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**Energy Supply Technical Work Group
Summary List of Pending Policy Options for Analysis**

| | Policy Option | GHG Reductions (MMtCO ₂ e) | | | Net Present Value 2007-2025 (Million \$) | Cost-Effectiveness (\$/tCO ₂ e) | Status of Option |
|-------|---|---------------------------------------|------|-----------------|--|---|------------------|
| | | 2010 | 2025 | Total 2007-2025 | | | |
| ES-1 | Generation Performance Standard | <i>Not Quantified</i> | | | | | Pending |
| ES-2 | Improve the GHG Profile of Biofuels and Fossil Fuels (e.g., Low Carbon Fuel Standard, Biofuel Production) | <i>Not Quantified</i> | | | | | Pending |
| ES-3 | Efficiency Improvements, Repowering and other Upgrades to Existing Plants | <i>Not Quantified</i> | | | | | Pending |
| ES-4 | Transmission System Upgrading, including reducing transmission line and distribution system loss. | <i>Not Quantified</i> | | | | | Pending |
| ES-5 | Renewable and/or Environmental Portfolio Standard | <i>Not Quantified</i> | | | | | Pending |
| ES-6 | Nuclear Power Support and Incentives | <i>Not Quantified</i> | | | | | Pending |
| ES-7 | Incentives for Advanced Fossil Fuel Generation and Carbon Capture and Storage (CCS), Including Combined Hydrogen and Electricity Production with Carbon Sequestration | <i>Not Quantified</i> | | | | | Pending |
| ES-8 | Carbon Capture and Storage and/or Reuse Policies | <i>Not Quantified</i> | | | | | Pending |
| ES-9 | Large-scale, Supply-oriented Combined Heat and Power (CHP) & Geothermal Incentives and/or Barrier Removal | <i>Not Quantified</i> | | | | | Pending |
| ES-10 | Voluntary GHG Targets | <i>Not Quantified</i> | | | | | Pending |

| | Policy Option | GHG Reductions (MMtCO ₂ e) | | | Net Present Value 2007–2025 (Million \$) | Cost-Effectiveness (\$/tCO ₂ e) | Status of Option |
|------------|--|---------------------------------------|------|-----------------|--|---|------------------|
| | | 2010 | 2025 | Total 2007-2025 | | | |
| ES-11 | Carbon (GHG) tax | <i>Not Quantified</i> | | | | | Pending |
| ES-12 | Distributed Renewable Energy Incentives and/or Barrier Removal | <i>Not Quantified</i> | | | | | Pending |
| ES-13 | Technology-based approaches, including research & development, fuel cells, energy storage, distributed renewable energy technologies, etc. | <i>Not Quantified</i> | | | | | Pending |
| TRACK 1 | ES-X Cap and Trade Program | <i>Not Quantified</i> | | | | | Pending |
| TRACK 2 | ES-X Greenhouse Gas Cap & Trade | <i>Not Quantified</i> | | | | | Pending |
| TRACK 3 | ES-X Cap and Trade Program | <i>Not Quantified</i> | | | | | Pending |

Note: Italicized text reflects questions for or items still under consideration by the TWG as it continues its work on elaborating option descriptions.

ES-1. Generation Performance Standard

Policy Description

A generation performance standard (GPS) is a mandate that requires those entities that deliver electricity (load-serving entities or LSEs) to acquire electricity, or power plant developers to build and operate new base load generation, with a per-unit emission rate below a specified mandatory standard.

Policy Design

Goals: The general goal of the policy is to prevent utilities from making long-term investments in high-carbon generation technology. In particular, the generation performance standard would prevent utilities from making a long-term financial commitment to base load generation plants with CO₂ emissions in excess of 1,100 pounds of CO₂ per megawatt-hour.

A long-term financial commitment would be defined to include either a new ownership investment in base load generation or a new contract with a term of five or more years, which includes procurement of base load generation. The TWG would like CCS to analyze the impact of two different approaches regarding the renewal of contracts procuring base load power from existing units – one approach that includes such contracts (if they are for five or more years) and one that excludes them.

The GPS would be designed to harmonize with policies that seek to reduce greenhouse gas emissions by promoting greater use of biomass and combined heat and power (CHP). For purposes of compliance with the GPS, the CO₂ emissions attributed to biomass energy would be net emissions based on a full fuel-cycle analysis. For base load projects that are part of a CHP project, the GPS would be raised to 1300 pounds of CO₂/MWh.

Timing: CCS should analyze two alternative onset dates for the GPS – an immediate onset date that would apply to all base load projects not already in operation, and a delayed onset date that would exclude base load facilities currently under consideration in proceedings before the Public Utilities Commission. The ongoing need for a GPS would be reviewed after the implementation of a cap and trade system.

Parties Involved: The program would apply to any state LSE making long-term financial commitments to base load power.

Implementation Mechanisms

Implementation would be through the Public Utilities Commission, which would review all long-term financial commitments to base load generation made by Minnesota utilities to ensure compliance with the generation performance standard.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Reduces carbon dioxide emissions from fossil-fuel electric generators, and promotes low carbon alternatives to fossil fuel generators.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

The GPS would expand PUC oversight to certain transactions or projects not currently subject to PUC review under the Certificate of Need or other laws, but only for the purpose of screening those transactions or projects for compliance with the GPS. It is uncertain how many additional projects would be subject to PUC approval. It is expected that the GPS approval process would be far more streamlined than the typical Certificate of Need review process.

Other uncertainties noted by the Technical Working Group include: (1) the need to consider whether a GPS is necessary if the state enacts a cap-and-trade program covering electric generation; (2) whether the 1300 pounds per megawatt hour threshold is set at the right level to encourage efficient CHP installations; (3) whether natural gas peaker units could reasonably be included in the policy in addition to base load generation; and (4) whether offsets would be allowed for compliance flexibility.

