHG Reductions:** The GHG reductions from this policy come either from reducing the need for virgin materials in lumber/wood products,

thus allowing forests to grow and sequester carbon, or from reducing the need to burn fossil fuels by combusting wood waste in waste-to-energy facilities. The GHG reductions are significantly larger for recycling/reuse than for combustion due to the significant benefit of forest carbon sequestration when fewer trees are harvested. Because of the life-cycle approach, not all emissions reductions would occur within Wisconsin, though the state would share in global benefits from reduced GHGs and there would be a potential to incorporate credits for waste management alternatives into a cap-and-trade system.

The estimates are based on data from the DNR's 2002 Waste Characterization Study, which estimated the amounts of materials generated and landfilled in Wisconsin each year in MSW landfills (additional amounts are disposed of at C&D waste landfills). An estimate of recovery of 50% of recoverable, landfilled untreated wood was used to represent increased diversion as the

Certain local governments that receive payments from landfills under local negotiated agreements would also lose revenues as tonnages decreased.

There would also be costs stemming from tax breaks and grants for wood recycling infrastructure development, which could be paid for by using recycling fund revenues as discussed in other templates.

Revenue would be generated through the collection of state-imposed taxes at specialized C&D landfills, which are now exempt. The amount of waste accepted at those sites is unknown, so the revenue gain cannot be accurately estimated.

11. Barriers to Implementation:

- A. Logistical. The state would need to coordinate closely with local governments in developing a model ordinance. If a ban were implemented, a comprehensive inspection and enforcement program would need to be implemented to detect violations at construction sites or landfills.

Annual loss in state tipping fee revenue due to diversion of untreated wood from landfills			
Additional recycling/combustion of current tons landfilled	Lost recycling tipping fee revenue	Lost environmental repair and other fee revenue	Net revenue loss
228,839 tons	\$915,356	\$434,794	\$1,350,150

recommended policies were phased in. These tonnages were multiplied by an emissions factor calculated by the U.S. EPA. The emissions factor represents the difference, in metric ton carbon dioxide equivalents, of recycling or combustion compared with landfilling a material.

- 10. Rough Estimate of Costs for Selected Years:** With untreated wood diverted from MSW landfills to recycling or incineration, the state would lose tipping fee revenues. Currently, the state receives \$4/ton from a recycling tipping fee and \$1.90/ton from other fees (principally an environmental repair fee) for solid waste disposed of at Wisconsin MSW landfills. The loss of revenue would be partly offset by new revenue gained by extending state taxes to wood and other wastes disposed of at C&D landfills. The table below shows the net lost revenue for the 50% recycling or combustion scenarios. Aggregate annual revenue from the fees is approximately \$45 million.

Builders could need additional training on how to separate and collect untreated lumber from construction and demolition projects, as well as provisions of local recycling ordinances.

- B. Financial. Local governments would need resources for enforcing the new requirements. Construction companies, landfills, waste haulers and the DNR would need some additional resources to implement and maintain a wood landfilling ban. Builders or other groups responsible for diverting wood might need financial incentives to offset costs of setting up a large-scale collection system.
- C. Political. There could be resistance from some local governments that would have to implement and enforce local ordinances requiring recycling at construction sites. Construction interests could oppose wood recovery ordinances or bans due to increased costs. For a wood landfilling ban, there could be resistance from landfill operators and

owners and some local governments, in light of potential reduction in revenue from landfill tip fees and safety and health concerns associated with enforcing bans at disposal facilities.

12. Other Factors: None

13. Related Policies:

- Advanced Biomass and Biofuel Commercialization and Utilization
- Industrial Boiler Fuel Switching
- Enhanced Recycling (for purposes of quantification)

Enhanced Recycling

1. **Work Group:** Ad-hoc Waste Materials Recovery and Disposal
2. **Policy Name:** Reduce greenhouse gas (GHG) emissions through enhancements to existing recycling programs (Enhanced Recycling)
3. **Policy Type:** Legislative action for upcoming biennial budget
4. **Affected Sectors, Sub-Sectors and/or Entities:** Landfill operators, waste and recycling haulers, municipalities, residents, and businesses

