



www.mtclimatechange.us

**Energy Supply Technical Working Group
Preliminary Draft Option Descriptions
February 15, 2007**

The table below lists the options that the Energy Supply TWG is tasked with developing and analyzing, based on the Energy Supply TWG call on 11/16, the CCAC meeting on 12/14, and the TWG meeting on January 25. Numbers in parentheses in the first column of the table below refer to original Option numbers from the Energy Supply “Catalog of State-Level GHG Reduction Policy Options” (which is available on http://www.mtclimatechange.us/Energy_Supply.cfm under the documents for the 11/16 call). Also included in the Table are the names of those who have volunteered to work with others to prepare descriptions and designs for one or more high-priority options.

Templates for descriptions of each of the Energy Supply Priority Options are provided following the Summary Table. In these descriptions, CCS facilitators have prepared rough draft text for the “Policy Description” section of each of these options, but please note that this text is intended only as a starting point, and changes and edits to the text to reflect the ideas and concerns of the TWG and the CCAC are desired and encouraged.

Volunteers for the options in “Bin A” met by teleconference on January 18, 2007 and discussed options ES-1 and ES-2, with some limited discussion for ES-4. Outcomes of that meeting are summarized with each relevant option. Some of these options, as well as other ES options, were discussed in the ES TWG call of 1/25/07. Changes made to the text below as a result of that call are highlighted in blue. Finally, further ideas were fleshed out during the “Bin B/D” call on February 8, 2007 – these are shown in yellow highlight.

Table X.
Energy Supply Technical Work Group
Summary List of Recommended High Priority Mitigation Options*

#	Name	Drafting Volunteers
Group A	Renewable Energy and Energy Efficiency	C. Magraw, M. Fitzpatrick, T. Gregori, DEQ, K. Thornton, B. Drummond, B. Buchanan, P. Judge
ES-1 (old 1.1)	Environmental portfolio standard (renewables and energy efficiency)	
ES-2 (old 1.5)	Renewable energy incentives (biomass, wind, solar, geothermal)	
ES-4 (old 2.1, 2.4)	Incentives and barrier removal (including interconnection rules and net metering arrangements) for combined heat and power (CHP) and clean distributed generation (DG)	
ES-7 (old 5.4)	Demand-side management (RCI TWG will take lead for analysis, with ES TWG providing review)	
Group B	Advanced fossil fuel and other technologies	C. Magraw, DEQ, P. Cartwright, B. Green, M. Lambrecht
ES-3 (old 1.8, 1.11, 3.5)	Research and development (R&D), including R&D for energy storage and advanced fossil fuel technologies	
ES-5 (old 3.1, 3.4)	Incentives for advanced fossil fuel generation and carbon capture and storage (CCS), including combined hydrogen and electricity production with carbon sequestration	
ES-6 (old 5.1)	Efficiency improvements and repowering of existing plants	

#	Name	Drafting Volunteers
Group C	Direct GHG policies	T. Gregori, C. Magraw, DEQ, M. Fitzpatrick, K. Thornton, B. Drummond, P. Judge
ES-8 (old 6.1)	CO ₂ tax (to be considered jointly with RCI TWG)	
ES-9 (old 6.2)	GHG cap and trade	
ES-10 (old 6.3)	Generation performance standards or GHG mitigation requirements for new (and/or existing) generation facilities, with/without GHG offsets	
Group D	Fossil fuel production and processing	C. Magraw, DEQ, M. Fitzpatrick, S. Dickenson P. Cartwright, B. Green, M. Lambrecht
ES-11 (old 8.1, 8.2, 8.4)	Methane and CO ₂ reduction in oil & gas operations, including fuel use and emissions reduction in venting and flaring	
ES-12 (new option)	GHG reduction in refinery operations, including in future coal-to-liquids refineries	
ES-13 (old 8.3)	CO ₂ capture and storage or reuse (CCSR) in O&G operations, including refineries and coal-to-liquids operations	

ES-1 Environmental portfolio standard (renewables and energy efficiency)

Policy Description

A renewable portfolio standard (RPS) is a requirement that utilities must supply a certain percentage of electricity from an eligible renewable energy source(s). For example, an RPS of 5% would mean that for every 100 kWh that a utility or a “load serving entity” (LSE) supplies to end users, 5 kWh must be generated from renewable resources. An environmental portfolio standard (EPS) expands that notion to include energy efficiency as an eligible resource as well, exchangeable or not depending on design. About 20 states currently have an RPS in place (including Montana), while a handful have implemented an EPS (Washington and Nevada among them). In some cases (as in Montana), utilities can also meet their RPS (or EPS) requirements by purchasing certificates from eligible energy projects, typically referred to as Renewable Energy Certificates (RECs) in the case of RPS policies.