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

ES-2. Improve the GHG Profile of Biofuels and Fossil Fuels (e.g., Low Carbon Fuel Standard, Biofuel Production)

Policy Description

Evaluate the potential for a low carbon fuel standard (LCFS) that will stimulate innovation and investment in alternative fuels and technologies and increase efficiency in the fuel extraction/refining processes. This policy focuses on the “carbon intensity” (carbon per energy unit) of the fuels as measured on a full life cycle basis. A study should evaluate the cost / benefit of a low carbon fuel standard (LCFS) at varying levels as a policy option for Minnesota. Such an evaluation should consider

- The effect of an LCFS on reducing global warming gases from the transportation fuel sector.
- The influence of an LCFS on other ancillary environmental benefits (i.e. water quality, other criteria air pollutants, etc...)
- The setting of targets that are based on sound climate change science and sound engineering for assessment of the sector to transition.
- Coordination with existing & future California and Federal Government low carbon fuels standards, blending requirements, production incentives/targets.
- The effect and coordination potential with regional fuels markets, including the California LCFS market.
- The potential impact on in state production/use and transition costs for Minnesota refineries and ethanol producers.
- Potential for innovation and resulting jobs and economic development.
- The effect and coordination potential with existing infrastructure and needs for future compatible infrastructure.
- The effect and compatibility potential for existing equipment utilized at refineries (i.e. efficiency, blending, etc)
- Potential implementation timing impacts and regulatory needs.
- Potential integration with existing carbon markets and regulatory regimes.
- How existing RFS and other Minnesota biofuel policies could help meet and integrate varying LCFS targets.
- What are the economies of scale benefits or costs associated with expanding an LCFS to include multiple class vehicles or other non-transportation fuels?

Minnesota has already adopted policies requiring the use of biofuels, which if not included in the baseline, is one way to achieve a LCFS (*see Related Policies/Programs in Place*). As Minnesota’s experience has shown, a number of issues need to be analyzed to understand environmental, vehicle performance and economic transition costs and benefits. This information is necessary to determine the best implementation strategy and environmental benefits.

Policy Design

Design, fund & execute a study to understand the cost / benefit of a low carbon fuel standard (LCFS). Targets to be analyzed include a 5%, 10%, 15%, 20%, and 25% reduction in carbon intensity from transportation fuels consumed in the state by 2025.

Implementation Mechanisms

Low carbon fuel standard.

Related Policies/Programs in Place

Ethanol: Since 1997, Minnesota has mandated that all gasoline sold in the state be blended with 10 percent ethanol. In 2005, Minnesota passed a law mandating 20 percent ethanol in gasoline by 2013 if ethanol does not make up 20 percent of the gasoline sold in the state by XXXX.

However, a 20 percent mandate can only go into effect if approved by the EPA. As part of a petition to the EPA to grant a waiver for the use of E20, studies are being done to make sure a 20-percent blend does not adversely affect the performance of vehicle and small engines. Testing is also being done to make sure emissions are not adversely impacted, particularly tailpipe and permeation emissions.

Biodiesel: Current Minnesota law requires all diesel fuel sold in the state be blended with 2 percent biodiesel. The Governor recently announced a proposal to increase the mandate to 20 percent, which is expected to be discussed during the 2008 legislative session.

Types(s) of GHG Reductions

Avoided emissions from fossil-fuel and biofuel production.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

The Technical Working Group identified the following uncertainties: (1) how an LCFS would interact with a cap-and-trade program, if at all; and (2) how the LCFS would be harmonized with the existing renewable fuels mandate.

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

ES-3. Efficiency Improvements, Repowering and other Upgrades to Existing Plants

Policy Description

This policy would promote the identification and pursuit of cost-effective emissions reductions from existing generating units through improving their operating efficiency, adding biomass or other fuel changes, or adding carbon capture technology. This policy would complement a Generation Performance Standard (which applies to new plants and new units) by applying to existing units. Given that CO₂ emissions have not previously been the focus of state regulation, and given that existing units have not been the focus of resource planning, it is expected that there are as-yet unidentified opportunities to reduce emissions from existing facilities that will be cost-effective, particularly once CO₂ limits are in place. This policy would, in time, result in the identification of a portfolio of technological options for reducing greenhouse gas emissions and allow state utilities to share the opportunities they have identified.

CCS should investigate the impact of policies that:

- ❑ require utilities to evaluate their existing generating units for opportunities to improve their emissions profile through efficiency improvements, the addition of biomass or other fuel changes, or the addition of carbon capture technology. This evaluation would be part of an overall plan identifying cost-effective options for reducing system CO₂ emissions on a short-term and long-term basis.
- ❑ require utilities to pursue cost-effective options for reducing their emissions profile through measure identified above.
- ❑ create financial incentives that reward such emissions reductions.

The terms “cost effective” would be defined by some objective measure, such as cost per ton of carbon equivalent.

Policy Design

Goals: The policy would be intended to ensure that utilities undertake analyses of their operating systems to identify and pursue cost-effective opportunities to reduce emissions

Timing: This policy would become applicable as soon as possible.

Parties Involved: It would cover Minnesota load-serving entities.

Implementation Mechanisms

The planning and emission reduction requirements would be implemented through the Integrated Resource Planning (IRP) process already implemented by the Public Utilities Commission.

Related Policies/Programs in Place

Existing IRP requirements (see above). The requirement is an important counterpart to a Generation Performance Standard (GPS), which only covers new financial commitments. It complements a cap and trade policy by ensuring that utilities pursue cost-effective potential

emission reductions rather than the more obvious option of purchasing emission allowances (with the projected price of allowances being a key part of the definition of “cost effective” reductions).

Types(s) of GHG Reductions

Avoided emissions from fossil-fuel generation.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

The Technical Working Group identified the following uncertainties: (1) whether and how the new source review provisions of the Clean Air Act would affect the promotion of plant upgrades; (2) how this option relates to the GPS proposal; (3) how the terms “cost-effective” should be defined; and (4) how it relates to the cap-and-trade proposals.

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

ES-4. Transmission System Upgrading, including reducing transmission line and distribution system loss

Policy Description

Measures to improve transmission systems to reduce bottlenecks and enhance throughput may be required to meet long-term electricity demands and improve the efficiency of operations system wide. Opportunities may exist to substantially increase transmission line carrying capacity through the implementation of new construction and retrofit activities on the transmission grid, including incorporating advanced composite conductor technologies, capacitance technologies, and grid management software.