- Commercial/business recycling, estimated based on the amount of residential recycling and the residential-commercial ratio of recyclables found in the 2002 Waste Characterization Study.¹

The sum of these numbers shows up in the “total tons” column below. This figure is then multiplied by the U.S. EPA emissions factor² for that material category to get the metric ton carbon dioxide equivalent (MTCO₂e) GHG emissions savings for the amount recycled. (EPA has specific emissions

5. **Estimated Greenhouse Gas Emissions Reduction Impact:**

It is not possible to provide a definite quantitative estimate of the GHG reductions associated with this policy. However, this policy should result in significant GHG reductions because it will provide important tools to allow local governments and others to increase recycling in Wisconsin.

Recycling provides substantial reductions in GHG emissions by reducing the consumption of energy and resources, such as forests, to obtain raw materials for manufacturing.

Please Note: Because this template covers some of the same materials as the other waste-related templates - especially paper and wood - estimated savings from this template should not be added to the estimated savings from other templates.

- A. Summary of current GHG savings from recycling. The DNR has compiled estimates of the amounts of several “materials” generated in Wisconsin and recycled in 2006. These are based on:
 - Residential recycling amounts (primarily from single-family homes and buildings with 1 - 4 units)

Actual residential and estimated commercial recycling and resulting GHG savings for selected materials, 2006			
Category	Total tons	Emissions factor (MTCO ₂ e/ton)	MTCO ₂ e
Glass containers	103,527	-0.32	33,129
Paper	921,125	-3.89	3,583,176
Steel containers	25,973	-1.83	47,531
Plastic containers	29,424	-1.53	45,019
Aluminum containers	7,959	-13.61	108,308
Total	1,088,008	--	3,817,163

factors for mixed paper and mixed plastics.)

- B. Potential additional GHG reductions with recycling rate increase. Another method for estimating GHG reductions from recycling is to look at the overall recycling rate (that is, the amount of municipal solid waste, or MSW, generated in Wisconsin that is diverted for recycling). DNR estimates the current overall recycling rate at 24% (1.4 million tons recycled out of 5.6 million tons of MSW generated in Wisconsin in 2006). Note that the volume of recyclables is higher than the 1.1 million tons in the above table, because other recyclable materials are included in that figure. Because of this, the table below uses EPA’s emissions factor for “mixed recyclables.”³

Below are the GHG emissions savings if the overall

1. <http://dnr.wi.gov/org/aw/wm/recycle/studies/index.html>
 2. From Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks (3rd ed.), U.S. Environmental Protection Agency, <http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html>

Tons recycled and GHG emissions reductions with increased recycling rate

Increase over current rate	Additional tons recycled	Emissions factor (MTCO ₂ e/ton)	MTCO ₂ e
1% (25% total diversion)	55,620	-3.05	169,641
2% (26% total diversion)	111,239	-3.05	339,279
5% (29% total diversion)	278,099	-3.05	848,202

recycling rate were to increase to 25, 26 or 29% (an increase of one, two or five percentage points).

NOTE: Some of these estimated emissions reductions come from increased recycling of paper and wood. Separate templates prepared by the ad-hoc waste work group also propose policies that would increase paper and wood recycling. To avoid double counting the benefits from increasing paper and wood recycling, emissions reduction estimates from those templates should not be added to these estimates.

6. Estimated Costs: This policy is predicted to cost approximately \$5 - 10 million annually.

Funding Sources: \$5 - 10 million is the amount that has been historically diverted from Wisconsin’s Recycling Fund (now the Recycling and Renewable Energy Fund), which includes revenue and interest from landfill fees and corporate income surcharges, for general purpose spending.

For the fiscal year 2008 - 09 Wisconsin’s budget projects that the state will collect \$53 million in revenue and interest from landfill fees and corporate income surcharges established to pay for state and local recycling programs. Of that amount, about \$38.5 million, or roughly 73%, will be spent on recycling (note that the diverted amount for the 2008 - 09 fiscal year is greater than the historical amount). The balance will be used for state spending related to: PCB Sediment Waste Transportation; the Department of Agriculture, Trade and Consumer Protection Clean Sweep Program; and the Department of Commerce Wisconsin Development Fund, especially for renewable energy projects. Because of the importance of these programs, the work group recommends that their funding continue, but utilizing a source separate from landfill fees

and corporate income surcharges used for recycling.