Policy Design

The volunteer group discussed adding a higher renewable requirement for 2025 (current RPS levels do not increase after 2015) and including requirements for cost-effective end-use energy conservation.¹

- Goals: add new requirement of 25% renewable generation by 2025 (and 20% in 2020??)
 - Require each investor-owned utility (IOU) in the State to
 - By 2010, identify its achievable cost-effective energy conservation for the subsequent 10 years
 - Implement a plan to achieve 100% of its cost-effective energy conservation by 2025
 - Update its energy-efficiency assessment and plan regularly, possibly every two years.
 - Require each co-operative utility in the State to

¹ End-use energy conservation comprises changes at electricity customer sites to both (i) reduce energy used to provide services - such as heating, cooling, illumination, entertainment – through increased energy efficiency of appliances and other technologies and (ii) reduce demand for these services – for example, by turning off unused lights and televisions, turning down thermostats, etc.

- By 2015, identify its achievable cost-effective energy conservation for the subsequent 10 years
- Implement a plan to achieve 100% of its cost-effective energy conservation by 2025²
- Update its energy-efficiency assessment and plan regularly, possibly every two years.

○ **Extend energy efficiency requirements to natural gas utilities³.**

- **Timing:** see above
- **Parties Involved:**
- **Other:**

(The volunteer group discussed whether this option can be expanded to cover rural electric cooperatives. Several volunteers supported expansion to co-operatives, but there were concerns as to how an RPS could be enforced (since co-operatives are not regulated by the Public Service Commission). Further discussion is needed.)

Implementation Mechanisms

Volunteer group had the following concerns, which will need to be discussed further:

- Need a way to make sure that the utilities are not punished, rather rewarded, for pursuing energy efficiency [CCS note: “decoupling” of utility revenues from the level of utility sales is a strategy for removing this barrier that has been proposed, and in some cases implemented, in other states]
- May need special consideration for utilities that have no growth, and hold long-term contracts that lock the utilities in to purchases of specific power supply resources
- May need to define what is “cost-effective”
- Consider adjustment of cost cap in existing bill, and

² A reference to a similarly-structured portfolio standard recently enacted in Washington State reads as follows “During the last election, Washington State passed Initiative I-937. This initiative imposes targets for energy conservation and use of eligible renewable resources on the state's electric utilities that serve more than 25,000 customers. Seventeen of Washington's 62 electrical utilities currently qualify, and they account for about 80 percent of the state's load.” An issue brief prepared by BPA that is a basic overview of the initiative is available at http://www.bpa.gov/corporate/pubs/issue_briefs/06/ib112906.pdf

³ A TWG member reported that the Montana Public Service Commission is considering an increase in Universal System Benefit charges for natural gas utilities. Much of the increase would go toward low-income weatherization (TWG members and others—please confirm).

- consider possibility of different standards for cost cap to apply to IOUs and co-operatives

Related Policies/Programs in Place

Montana's renewables portfolio standard (RPS), enacted in April 2005 as part of the Montana Renewable Power Production and Rural Economic Development Act, requires public utilities to obtain a percentage of their retail electricity sales from eligible renewable resources according to the following schedule:

- 5% in 2008 through 2009;
- 10% in 2010 through 2014; and
- 15% in 2015 and thereafter.

Eligible renewable resources include wind, solar, geothermal, existing hydroelectric projects (10 megawatts or less), landfill or farm-based methane gas, wastewater-treatment gas, low-emission, nontoxic biomass, and fuel cells where hydrogen is produced with renewable fuels. Facilities must begin operation after January 1, 2005, and must either (1) be located in Montana or (2) be in another state and delivering electricity to Montana.

Utilities can meet the standard by entering into long-term purchase contracts for electricity bundled with renewable-energy credits (RECs), by purchasing the RECs separately, or a combination of both. The law includes cost caps that limit the additional cost utilities must pay for renewable energy and allows cost recovery from ratepayers for contracts pre-approved by the Montana Public Service Commission (PSC). RECs sold through voluntary utility green power programs may not be used for compliance. The PSC will develop rules to implement the RPS by June 1, 2006.