Siting new transmission lines can be a difficult process due to the regulatory time and cost of line construction including new Right-of-Way (R/W) acquisition. This increases environmental impacts through increased carbon emissions due to siting and clearing a R/W and the local impact on the environment, habitat, and on land use, enjoyment, and value of property.

Policy measures in support of this option could provide incentives to utilities to upgrade transmission systems and reduce barriers to Certificate of Need filings for new and existing transmission lines. Future development of renewable energy facilities may require the addition of new or improved transmission lines which must be seamlessly integrated into the transmission grid. Measures facilitating development of these projects can be a critical part of Minnesota's renewable energy future.

There are several energy efficiency measures that can be implemented to reduce the transmission and distribution line losses of electricity. Utilities use a variety of components throughout the transmission and distribution system to manage losses. Increasing the efficiency of these components can further reduce losses and associated GHG emissions. For example, the state of Vermont offers a rebate to encourage the installation of energy efficient transformers. Regulations, incentives, and/or support programs can be applied to achieve greater efficiency of transmission and distribution system components.

Any reduction of leaks during production, processing, and distribution on natural gas systems avoids methane emissions to the atmosphere and prevents the waste of valuable product.

Policy Design

- Goals:**
- 1). Provide financial incentives for implementing smart energy (computer) technologies.
 - 2). Assess the effectiveness of the streamlining efforts enacted in 2005 to siting and routing of transmission lines to determine what additional streamlining activities should be enacted.
 - 3). Allow financial recovery credit for related efficiency savings resulting in GHG reductions even if it is not shown to be cost effective from a customer standpoint whether it results from upgrading transformers or reconductoring.
 - 4). Improve individual line and grid efficiencies with incentives to reduce line losses.

5). Provide financial R & D support to identify new technologies including improved leak surveying of natural gas systems and upgrading natural gas controllers that operate and vent natural gas.

Timing: When should the program launch and over what time period should the reductions be achieved?

Parties Involved: Electric Utilities, Gas Utilities, Independent System Operator, Gas Pipeline Companies

Implementation Mechanisms

TBD

Related Policies/Programs in Place

Renewable energy objective, 25 by 2025.

Types(s) of GHG Reductions

Reduced carbon dioxide from fossil-fuel electricity generation; Avoided emissions from increased siting of renewable energy facilities; avoided methane emissions from leaks in natural gas distribution.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

The proposal would need to be integrated with the existing Cap-X 2020 program.

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

ES-5. Renewable and/or Environmental Portfolio Standard

Policy Description

A portfolio standard policy can be designed to require that a sector (Electricity Supply, Transportation, Industrial/Manufacturing and Commercial/Residential buildings) provide for lower greenhouse gas emissions from energy use or operations by targeting an increased amount of lower emission activities in the aggregate by a target date. A renewable portfolio standard (RPS) is a requirement that utilities and other load-serving entities must supply a certain, generally fixed, percentage of electricity from eligible (e.g. low greenhouse gas emitting) renewable energy sources. An environmental portfolio standard (EPS) expands portfolio requirements to include energy production with technologies that are not now classified as renewable but are viewed as releasing less greenhouse gas emissions than conventional energy production. These can include energy efficiency improvements or other GHG emission-reducing technologies (such as combined heat-and-power [CHP]) as an eligible resource. About 20 states currently have an RPS in place, while a handful have implemented an EPS. In some cases, utilities can also meet their portfolio requirements by purchasing Renewable Energy Certificates (RECs) from eligible renewable energy projects or carbon offsets from certified sources.

Minnesota has adopted a renewable energy objective of 25% by 2025.

Policy Design

Goals:

- 1). Evaluate what GHG reductions may be realized should Minnesota increase portfolio requirements beyond the 2025 time frame requirement in existing law through 2050. The study should include an analysis of the adequacy of transmission capacity.
- 2). Evaluate hydro, biomass and the use of offsets in the context of CO₂ benefits to meet RES/EPS requirements as defined in Minnesota State Statutes
- 3). Increase R & D funding for renewable/environmental (low CO₂ emitting) energy that reduces CO₂/ GHG emissions. (E.g. U of M IREE)
- 4). Evaluate Performance Standards (Carbon Intensity Target) for renewable/environmental energy use by Residential, Commercial and Industrial entities.

Timing: Assume that current legislation will cover the time period from current to 2025. Legislation should be enacted by 2009 to give time for planning to meet the new standards. Funding for Renewable/Environmental R & D should begin as soon as practicable.

Parties Involved: M-RETS, Minnesota Public Utilities Commission, Minnesota State Legislature, Minnesota Department of Commerce

Other?

Implementation Mechanisms

Requires future legislation covering period from 2025 to 2050 for the renewable requirement while:

- 1). Performing an evaluation of expanding the RPS requirement once the dates in existing law have been reached.
- 2). Providing utilities with adequate lead-time.
- 3). Re-evaluating expansion of what qualifies as renewable and/or environmental sources.

Increase funding by 2009 for R & D relative to new and improved technology advancements.

Institute a renewable energy credit trading program. (Minnesota Statutes 2007, Chapter 216B.1691).

Explore creation of energy intensity targets like carbon intensity targets as a means for broadening the application of portfolio standards to all Minnesota sectors.

Related Policies/Programs in Place

The state has adopted a 25% renewable energy goal by 2025.

Minnesota Statutes 2007, Chapter 216

Types(s) of GHG Reductions

Reductions in all GHG emissions from energy production and GHG emissions associated with process operational emissions and energy consumption.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

ES-6. Nuclear Power Support and Incentives

Policy Description

The role of nuclear power in a greenhouse gas-constrained energy supply system is both important and controversial. Today, nuclear power plants provide about 20% of electric power both nationally and in Minnesota. The role of both existing and new units needs to be considered for a comprehensive climate change policy process.

This policy provides support and incentives for life extension at existing nuclear power plants and for study of potential new nuclear power plants in Minnesota.