7. Specific Description of Policy Proposal:

This proposal seeks to reduce GHG emissions by enhancing Wisconsin’s present recycling programs. The Ad Hoc Waste Materials Recovery and Disposal Work Group has identified four initiatives to enhance Wisconsin’s recycling: education and outreach, grants to local governmental units and others to increase recycling, more effective deployment of recycling programs, and research regarding further recycling opportunities.

A. Education and outreach. As discussed in Section 5 above, recycling results in significant GHG reductions, in addition to other environmental and economic benefits. Inadequate outreach and promotion of recycling are key obstacles to increasing recycling rates, so this initiative has the potential to increase participation in recycling programs by linking the simple act of recycling with the meaningful impact it can have on climate change.

- Some consumers already believe recycling is an important tool for addressing climate change. In an October 2007 Harris poll, 31% of respondents listed recycling as the most important thing they could do to reduce global warming. Most Wisconsin residents and entities, however, do not make this link. Trend research on recycling participation also suggests diminishing interest in recycling in general. A recent research effort by the National Recycling Coalition found over 100 million “sometimes” recyclers in the United States who lacked the motivation and interest in recycling to participate routinely. The research indicated that in order to participate more in recycling, these consumers need to feel more optimism, hope, and accomplishment from the act of recycling. Drawing a link between climate change, an area in which many feel powerless to act, and recycling, which is available at virtually everyone’s doorstep, is a powerful way to boost recycling in Wisconsin and nationwide.
- Providing education and outreach to link recycling to climate change is a low cost

way to enhance waste recovery and reduce GHG emissions, because it largely relies on greater utilization of existing recycling infrastructure. To prevent overlap, the Waste Materials Recovery and Disposal Work Group recommends that this education and outreach regarding recycling be performed by the entities set up under the Comprehensive Initiative to Support Voluntary Long-term GHG Emissions Reductions.

the Recycling and Renewable Energy Fund for non-recycling purposes. Such money would be used to establish a recycling innovation fund or augment existing recycling grant programs to provide recycling grants to local governments and others. These grants would be based in part on the projected net reductions in GHGs from the proposed recycling initiatives. This would help ensure that the most effective steps to reduce GHG are implemented.

B. Grants to local governmental units and others to increase recycling. If the funds diverted from the Recycling and Renewable Energy Fund identified in Section 6 were redirected to recycling purposes, the Work Group recommends the following:

- Utilizing all state recycling funds solely for recycling would provide money to help local governments and others increase recycling in their areas. Increased recycling could be achieved through the use of funds to improve recycling programs and infrastructure, including increased enforcement of existing state and local recycling laws, and equipment associated with adding materials to recycling streams, implementing single-stream recycling and increasing the size of containers used for recycling. Local governments may also have unmet infrastructure needs for recycling containers for public spaces, special events and government facilities that these grants could fulfill.
- In addition to the above, the existing grant formula structure could be revised to provide incentives for improving recycling performance by grant recipients. Such incentives might include establishing baseline minimum rates and per-capita supplements or “bonuses” for achieving higher recovery rates, and allowing a broader range of materials to count towards a recipient’s recovery rate. Bonuses could be tied to reduced GHG emissions achieved through recycling and reuse programs.
- Because local governments and others may have varying needs to help them increase recycling, the work group believes that it is important to allow them to determine what would be the most effective initiatives. Accordingly, this policy would call for DNR to receive the money that is now taken from

C. Effective deployment of recycling programs. In order to ensure that recycling is fully implemented by local governments and those within their jurisdictions, it is important for local governments to promote active recycling by all. Accordingly, this policy proposal calls for local governments to take steps to ensure that all businesses and other entities within their jurisdictions are fully implementing appropriate recycling plans. For example, it would provide for local governments to work with retail establishments, parks and other spaces used by the public to ensure that they have recycling containers available. Event sponsors could be required by ordinance to submit and follow a recycling plan as part of the local permit process. Local governments would be eligible to receive grants to fund technical assistance and outreach within business sectors and other entities to assist them in developing sustainable material recovery programs in support of the local governments’ overall plans.