The RPS includes specific procurement requirements to stimulate rural economic development. For example, the utilities must buy a portion of the required renewable energy (electricity + credits) from community renewable-energy projects with a maximum individual nameplate capacity of 5 megawatts (MW). These include projects in which local owners have a controlling interest and that are interconnected on the utility's side of the meter. In 2015, these projects must provide a total of at least 75 MW of renewable-energy capacity. In addition, public utilities must enter into contracts that include a preference for Montana workers.⁴ [text expanded based on suggestion from TWG member]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

4

<http://www.dsireusa.org/library/includes/tabsrch.cfm?state=MT&type=RPS&back=regtab&Sector=S&CurrentPageID=7&EE=1&RE=1>

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-2 Renewable energy incentives (biomass, wind, solar, geothermal)

Policy Description

This policy option reflects financial incentives to encourage investment in renewable energy sources by businesses that sell power commercially (smaller-scale renewable sources are covered in ES-4). These financial incentives for renewables include (1) direct subsidies for purchasing/selling distributed renewable technologies given to the buyer/seller; (2) tax credits or exemptions for purchasing distributed renewable technologies given to the buyer/seller, (3) feed-in tariffs, which provide direct payments to renewable generators for each kWh of electricity generated from a qualifying renewable facility; (4) tax credits for each kWh generated from a qualifying renewable facility; (5) regulatory policies that provide incentives and/or assurance of cost recovery for utilities that invest in customer-owned renewable energy systems. The policy could also include R&D funding to support development of distributed renewable technologies.

Policy Design

This option is designed to provide additional support to the renewable portion of the renewable and energy-efficiency portfolio standard in ES-1 by providing incentives for utilities and other potential builders/developers/owners of renewable energy supply facilities and local manufacturers of renewable energy technologies. The goal of this option is to increase the supply of renewable energy and reduce its cost. This option is designed to support facilities that sell power commercially (as opposed to, for example, consumer-sited facilities that sell power to the grid via net metering—the latter facilities are covered under ES-4).

- **Goals:** Renewable generation goals are same as ES-1
- **Timing:** Implement in a time frame that best supports ES-1. Since renewable goals for ES-1 will start in 2008, incentives are needed as soon as practicable. Changes to legislation will need to wait until end of 2009.
- **Parties Involved:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

Could include the following:

- Tax policies, production tax credits (federal), PURPA requirements (Montana has mini-PURPA law).
- Recent change in property tax specification for wind projects could be expanded to other renewable forms of generation as appropriate.
- Incentives for locating manufacturing plants in the state for renewable generation, with potential sunset provisions as industries mature in Montana
- Target incentives to community wind projects

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-3 Research and development (R&D), including R&D for energy storage and advanced fossil fuel technologies

Policy Description

R&D funding can be targeted toward a particular technology or group of technologies as part of a state program with a mission to build an industry around that technology in the state and/or to set the stage for adoption of the technology for use in the state. For example, an agency can be established with a mission to help develop and deploy energy storage technologies. R&D funding can also be made available to any renewable or other advanced technology through an open bidding procedure (i.e., driven by bids received rather than by a focused strategy to develop a particular technology). Funding can also be given for demonstration projects to help commercialize technologies that have already been developed but are not yet in widespread use. Funding could be provided to increase collaboration between existing institutions for R&D on technologies.

Policy Design

The following are initial ideas for discussion:

Seek partners for, and aim to attract, federal R&D funding for high-altitude IGCC demonstration project in Montana as authorized by the Energy Policy Act of 2005. Consider FutureGen process as a potential source of lessons on how to develop and succeed at funding a demonstration project.

Establish emerging energy technology program in Montana university system, attract federal R&D funding, grow technology expertise, issue advanced degrees, and aim for resulting “multiplier” benefits. Consider elements of the Big Sky Sequestration Partnership as a model. Target, among other technologies, compressed air storage to increase penetration of intermittent renewable energy technologies.

Create a small pool of state funding for R&D efforts. Even though overall volume would be limited, it could have important symbolic value and help leverage larger amounts of external funding. Consider such funding for the university program and/or the Big Sky Sequestration partnership.

TWG member suggestion subsequent to call: Increase coal tax to fund research and development programs (per above) in clean energy technologies, including clean coal, sequestration, and compressed air storage, among others.