Policy Design

Goals: The policy would be intended to ensure that utilities undertake analyses of their operating systems to identify and pursue cost-effective opportunities to reduce emissions with an emphasis on nuclear power through

1. life extension,
2. capacity upgrades,
3. purchase of imported nuclear power and
4. potential new nuclear power plants.

Timing: This policy would become applicable as soon as possible.

Parties Involved: It would cover Minnesota load-serving entities.

Implementation Mechanisms

The planning requirements would be implemented through the Integrated Resource Planning (IRP) process already implemented by the Public Utilities Commission. Thorough consideration of the safety, economics, and environmental implications of nuclear power would be explicitly called for.

In addition, the ongoing work at the Minnesota Legislature periodically produces reports and positions that enable a more comprehensive look at the issues surrounding nuclear power. These efforts would continue to inform the debate.

Related Policies/Programs in Place

Existing IRP requirements (see above). These require consideration of relatively low-value GHG adders in the planning process, but do not require specific analysis of nuclear power as a GHG-reducing supply option. In the event that a comprehensive GHG policy were implemented in the state's electric power sector, it would likely overlap with this policy, although it is likely that full consideration of nuclear power options could still require a dedicated policy.

Types(s) of GHG Reductions

Avoided emissions from fossil-fuel generation.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

Nuclear fuel availability

Nuclear waste storage and disposal

Security requirements

Changes in federal policy (Nuclear Regulatory Commission relicensing, long term waste repository etc.)

Technology and economics of new units

Industry-wide developments

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

Mostly captured in the Key Uncertainties items above. Political feasibility also affects nuclear power, to differing degrees for life extensions and capacity upgrades as opposed to new units.

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

ES-7. Advanced Fossil Fuel Technology Incentives, Support or Requirements

Policy Description and Design

Goals: For coal to play a significant role in Minnesota's future energy system, its overall environmental profile must improve, and come as close as possible to producing zero CO₂ emissions, while producing energy that is both affordable and reliable.

Timing: By 2020, the Upper Midwest region (Minnesota, Wisconsin, North and South Dakota) should strive to have at least two IGCC projects with CCS through design, construction and into full operation. Similar goals for demonstrations of amine scrubbing, oxy-fuel combustion, and next generation gasification technologies should be developed.

Parties involved: Incumbent utilities, IPP's, state regulators.

Implementation Mechanisms

1. Technology demonstrations – Critical to have commercial scale demonstrations using low-rank coals designed and under construction within the next 5 years, including demonstrations of IGCC with western sub-bituminous coal, IGCC with North Dakota lignite, and IGCC in conjunction with renewable energy such as wind power and/or hydrogen production. There are three demonstrations already in progress: Excelsior Energy's Mesaba IGCC project proposed for northeastern Minnesota, Xcel Energy's proposed IGCC demo in Colorado, and Great River Energy's coal-to-liquids IGCC project with CCS in North Dakota.
2. Provide support for Front-End Engineering and Design (FEED) packages – state programs that offset some of the cost of FEED packages would allow utilities and developers to recoup their initial engineering costs through state tax credits or grants.
3. Provide direct state financial incentives (tax credits, loan guarantees, etc.)
4. Allow regulated utilities cost recovery for appropriate demonstration projects.
5. Enhance IRP policies by using them to encourage low- CO₂ coal technologies – by incorporating proxy values for risk of future carbon regulations as Minnesota's 2007 legislation directs.
6. Update workforce training and research and development programs and investments, with a focus on developing the gasification and carbon sequestration industries.

Related Policies/Programs in Place

In 2003 the Minnesota Legislature enacted two statutes, Minn. Stat. 216B.1693 (the "Clean Energy Technology Statue") and Minn. Stat. 216B. 1694 (the Innovative Energy Project Statue"), providing important regulatory incentives, including an exemption from the requirements of a certificate of need and eminent domain rights for approved sites and routes for project facilities, to encourage the rapid development of IGCC projects in Minnesota.

Types(s) of GHG Reductions

Reductions in emissions of carbon dioxide from coal combustion.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

ES-8. Carbon Capture and Storage and/or Reuse Policies

Policy Description and Design

(Same as ES-7)

Goals: For coal to play a significant role in Minnesota's future energy system, its overall environmental profile must improve, and come as close as possible to producing zero CO₂ emissions, while producing energy that is both affordable and reliable.

Timing: By 2020, the Upper Midwest region (Minnesota, Wisconsin, North and South Dakota) should strive to have at least two IGCC projects with CCS through design, construction and into full operation. Similar goals for demonstrations of amine scrubbing, oxy-fuel combustion, and next generation gasification technologies should be developed.

Parties involved: Incumbent utilities, IPP's, state regulators.

Implementation Mechanisms

1. Require development of the legal and regulatory frameworks needed for geologic storage of CO₂ – new regulations should address issues of CO₂ ownership in storage and liability for same. State environmental agencies should develop permitting processes for underground storage, including guidance on pipelines, drilling, storage, measurement, monitoring and verification.
2. Support comprehensive assessments of geologic reservoirs at state and federal levels to determine storage potential and feasibility.
3. Evaluate the feasibility of CO₂ transport via pipeline and “advanced sequestration” (i.e., mineralization, carbon nano-fibers) if Minnesota determines it has no in-state storage opportunities.
4. Provide tax incentives for CCS, including when transported via pipeline for use in enhanced oil recovery operations.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Reductions in emissions of carbon dioxide from combustion sources.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** TBD
- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

Key Uncertainties

TBD

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

ES-9. Large-scale, Supply-oriented Combined Heat and Power (CHP) & Geothermal Incentives and/or Barrier Removal

Policy Description

Combined heat and power (CHP) can reduce GHG emissions by increasing the overall efficiency of fuel use and reducing transmission line loss with the co-location of heat and power facilities. Minnesota has a history of CHP applications through district heating and other projects. CHP also lends itself to the use of biofuels, an important Minnesota emphasis. However, there are numerous barriers to CHP, including inadequate information, institutional barriers, high transaction costs because of small projects, high financing costs because of lender unfamiliarity and perceived risk, "split incentives" between building owners and tenants, and utility-related policies like interconnection requirement, high standby rates, exit fees, etc. The lack of standard offer or long-term contracts, payment at avoided cost levels, and lack of recognition for emissions reduction value provided also creates obstacles. Policies to remove these barriers can include: improved interconnection policies, improved rates and fees policies, streamlined permitting, recognition of the emission reduction value provided by CHP and clean distributed generation, financing packages and bonding programs, power procurement policies, education and outreach, etc.