D. Research regarding further recycling opportunities. This policy proposal also calls for a portion of the funds currently diverted from the Recycling and Renewable Energy Fund to be made available for studies of further recycling opportunities. These studies would include periodic waste composition and generation studies to provide fundamental metrics for the performance of the recycling program. Other research could also include examination of:

- Bottlenecks in the recycling system (shortage of single-stream processing capacity, limited markets for certain materials)
- Gaps in collection infrastructure (businesses, underserved communities, public events and spaces)
- Study of best practices to enhance recovery in problem areas or for problem materials (such

as food waste and construction/demolition materials)

- The feasibility of innovative or incentive-based programs for increasing recovery of materials
- Examining the sources of discarded material to identify the greatest potential for recovery

8. Timetables, Duration, and Stringency of Options:

This policy would call for protection of all money from the Recycling and Renewable Energy Fund by 2010 and for use of those funds for the above policies during that year and all years thereafter.

9. Explanation of Rough Estimate GHG Reductions:

Because many of the initiatives described would be customized to meet the needs of local governments, it is difficult to quantify specific GHG reductions associated with this set of policies. Since recycling generates significant GHG reductions, the projects and programs supported by the policies in this template would be screened for their potential impact on GHGs, and because the policies provide the necessary tools for local governments and others to increase recycling, they are anticipated to lead to significant improvements in both recycling and GHG reductions.

10. Rough Estimate of Costs for Selected Years: The cost of this policy is the amount of money that is presently diverted from the state's Recycling and Renewable Energy Fund. Historically this amount has been in the \$5 - 10 million range.

11. Barriers to Implementation: The primary barrier to implementation would be the fact that the use of all money from the Recycling and Renewable Energy Fund would prevent that money from being used as general revenue for the state, including for renewable energy projects. Accordingly, there will likely be pressure to continue to divert the funds to the general revenue and other uses.

12. Other Factors: None

13. Related Policies:

- Comprehensive Initiative to Support Voluntary Long Term Greenhouse Gas Emissions Reductions
- Paper Waste (for purposes of quantification)
- Wood Waste (for purposes of quantification)

Electronics Waste

1. **Work Group:** Ad-hoc Waste Materials Recovery and Disposal
2. **Policy Name:** Electronics reuse and recycling (Electronics Waste)
3. **Policy Type:** Regulation/legislation, incentives
4. **Affected Sectors, Sub-Sectors and/or Entities:** Computer/electronics producers, retailers and recyclers; businesses and residents; municipalities; landfill operators; waste and recycling haulers
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** GHG savings from recycling computers (extracting recyclable materials such as aluminum and glass) and especially from refurbishing computers - reducing the need for new computer equipment - are potentially significant given the growing volume of electronics in use. The exact amount of electronics equipment that could be recycled/refurbished every year is difficult to pinpoint, but a 2006 DNR survey estimated that there are currently 3.8 million computers (about 60,000 tons) and nearly 7.5 million televisions (about 190,000 tons) in Wisconsin households. The estimates do not include the computers and other electronics found in businesses and institutions, though these entities are currently more likely to recycle their electronics due to state hazardous waste rules.

While not all of the household computers and televisions are obsolete, the short life of many electronics indicates that significant volumes are or will be ready for disposal in coming years. There is evidence from the household survey and other sources that households and small businesses are storing a large volume of unusable or unwanted electronic equipment, and that only a small volume of electronics is currently being landfilled or incinerated.

Virtually all of this equipment can either be recycled or refurbished. Research indicates that when the equipment is recovered for these purposes, with both household and business sources taken into account, approximately 50% of used electronics are recycled and 50% refurbished. However, all but the smallest businesses, and households, are prevented by hazardous waste laws from disposing of computer equipment in landfills and incinerators. Therefore, most of the used material that would be diverted from landfilling comes from households and small businesses, and this material tends to be older and

less ideal for refurbishing. According to recycling industry sources, a more accurate estimate for the refurbishing rate of household computers is on the order of 5%.