- **Goals:**
- **Timing:**
- **Parties Involved:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-4 Incentives and barrier removal (including interconnection rules and net metering arrangements) for combined heat and power (CHP) and clean distributed generation (DG)

Policy Description

This option is focused on CHP and DG located on-site at consumer facilities that do not sell power commercially. There are numerous barriers to CHP and clean DG, 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 include: improved interconnection policies; improved rates and fees policies; streamlined permitting; recognition of the emission reduction value provided by CHP and clean DG; financing packages and bonding programs; power procurement policies; education and outreach; etc.

Financial incentives for combined heat and power (CHP) and clean distributed generation systems could include: (1) direct subsidies for purchasing/selling systems given to the buyer/seller; (2) tax credits or exemptions for purchasing/selling systems given to the buyer/seller; (3) tax credits or exemptions for operating systems; (4) feed-in tariff, which is a direct payment to owners for each kWh of electricity or BTU of heat generated from a qualifying system; and (5) tax credits for each kWh or BTU generated from a qualifying system.

Policy Design

Key elements of design for this CHP/DG incentives and barrier removal policy include⁵:

⁵ Two papers on the topic of reducing barriers to CHP and DG in Montana have been referenced in TWG discussions. These are [Reducing Market Barriers to Small-Scale Distributed Generation in Montana](#), and [Reducing Regulatory Barriers to Small-Scale Distributed Generation in Montana](#), both dated May, 2004, and prepared for the Montana Department of Environmental Quality by Thomas Yoder and Brian Gurney of the Center for Applied Economic Research Montana State University – Billings.

- Create standardized interconnection rules for CHP and DG systems to increase investor and developer certainty and predictability and reduce transaction costs.⁶
- Consider offering different interconnection and net metering rules for smaller (residential-size, 5-10 kW) systems, as it might be easier for cooperatives to agree on a standard for these systems than for larger systems.
- Remove barriers to the adoption of CHP and DG systems by customers of Montana utilities, including electric coops, while taking into account the potential impact that net metering may have on cross-subsidies between consumers.
- Increase incentives for installing CHP and DG systems. (Note that a bill is currently before the legislature that would double incentives for residential systems.)
- Create a rotating fund for loans to defray some of initial costs of CHP and DG systems. Such a fund could be modeled in part on an existing loan program funded by air pollution non-compliance fees.⁷

[Insert text as appropriate]

- **Goals:**
- **Timing:**
- **Parties Involved:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

⁶ The Montana Public Service Commission is currently considering interconnection rules in accordance with EPAct 2005 (Energy Policy Act of 2005) requirements.

⁷ Another reference to this option noted by the TWG is Distributed Energy Generation, Benefits, Barriers and Best Practices, Report to the 60th Legislature Energy and Telecommunications Interim Committee, dated September 2006, prepared by Casey A. Barrs, and available as [http://leg.mt.gov/content/committees/interim/2005_2006/energy_telecom/staff_reports/DEG_consolidated_8-21-06%20\(2\).pdf](http://leg.mt.gov/content/committees/interim/2005_2006/energy_telecom/staff_reports/DEG_consolidated_8-21-06%20(2).pdf).

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-5 Incentives for advanced fossil fuel generation and carbon capture and storage (CCS), including combined hydrogen and electricity production with geological carbon sequestration

Policy Description

Advanced fossil technologies produce few CO₂ emissions per kWh as the result of more efficient generating technologies (supercritical coal, integrated gasification combined cycle, etc.) and/or carbon capture and sequestration or reuse (CCSR), either before or after fuel combustion.

Policies for advanced fossil technologies can include regulations or incentives to promote advanced technologies for new coal or natural gas plants. A technology regulation might require that new coal plants achieve a certain CO₂ emission rate. Incentives may be in the form of direct subsidies, assistance in securing financing and/or off-take agreements, or guarantee cost recovery for prudently incurred utility investments.