Financial incentives for CHP could include: direct subsidies for purchasing/selling CHP systems given to the buyer/seller; tax credits or exemptions for purchasing/selling CHP systems given to the buyer/seller; tax credits or exemptions for operating CHP systems; feed-in tariff, which is a direct payment to CHP owners for each kWh of electricity or BTU of heat generated from a qualifying CHP system; and tax credits for each kWh or BTU generated from a qualifying CHP system.

Policy Design

Goals: MCCAG recommends that Minnesota undertake a concerted effort to revise its regulatory policies and remove institutional barriers in order to allow CHP and the recovery and use of waste energy to compete on a level playing field with other sources of electric and thermal energy.

Timing: Program start-up as soon as possible.

Parties Involved: All utilities serving customers in Minnesota.

Implementation Mechanisms

- Information and education.
- Technical assistance.
- Financial incentives.
- Regulatory policies.
- Codes and standards.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Reductions in emissions of carbon dioxide from combustion sources.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** TBD
- **Quantification Methods:** TBD
- **Key Assumptions:** TBD

Key Uncertainties

As with any assessment of the future, this analysis has many uncertainties. Key uncertainties are those related directly to the assumptions and quantification methods noted above. If those assumptions are incorrect, then the results would change. Other uncertainties include the forecast of the price of fossil fuels and the growth in the demand for electricity.

Feasibility Issues

TBD

Status of Group Approval

TBD

Level of Group Support

TBD

Barriers to Consensus

TBD

ES-10. Voluntary GHG targets

Policy Description

Numerous US companies and organizations, including many utilities, have taken on voluntary GHG reduction commitments. Some of these are organized through the US EPA's Climate Leaders program. Others include participation in Power Partners and the EIA 1605(b) Voluntary GHG Emission Reduction Program. These commitments can be based on total GHG emissions in a given year, specific voluntary projects or can be defined on an intensity basis (t CO₂e per MWh generated or delivered.). Some entities with voluntary commitments also transact through the Chicago Climate Exchange (CCX), a self-regulating pilot program for reducing and trading GHG emissions in North America.

Policy Design

Goals: The goals for a Minnesota Voluntary GHG program include:

1. Encouraging Minnesota business and citizens to voluntarily begin reducing GHG emissions immediately, without waiting for mandatory Minnesota or national GHG reduction program measures.
2. Provide a means for Minnesota voluntary GHG emission reductions to be quantified and recognized by applying Minnesota approved GHG quantification methods.
3. Allow regulated entities assurance of cost recovery for voluntary GHG reduction measures that are previewed and approved by the MPUC as in the best interest of Minnesota stakeholders, considering Minnesota climate change risks.
4. Provide documentation that supports voluntary measures receiving full credit under a future Minnesota or national mandatory or voluntary GHG reduction program (e.g. credit for early action).
5. Enable Minnesota voluntary GHG emission reduction measures to receive credit as certifiable CO₂ offsets for use within and outside of the United States.

Timing: Upon promulgation.

Parties Involved: All sectors and sources that wish to provide for voluntary GHG reductions or offsets, including: government, industry, business, commercial building owners and homeowners.

Other?

Implementation Mechanisms

Legislation will provide for voluntary GHG emission reductions to be registered and for cost recovery mechanisms. The MPCA shall be authorized to provide for voluntary measure recordkeeping. The MPUC shall be authorized to provide for review for public interest for cost recovery.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Reductions in emissions of carbon dioxide, as well as other greenhouse gases, depending on participation in the program.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** Early action will be referenced against the Minnesota 2005 GHG emission inventory. Previous voluntary action that Minnesota entities performed under pre-2005 programs may also be quantified for receiving recognition if third party certification documents that the GHG emission reductions or offsets were delivered compared to 1990 as established under the U.S. Climate Change Action Plan developed in accordance with the Rio Accords ratified by the US Senate.

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

ES-11. Carbon (GHG) tax

Policy Description

A GHG tax would be a tax on each ton of CO₂ equivalent emitted from certain sources. The tax could be imposed upstream, based for example on the carbon content of fuels (e.g. fossil fuel suppliers) or at the point of combustion and emission. Although taxed entities would pass some or all of the cost on to consumers, there would be competitive pressure to find cost-effective ways to lower (or offset) emissions. Consumers who see the implicit cost of GHG emissions in products and services could adjust their behavior to lower emissions and reduce cost. Revenues collected could be fully applied to incentivize low emission alternatives. The program can also be designed to be “revenue neutral” (not a net tax increase) for example by offsetting with an income tax reduction. Revenue could also be directed for relief to parties that are disproportionately impacted by the tax. In general a carbon tax can influence behavior through tax avoidance opportunities, exemptions, targeted rebates and funding mechanisms for installation of favored technologies.

Policy Design

Goals:

- Make the cost of inefficient or higher CO₂ emitting activities more expensive than alternatives, creating a financial incentive to change behavior away from activities that result in atmospheric CO₂ emissions.
- Design a tax that includes safety valves to reduce low-income impact and minimize detrimental economic consequences.
- Optionally, the tax could be “revenue neutral”, meaning an equal amount of other state taxes would be reduced so that the “net” to the state is essentially zero; or, the revenue from the tax could be used to develop or promote alternatives that reduce CO₂ emissions. However, reducing other taxes must not have the effect of eliminating the incentive to change behavior (reduce CO₂ emissions).
- Establish a tax collection system that is simple and cost-effective.

Timing: Would depend on political will. Once enacted, could be implemented relatively quickly.

What would be taxed: Tons of CO₂ or equivalent emitted from combustion. Specific assessment factors (such as BTU) could be determined for ease of collection and to account for variability of carbon content of fuel. Rebates could be created for CO₂ controls that prevent atmospheric emissions.