If 20% of residential in-service computers and televisions were replaced in Wisconsin every year and of these, 5% were refurbished and 95% were recycled instead of all landfilled or incinerated, an order-of-magnitude estimate of GHG reductions would yield approximately 249,333 metric tons (MT) of CO₂e per year.

6. **Estimated Costs:** Costs for landfill operators, waste and recycling haulers, municipalities and businesses could increase if additional equipment or changes to administrative procedures to divert electronics from landfills to recycling centers are needed. Some of these costs could be recovered through the sale of refurbished computers, recyclable components or recycled products. Manufacturers could minimize costs through design improvements to increase the recyclability and reusability of electronic products. DNR costs would increase due to an expansion of its landfill inspection and enforcement program. The state (and some local governments) would lose tipping fee revenue when more materials were recycled instead of landfilled.

Funding Sources: Most costs associated with this proposal would be borne by manufacturers and consumers purchasing covered electronic products. Any incremental DNR and municipal costs would be absorbed in operating budgets.

7. **Specific Description of Policy Proposal:** This policy would reduce GHG emissions by diverting electronics for reuse and recycling through a landfill ban and a state program requiring manufacturers to assume responsibility for collecting and recycling certain discarded household electronic products.

In December 2006, the Governor's Task Force on Waste Materials Recovery and Disposal recommended establishing a state policy to promote environmentally sound recycling and reuse of discarded televisions, monitors, laptops and desktop computers. The Task Force endorsed the principles developed by Midwest E-Waste Policy Initiative, which focus on product stewardship by manufacturers in a system that would be adopted by Wisconsin and five other Midwest states to provide regional consistency for manufacturers, recyclers and consumers. The Task Force's recommendation was designed around a shared responsibility model that would not unduly

burden local or state governments with the costs of collection and processing.

Since that time, Minnesota has enacted a law consistent with the Midwest Initiative, and a Wisconsin state senator introduced legislation consistent with the Minnesota bill in December 2007. The bill would have banned all computer monitors and televisions containing cathode ray tubes (CRTs), computers and other video display devices from Wisconsin landfills and incinerators, and would have required electronics manufacturers to recycle a certain amount of electronics per year based on their sales to households in the state.

This work group recommends the adoption of an electronic waste policy consistent with the Midwest E-Waste Policy Initiative which would establish manufacturer responsibility for the recycling of electronic waste.

Federal law requires that all full-power television broadcast stations stop broadcasting in analog format by February 17, 2009 and broadcast only in digital format. In light of this nation-wide conversion, this work group also recommends that the state provide funding for the DNR to conduct public education and outreach describing the options for recycling discarded televisions, particularly until the policy recommended above is established.

8. Timetables, Duration and Stringency Option:

Development and passage of legislation would take at least one year. The landfill ban and manufacturer requirements would be phased in to allow all impacted parties time to educate residents and to establish the infrastructure for collection and processing, and allow the DNR to design and implement registration, tracking and inspection programs. Duration would be indefinite.

9. Explanation of Rough Estimate of GHG

Reductions: The GHG reductions in this policy come from:

- Providing recycled materials (such as aluminum, glass, lead and copper) from computers for use in new products, thus reducing the need for virgin materials and reducing the energy needed to produce the new products; and/or

- Refurbishing and reusing computer equipment, thus extending its life and reducing the need to manufacture new computer equipment.

The U.S. EPA has calculated that, compared with landfilling, each ton of computers recycled reduces GHG emissions by 2.3 MT of CO₂e, while reducing the need for new computers would reduce GHG emissions by 55.5 MT of CO₂e per ton of computers refurbished for continued use.¹

10. Rough Estimate of Costs for Selected Years: With household computers, televisions and other electronic equipment (video display devices) being diverted from landfills to recycling and reuse, the state would lose tipping fee revenues. Currently the state receives \$4/ton from a recycling tip fee and \$1.90 from combined environmental fees. The exact amount of lost revenue would depend on the tonnages diverted from landfills each year. Electronics manufacturers would also incur costs associated with collecting and recycling equipment. First year costs would be higher, reflecting the immediate need to conduct public outreach on how to dispose of analog television receivers that may be generated by the switchover to a digital broadcast standard.