Policy Design

The following are some initial ideas to begin the discussion:

- Provide tax exemptions for CCSR technologies/equipment (as in SB 105 or in Governor's tax proposal).
- Enable eminent domain for pipelines to transport CO₂ (see HB 24).
- Direct DEQ or direct the State to enter into a regional collaborative effort to develop standards and protocols for CCSR.
- Establish moratorium on pulverized / fluidized-bed coal plants until post-combustion CCS is demonstrated to be technically and economically feasible. Establish moratorium period of 5-10 years. *(Note: During the volunteer call, there was disagreement as to the desirability of this proposal).*
- Create requirement that IGCC plants must sequester carbon within [3-5] years of initial operation.
- Direct state to assume liability for carbon capture and storage.
 - **Goals:**
 - **Timing:**

- **Parties Involved:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-6 Efficiency improvements and repowering of existing plants

Policy Description

Efficiency improvements refer to increasing generation efficiency at power stations through incremental improvements at existing plants (e.g., more efficient boilers and turbines, improved control systems, or combined cycle technology). Repowering existing power plants refers to switching to lower or zero emitting fuels at existing plants, or for new capacity additions. This includes co-firing biomass at coal plants fuels or the use of natural gas in place of coal or oil. Policies to encourage efficiency improvements and repowering of existing plants could include incentives or regulations as described in ES-5 above, with adjustments for financing opportunities and emission rates of existing plants.

Policy Design

The volunteer group suggests that this option be made a lower priority for this process. Not clear whether there is much potential here.

- **Goals:**
- **Timing:**
- **Parties Involved:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

- **Data Sources:**
- **Quantification Methods:**

- **Key Assumptions:**

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-7 Demand-side management

(RCI TWG will take lead for analysis, with ES TWG providing review)

ES-8 CO₂ tax

(to be considered jointly with RCI TWG)

Policy Description

A CO₂ tax would be a tax on each ton of CO₂ emitted from an emissions source covered by the tax. A CO₂ tax could be imposed upstream based on carbon content of fuels (e.g. fossil fuel suppliers) or at the point of combustion and emission (e.g. typically large point sources such as power plants or refineries). Taxed entities would pass some or all of the cost on to consumers, change production to lower emissions, or a combination of the two. As the suppliers respond to the tax, consumers would see the implicit cost of CO₂ emissions in products and services, and would adjust their behavior to purchase substitute goods and services that result in lower CO₂ emissions. CO₂ tax revenue could go completely to state revenue and be used in a variety of ways such as income tax reduction or policies and programs to assist with CO₂ reductions. CO₂ tax revenue can also be directed to helping the competitiveness of industries or assisting communities most affected by the tax.

Policy Design

A CO₂ tax is an effective way to signal to the market the need to reduce GHG emissions across sources and consumers. Options for applying a CO₂ tax include implementing a tax on a state, regional, or national level.⁸ The ideal scale for implementing a CO₂ tax is the national level. The state should still consider the possibility of a state tax, with a provision such that if a national tax is put in place, the Montana tax would not be additive to the federal tax. A Montana CO₂ tax could be implemented so as to be “revenue neutral”, that is, with the proceeds used to cover other State outlays, so that the average resident pays no more tax in total than before the CO₂ tax was put in place.

(Note: The TWG is not fully agreed on how to proceed with this option. Note also that it is under consideration by the RCII TWG and that a combined volunteer group is being considered to explore this option as well as the cap and trade option below.)

- **Goals:**
- **Timing:**
- **Parties Involved:**

⁸ At present, one municipality in the US—Boulder Colorado—is implementing a CO₂ tax, and CO₂ taxes are under jurisdictions are under consideration.

- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

Mechanisms for implementing a carbon tax might include:

- Offsets on income tax returns to help make the tax “revenue neutral”
- Different tax configurations might be implemented
- A carbon tax would likely be implemented at the fuel supplier level although other configurations are possible.

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

Benefits

Carbon dioxide emissions reductions will typically be accompanied by reductions in the emissions of other air pollutants.

Costs

There is a concern that Montana-only CO₂ tax would put at a competitive disadvantage for attracting and retaining businesses.

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-9 GHG cap and trade

Policy Description

A cap and trade system is a market mechanism in which 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 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.

For every ton of CO₂ released, an emitter must hold an allowance. Therefore, the number of allowances issued or allocated is, in effect, the cap. The government can give allowances away for free, auction them, or some combination of the two. Participants can range from a small group within a single sector to the entire economy. The compliance obligation can be imposed “upstream” (at the fuel extraction or import level) or “downstream” at points of fuel consumption.