Who would pay: Impose the tax as far upstream as practicable to ensure ease of administration. Major payers: utilities that generate or distribute electricity in Minnesota; refiners or distributors of transportation and heating fuels in Minnesota; and commercial and industrial sources creating energy for production or other commercial use. It is assumed that the cost of the tax would be passed down to the ultimate consumer, such as residential and commercial utility ratepayers for electricity and heating and purchasers of fuels for commercial and personal transportation.

Amount of tax: In order to achieve the stated goal, the tax must be high enough to trigger financial and behavioral decisions to actually shift to lower emitting fuels. How is the “tipping point” determined? It is assumed that models exist that predict this tipping point. Is it \$50.00 per ton? Higher? Lower? [See attached analysis by Mike Cashin, “Carbon Tax Pricing Level Significance] The tax could be implemented incrementally.

The TWG must determine a scenario that will allow the quantification of costs and benefits in the next phase of this process. The tax should be: \$___/ton of CO₂e, phased in at equal increments over a period of ___years. Considering the different price impact by sector, should the tax vary by sector?

Several scenarios could be modeled to assess the costs and benefits of a higher or lower tax and provide context for a discussion of the political viability of a specific tax amount.

Implementation Mechanisms

Requires legislation and detailed tax collection system.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Reductions in emissions of all emissions subject to the tax.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval] A thorough analysis of the economic impact of any carbon tax on people at various income levels, especially low and moderate income payers, should be performed before the legislature considers a carbon tax.
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

ES-12. Distributed Renewable Energy Incentives and/or Barrier Removal

Policy Description

Distributed renewable energy should be encouraged as it plays a part in the overall goal of reducing carbon emissions. This policy includes subsidies or incentives that encourage investment in small-scale distributed renewable energy resources.

Policy Design

Goals: The goal of this policy is to encourage investment small-scale distributed renewable energy via incentives and/or the prevention of barriers. Incentives for distributed renewables should include: (1) direct subsidies for purchasing/selling renewable technologies; (2) tax credits or exemptions for purchasing/selling renewable technologies; (3) feed-in tariffs, which provide direct payments to renewable generators for each kWh of electricity generated from a qualifying renewable facility (feed-in tariffs should take into consideration and recognize all the attributes of energy including carbon impact to the purchaser and the “green impact”); (4) tax credits for each kWh generated from a qualifying renewable facility; (5) allowing the distributed generation projects count toward the Conservation Improvement Program (CIP) savings goal of 1.5% annually if the investment is reasonable and prudent, whether utility-owned or customer-owned.

Timing: Analysis and review of technologies, financial incentives and size of a project to begin immediately.

Parties Involved: All utilities serving customers in Minnesota; state agencies with jurisdiction; other interested stakeholders

Other? A source to cover any financial incentive would need to be determined. The level of credit or funding should be consistent for all utilities (IOUs, municipals and cooperatives). The cost of the incentive should be shared among all end users so that no one is overly burdened.

Implementation Mechanisms

- Funding mechanisms and incentives
- Regulatory policies that support utility investments in small-scale distributed renewable energy.

Related Policies/Programs in Place

Renewable Energy Standard 25 by 25. Existing matching programs for investment in photovoltaic systems. Wind production tax credits.

Types(s) of GHG Reductions

Reductions in emissions of carbon dioxide from combustion sources.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

ES-13. Technology-based approaches, including research & development, fuel cells, energy storage, distributed renewable energy technologies, etc.

Policy Description

Technology and innovation play a critical role in the development of economic processes, including energy production and use. Major progress in climate change policy requires improvements to technologies as well as increased rates of technology adoption and use. Trends toward smaller scale in energy production technology, combined with the impact of automation and remote system controls, present challenges to current business models and operational procedures.

This policy is an umbrella covering several technology-related policy options that together can contribute to GHG emission reductions in Minnesota.

Policy Design

Goals: This set of policies would provide state government and other private and public parties with resources and incentives for analysis, targeted R&D, market development, and adoption of GHG-reducing technologies that are not covered by other policies. The overall goals would be:

1. To position Minnesota as a world leader in climate-related technology development and deployment,
2. To achieve actual emission reductions from technology investments, and
3. To develop state industries with high in-state and export capability.

Timing: This policy would be intended to come into effect in 2008 and 2009 and would continue indefinitely as an enabling mechanism for other climate-related policies.

Parties Involved: Minnesota government. Private and public partners on a voluntary basis.

Implementation Mechanisms

An R&D budget line item would be created to fund a small staff in the Commerce Department or another related agency. This group would follow technology trends and identify critical technology pathways as well as opportunities for collaboration and funding from other sources.

In addition, a Clean Technologies Innovation Program would be funded at the state level to provide grants and incentives as they are identified by the state along with other sources of public input into the prioritization process. Two models would be the California Public Interest Energy Research (PIER) program and the New York Energy Research and Development Agency (NYSERDA). Utilities would be able to apply as partners for these funds.

Finally, the state's regulated utilities would be allowed to devote a percentage of their sales revenue to substantial R&D projects on a voluntary basis as part of their overall energy supply portfolios. The invested capital portion of these projects would be given advantageous cost recovery as an incentive to carry out such projects. This policy could be relaxed when effective climate change policy comes into effect, although there may still be merit in continuing some level of incentive for utility R&D effort even when climate policy is in place.

These policies would replace the current, more limited Renewable Development Fund (RDF).

Related Policies/Programs in Place

State efforts on innovation including biotechnology, agriculture, transportation etc.

Renewable Development Fund.

Tax credits and Federal incentives.

Technology-specific policies such as hybrid vehicle or solar pilot programs and incentives.

Types(s) of GHG Reductions

Various, from no direct reductions to direct offset of emitting fuels, processes, etc. to actual uptake and use of GHGs thus removing them from the atmosphere.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD –generally low as an enabling policy for larger and/or more cost-effective policy options in the future.

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

Funding level stability

Ability to identify productive technology pathways

Measures of success and program oversight

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

Requires broad range of skills for effective administration.