11. Barriers to Implementation:

- A. Logistical. A comprehensive tracking, inspection and enforcement program would need to be implemented to ensure compliance with program requirements by manufacturers and at landfills.
- B. Financial. Under the producer responsibility model, there should be minimal financial barriers to implementation.
- C. Political. While stakeholders agree that a system is needed to ensure environmentally sound recycling and reuse of discarded electronics, there is disagreement on the approach among the various stakeholders.

12. Other Factors: None

13. Related Policies: None

1. From *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks* (3rd ed.), U.S. Environmental Protection Agency, <http://www.epa.gov/climatechange/wyacd/waste/SWMGHGreport.html>

Food Waste

1. **Work Group:** Ad-hoc Waste Materials Recovery and Disposal
2. **Policy Name:** Reduced landfilling of food waste (Food Waste)
3. **Policy Type:** Incentives and research
4. **Affected Sectors, Sub-Sectors and/or Entities:** Municipalities, compost facilities, landfill operators, businesses and institutions
5. **Estimated Greenhouse Gas Emissions Reduction Impact:** This policy would not lead to any direct GHG emission reductions. However, if the study recommended by the policy was conducted, sufficient knowledge should be developed to generate policy proposals (such as a mandate for some level of diversion or incentives for voluntary approaches and local initiatives) that would lead to direct GHG emission reductions. The following table presents a rough estimate of potential savings in GHG emissions if 25 or 50% of food waste currently generated and landfilled in Wisconsin each year were composted instead. These reductions result from reduced methane production in landfills and increased carbon storage in soil due to compost use. To the extent that food waste diverted from landfills can be used to produce biogas through anaerobic digestion, and that biogas displaces fossil fuel based energy production, additional GHG reductions will occur.
6. **Estimated Costs:** There would be significant start-up costs for municipalities and others collecting and composting food waste. This would include large-scale education and outreach programs to get businesses (and eventually residents) to properly separate food waste. There would be lost revenue from landfill tipping fees as more waste was diverted to composting facilities.

Funding Sources: Some of the costs for municipalities might be met by state funding or incentives. An appropriation from the state's Recycling and Renewable Energy Fund might be one source of funding for this proposal.

7. **Specific Description of Policy Proposal:** Food waste makes up more than 10% of all municipal solid waste generated and landfilled in Wisconsin each year. Because of the high volume of food and other compostable organics in the waste stream, the Governor's Task Force on Waste Materials Recovery and Disposal recommended actions to substantially increase the diversion of waste organics, including food residuals, from disposal. A key benefit of this would be to reduce GHG emissions, primarily by reducing the amount of materials in landfills that decompose anaerobically, thus releasing methane.

Currently, there are significant amounts of food in the waste stream, much of it from commercial and institutional sources such as grocery stores, restaurants, institutions, food distributors and food processors. There is, however, little infrastructure or precedence in Wisconsin for large-scale composting of materials other than yard trimmings. Because of these limitations, the Waste Task Force recommendations centered on actions to address knowledge and regulatory barriers rather than policies to legislate mandatory actions or provide incentives for voluntary approaches. Specific recommendations include the following:

- A. Initiate a study to identify contributors of pre- and post-consumer food waste currently entering the municipal solid waste stream. The initial focus

Annual reductions in GHG emissions, in metric ton carbon dioxide equivalents (MTCO₂E), from food waste diverted from landfills to composting facilities

Material	Tons ¹ Landfilled	Emissions factor ² (MTCO ₂ e /ton)	Total savings (MTCO ₂ e) if 25% composted	Total savings (MTCO ₂ e) if 50% composted
Food waste	486,619	-0.92	111,518	223,032

would be on commercial/institutional generators because these sources account for nearly 60% of

1. From DNR 2002 Waste Characterization Study, <http://dnr.wi.gov/org/aw/wm/recycle/studies/index.html>.

2. From *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks* (3rd ed.), U.S. Environmental Protection Agency, <http://www.epa.gov/climatechange/wycd/waste/SWMGHGreport.html>

landfilled food waste and include many single, large-volume sources, which would ease collection and reduce administrative costs.

- B. Initiate research on the details of public health, practicality and costs of food waste composting from commercial properties, including pilot implementation studies. Similarly, ask the Office of Energy Independence to initiate and direct research on the potential for recovery of food waste through options preferred over composting from a GHG reduction standpoint.
- C. Develop and promote a hierarchy for the recovery of source-separated food waste, including donations for human use, animal feed, energy recovery and biofuel production.
- D. Identify and develop a strategy to reduce barriers to increased diversion of food wastes, and create incentives for the preferred options in the hierarchy.

The above recommendations would provide a platform from which specific policy proposals to achieve significant GHG reductions through increased food waste diversion could be developed. Such policy proposals might either mandate some level of diversion or provide incentives for voluntary approaches and local initiatives. The estimated GHG savings noted in Section 5, above, assume the implementation of an effective strategy based on the results of the above recommendations

- 8. **Timetables, Duration and Stringency Options:** Funding for research should be made available as soon as possible, ideally by the 2008-2009 fiscal year. Should the Wisconsin Global Warming Task Force elect to recommend additional policy proposals, funding for these should be made available as soon as possible, ideally by the 2009-2010 fiscal year at the latest, with a goal of 25% diversion of food waste by 2012 and 50% by 2015.

9. Explanation of Rough Estimate of GHG

Reductions: The GHG reductions in this policy come primarily from reducing landfill methane emissions by diverting wet organic waste (food) that would otherwise break down anaerobically in the landfill. There is also a small GHG benefit from the carbon stored in the compost itself and increased carbon storage in soils where compost is applied. Since the majority of the benefit comes from the diversion from landfilling, other uses of food waste (such as donation of edible food or use in animal feed) would likely have a similar GHG impact.

The estimates are based on data from the DNR’s 2002 Waste Characterization Study, which estimated the amounts of materials generated and landfilled in Wisconsin each year. Estimates of 25 and 50% of landfilled food waste were used to represent increased diversion as the composting infrastructure improves. (These estimates are more conservative than for other waste materials due to the current lack of infrastructure and the large number of individual sources of food waste - essentially all homes, businesses and institutions in the state.) These tonnages were multiplied by an emissions factor calculated by the U.S. EPA. The emissions factor represents the difference, in MTCO₂e, of composting compared with landfilling a material.

- 10. **Rough Estimate of Costs for Selected Years:** With food waste diverted from landfills for composting or other reuse, the state would lose tipping fee revenues. Currently, the state receives \$4/ton from a recycling tipping fee and \$1.90/ton from other fees (principally an environmental repair fee) for solid waste disposed of at Wisconsin landfills. The table below shows the lost revenue for the 25 and 50% diversion scenarios. Aggregate annual revenue from the fees is approximately \$45 million.

Annual loss in state tipping fee revenue due to diversion of food wastes from landfills			
Additional composting of current tons landfilled	Lost recycling tipping fee revenue	Lost environmental repair and other fee revenue	Total revenue loss
25% (121,655 tons)	\$486,619	\$231,145	\$717,764
50% (243,310 tons)	\$973,238	\$462,288	\$1,435,526

Certain local governments that receive tipping fee revenues under local negotiated agreements would also lose a small proportion of these revenues as tonnages decreased.

There would also be costs from state support of local or business food waste diversion initiatives.

11. Barriers to Implementation: There is currently very little infrastructure in Wisconsin for collecting and composting food waste on a large scale, so significant time and resources would need to be invested in such a system. Local governments would need to have an interest in adding food waste to their collection systems and a commitment to educate residents and businesses. Large sources of food scraps (such as food processing plants) might need incentives or assistance to manage their high volumes of waste and offset costs associated with setting up a composting program.

12. Other Factors: None

13. Related Policies: None