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

PLEASE NOTE: THREE ALTERNATIVE ES-X CAP-AND-TRADE STRAW PROPOSALS WERE SUBMITTED

Track 1. ES-x Cap and Trade Program

Policy Description

A cap and trade system is a market mechanism by which GHG emissions are limited or capped at a specified level, and entities covered under the system are required to hold permits for each unit of emissions. Through trading, participants with lower costs of compliance can choose to over-comply and sell their additional reductions to participants for whom compliance costs are higher. In this fashion, overall costs of compliance are lower than they would otherwise be.

The Energy Supply TWG recommends the analysis of a cap-and-trade program with the following features.

Policy Design

Emission Reduction Goals: The law requires the MCCAG to “recommend the parameters of a cap and trade system that includes a cap that would prevent significant increases in greenhouse gas emissions above current levels with a schedule for lowering the cap periodically to achieve the goals in subdivision 1 and interim goals recommended under paragraph (a).” Minn. Stat. 216H.02, subd. 5(b). Accordingly, the cap and trade should set an initial cap at 2007 emission levels, with gradual annual reductions to achieve the statutory goals of at least 15% below 2005 levels by 2015, 30% below 2005 levels by 2025, and 80% below 2005 levels by 2050. (The cap may need to be reduced below these levels to compensate for emissions from non-covered sectors if projections show those sectors are not likely to achieve similar reductions.)

Timing: The cap and trade should be implemented as soon as possible, to prevent significant increases above current emissions in the meantime and to maximize the time available to meet the 2015 target. Requiring covered sectors to meet 2007 emission levels in 2010 would allow two to three years for emitters and regulators to prepare for the program, and still allow five years under the program to implement reductions.

Other States: The program should be designed to maximize market trading with the Regional Greenhouse Gas Initiative (RGGI), the Western Climate Initiative (WCI), and any emerging regional market in the Midwest. For modeling purposes, CCS should assume a regional trading system with trading links to RGGI and WCI, as well as variations with smaller markets.

Sectors Covered: The cap-and-trade should cover the electric sector, major industrial emitters, the transportation sector, and the buildings sector.

Pollutants Covered: The program should cover all six greenhouse gases listed in the statute (CO₂, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) from the covered sectors.

Implementation Mechanisms

Point of Regulation: In the power sector, the point of regulation should be load-serving entities or “first sellers,” to ensure emissions associated with imported power are covered.

The transportation sector should be regulated upstream, focusing on the entity that imports the petroleum into the state.

Emissions associated with the buildings sector would primarily reflect natural gas consumption. Natural gas should also be regulated upstream, again focusing on the entity that imports the natural gas into the state.

Major industrial emissions should be regulated at the point of emissions, except to the extent emissions are associated with natural gas and petroleum that has already been regulated upstream. Emissions of certain high global-warming potential gases may also be regulated upstream of their usage, at the distribution level, if more practical.

Distribution of allocation: Allowances should be auctioned, with proceeds collected by the state used to: (1) fund energy efficiency programs, (2) promote development of sustainable low-carbon energy sources, (3) assist low-income energy consumers, and (4) help any workers harmed by the transition away from high-carbon technologies.

Offsets: Offsets should be subject to stringent standards to ensure their environmental integrity, and limited to ensure that the overwhelming majority of emission reductions come from covered sectors. They should be limited to the state of Minnesota to ensure to the maximum extent possible that environmental and economic co-benefits stay in the state.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

All six statutory greenhouse gases.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]

Track 2. ES-x Greenhouse Gas Cap and Trade

Policy Description

A cap and trade system is a market mechanism in which greenhouse gas (GHG) emissions are limited or capped at a specified level, and those participating in the system can trade permits (a permit is an allowance to emit one ton of CO₂). By allowing trading, participants with lower costs of compliance can over comply and sell their additional reductions to participants for whom compliance costs are higher. In this way, overall costs of compliance are reduced. Among the important considerations for Minnesota with respect to a cap and trade program are the sources and sectors to which it would apply, which GHGs would be covered, the level of the cap and the schedule for lowering it, how allowances would be distributed, how to recognize and incentivize early action, what offsets would be allowed, over what region the program would be implemented (e.g., nationally, regionally, state only) and whether the cap could be achieved under a regional program given leakage from non-participating states.

Policy Design

The MCCAG recognizes that any cap and trade program applicable to Minnesota sources would best be implemented on a national basis so that Minnesotans have better assurance of providing their fair share of climate action mitigation measures that address the global problem of global warming. While awaiting national action, the MCCAG is seeking a Minnesota cap and trade mechanism that can be coordinated and prospectively assimilated into a future regional or national cap and trade program without adversely impacting Minnesotans that acted in response to a Minnesota-only program.

The MCCAG recommends that a Minnesota GHG cap and trade program be designed to include as much of the Minnesota greenhouse gas emitting activity in the state as practical, including all sectors (transportation, utility, industrial/manufacturing and building/home energy use). The program should focus on the dominant greenhouse gas emissions (CO₂, methane and nitrous oxide) in tracking Minnesota progress in achieving reductions or offsets of GHG emissions but also include means for valuing reductions of all the primary six GHGs (include SF₆, HFCs and PFCs).to assure the Minnesota program can be consistent with international GHG reduction efforts. The program should assess cap and trade targets that make sense for application uniformly across all sectors, including means to assure effective market trading so that the cost for Minnesotans to implement GHG reduction measures can be effectively managed for economic impacts, equity, feasible implementation and effectiveness in achieving MN GHG emission reduction targets.

The MCCAG further recommends that the State of Minnesota should lead or participate in a regional collaborative to investigate market-based mechanisms, such as cap and trade and other state policies, that would limit and reduce greenhouse gas emissions in the Midwest and in the Nation. This will be valuable for the region and state to inform and help shape national legislation to regulate GHG emissions.

Goal levels: Several cap and trade scenarios should be modeled based on plans being seriously considered in the U.S. Congress for the purpose of gaining insight into potential impacts on the State. The Minnesota legislature targets should be assessed for implementation feasibility along

with assessment of alternative targets that can better align Minnesota action with regional and national efforts and that assure feasible implementation in Minnesota.

Timing: Program start-up as soon as possible. Mitigating actions implemented in 2005 or subsequent years should be fully credited and additional early actions should be incentivized and fully credited. The feasibility of the MN legislature 2015, 2025 and 2050 targets should be assessed along with alternate timing mechanisms. Specifically, the MCCAG should assess what sort of cap could be achieved with a near term timing like 2015, considering Minnesota GHG producing infrastructure. The MCCAG should also assess whether any 2050 target should remain a target (reference California) rather than being established as a cap, considering the uncertainty in modeling and technology involved with making projections over 40 years into the future.

Parties Involved: All utilities serving customers in Minnesota; other sectors of Minnesota's economy that have significant GHG emissions.

Data sources: Data for this analysis may be found through the U.S. Energy Information Administration (EIA) and its National Energy Modeling System (NEMS). In addition, the assistance of the Congressional Research Service could be sought. State agencies in Minnesota should supplement this data so that it is applicable to Minnesota.

Implementation Mechanisms

This is a market-based mechanism with an underlying regulatory obligation. Implementation mechanisms would need to focus on the incentive structure, research and development, technical assistance and education.

Related Policies/Programs in Place

No GHG cap and trade program is currently in place. Nevertheless, Minnesota legislation enacted in 2007 provides strong incentives for having a comprehensive and enforceable state law or rule in place by August 1, 2009 that directly limits and substantially reduces, over time, statewide power sector carbon dioxide emissions.

Types(s) of GHG Reductions

Reductions in CO₂ and other GHGs from a broad spectrum of Minnesota's economy should be evaluated.

Estimated GHG Savings and Costs per MtCO₂e

TBD

Key Uncertainties

TBD

Additional Benefits and Costs

TBD

Feasibility Issues

TBD

Status of Group Approval

Mandated by state legislation.

Level of Group Support

TBD

Barriers to Consensus

Structure, geographical coverage, and pace of implementation of the plan.

Track 3. ES-x Cap and Trade Program

Policy Description

A cap and trade system is a market mechanism by which greenhouse gas (GHG) emissions are limited or capped at a specified level, and those participating in the system are required to hold permits for each unit of emissions. Through trading, participants with lower costs of compliance can choose to over-comply and sell their additional reductions to participants for whom compliance costs are higher. In this way, overall costs of compliance are reduced.

Policy Design

Goals: The goal of a cap and trade program applicable to Minnesota should be to reduce our contribution to worldwide GHG emissions without seriously jeopardizing Minnesota's economy. The program should cover all segments of the economy, although the GHG emission reduction mechanisms may vary among sectors of the economy.

Timing: Program start-up should be as soon as possible. Mitigating actions implemented in 2005 (or earlier?) or subsequent years should be fully credited and additional early actions should be incented and fully credited.

Parties Involved: Any cap and trade program applicable to Minnesota should be implemented on a national basis. In the meantime, Minnesota should lead a campaign through the National Governors Association to encourage Congress to pass and have the President sign legislation implementing a national cap and trade program. Any cap and trade program applicable to Minnesota should cover all load-serving entities serving Minnesota energy customers and have comparable coverage of other sectors of the economy.

Other?

Implementation Mechanisms

Interim goals should be established, but checkpoints should be no closer together than every five years. This is because energy system efficiency improvements and technological advances are expected to be "lumpy," rather than to occur in smooth annual increments. The system should incent the earliest possible implementation of dramatic GHG emission reduction and/or capture and sequestration mechanisms, rather than making small, incremental changes designed to meet a timetable with annual increments.

There is concern that a full auction system for the allocation of emission allowances may not result in sufficient allowances being available to cover baseline emissions. Therefore, sufficient allowances should be distributed to cover baseline emission levels. Perhaps, it would be reasonable to set a firm initial price to be paid by the recipients of these allowances (\$10/ton CO₂?) during the first phase of this program. Payments from the sale of allowances would be used for research and development of new and refined emission reduction technologies. As the program proceeds and the number of allowances decreases in the out years, an increasing portion of the allowances could be auctioned, eventually reaching 100% auctioning.

All sectors of the economy should be included. A portion of the CCS analysis should be directed at determining the sectors that would be most appropriate to include in the initial phases of the program.

Offsets are essential to make a market-based system work, especially in the initial stages of the program. They should be viewed as the lubricant that makes the system work smoothly, but they are not the purpose of the program. A system needs to be established to ensure that any offsets are real, verifiable, permanent, and that they are only counted once. There should be consistency throughout the country on what counts as an offset. There should be protections against “gaming” the system. In order to enable an offset system, we must have an established baseline emissions registry against which emissions reductions and offsets may be measured.

If any portion of the allowance allocation system is subject to an auction, there needs to be a “safety valve,” especially in the early phases of the program when price volatility may be endemic. The narrower the geographical scope of the program, the more important it is to have a safety valve. Just as we would not want to cause serious harm to Minnesota’s economy while the economies of neighboring states thrive, we would not want to cause serious harm to the American economy while the economies of other big GHG emitters thrive.

Any cap and trade program should be at least national in scope. If a narrower program is implemented, it should be considered a temporary program in place only until a national program is put in place and it should be well-integrated with any comparable regional or state programs.

Related Policies/Programs in Place

None.

Types(s) of GHG Reductions

Carbon dioxide from combustion emissions, with the potential for other global warming pollutants from industrial sources.

Estimated GHG Reductions and Net Costs or Cost Savings

TBD

- **Data Sources:** [TBD by CCS on TWG approval]
- **Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]
- **Key Assumptions:** [TBD, as needed on TWG approval]

Key Uncertainties

TBD – [as needed and approved by the TWGs]

Additional Benefits and Costs

TBD – [as needed and approved by the TWGs]

Feasibility Issues

TBD – [as needed and approved by the TWGs]

Status of Group Approval

Pending – [until MCCAG moves to final agreement at meeting #5 or #6]

Level of Group Support

TBD – [blank until MCCAG meeting #5]

Barriers to Consensus

TBD – [blank until final vote by the MCCAG]