Among the important considerations with respect to a cap and trade program are: the sources and sectors to which it would apply; the level and timing of the cap; how allowances would be distributed (e.g., whether load-based or generation-based, how new market entrants are accommodated, how leakage is addressed, etc.); what if any offsets would be allowed; over what region the program would be implemented (e.g., nationally, regionally, etc.); and whether compliance with the cap could be achieved given leakage from non participating states and coal-fired generation located on tribal lands that would not be subject to the state-imposed cap. Other issues to consider include which GHGs are covered; whether there is linkage to other trading programs; banking and borrowing; early reduction credit; what if any incentive opportunities may be included; use of any revenue accrued from permit auctions; and provisions for encouraging energy efficiency.

The principal example of a GHG cap-and-trade system in the US today is the Northeast States’ Regional Greenhouse Gas Initiative: <http://www.rggi.org/>

Policy Design

Cap and Trade options should be explored on a regional or national basis⁹

Montana should ask its congressional delegation to support cap and trade nationwide. This would include assuring that regional or national Cap and Trade systems included the use of sequestration credits.

Montana should also consider working with regional states—possibly including West Coast states and/or Intermountain states—to assemble a regional cap and trade system. Such a system should

- Cover electricity generation and other large point sources
- (Possibly) Credit all relevant GHG emissions reduction and sequestration measures, including carbon capture and storage. *(Note that the TWG is not agreed on this point. The maturity of geological sequestration technology as well as monitoring was questioned.)*

[Insert text as appropriate]

- **Goals:**
- **Timing:**
- **Parties Involved:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

- **Data Sources:**
- **Quantification Methods:**

⁹ A model rule for application of a Cap and Trade system for the East Coast states is currently in place (www.rggi.org). Issues associated with Cap and Trade systems include distribution of allowances.

- **Key Assumptions:**

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-10 Generation performance standards or GHG mitigation requirements for new (and/or existing) generation facilities, with/without GHG offsets

Policy Description

A generation performance standard (GPS) is a mandate that requires that load serving entities (LSE) to acquire electricity (e.g. in CA), or that power plant developers to build and operate new generation (e.g. in OR and WA), with an emission rate (e.g. X lbs CO₂/MWh) below a specified mandatory standard. In some cases, GHG offsets or credits can be used for compliance (e.g. OR and WA). GHG offsets are GHG emission savings from project-based activities in sectors or regions not covered by the standard or regulations, which typically need to meet specific criteria laid out in the regulation.

A market-based variation of a GPS would allow generators with emission rates lower than the GPS to sell their extra “credits” to with generators with emission rates higher than the GPS.

A third variation of a GPS is to establish the standard and allocate allowances based on that standard every year. In this variation, as electricity generation increases, plants would receive more permits. Utilities could trade permits in order to achieve the standard, but there would be no fixed cap on emissions. This variation provides a financial incentive (via the trading) for generators to reduce emissions so that they can sell unneeded permits to generators who have high emissions.

Policy Design

A performance standard should be applied to new generation facilities in Montana¹⁰. This standard should *(not)* allow use of offsets *(no agreement in the TWG)*. *A TWG member noted that the level of the performance standard, perhaps eventually including offsets should be determined based on global needs to reduce GHG emissions, as determined, for example, through the IPCC (Intergovernmental Panel on Climate Change) process (no agreement in the TWG).*

Note that this option will complement and work with options ES-8 and ES-9.

[Insert text as appropriate]

¹⁰ A bill before the Montana Legislature follows the performance standards approach recently implemented in Oregon. The Oregon approach has been voluntarily adopted in the permitting of at least one recently-proposed generation facility in Montana.

- **Goals:**
- **Timing:**
- **Parties Involved:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-11 Methane and CO₂ reduction in oil & gas operations, including fuel use and emissions reduction in venting and flaring

Policy Description

There are a number of ways in which methane (CH₄) and CO₂ emissions in the oil and gas industry can be reduced. Natural gas consists primarily of methane; therefore, any leaks during production, processing, and transportation/ distribution should be addressed. In addition to reducing GHG emissions, stopping these leaks may be economically beneficial because it can prevent the waste of valuable product.

The EPA Natural Gas STAR program offers numerous methods of preventing leaks. These methods, called Best Management Practices (BMPs) and Partnership Reduction Opportunities (PROs), are divided by industry sub sector: production, processing, and transportation/ distribution. Among the practices recommended are *preventive maintenance*: (improving the overall efficiency of the gas production and distribution system), *reducing flashing losses* (*releases when pressure drops at storage tanks, wells, compressor stations, or gas plants*), and changing and replacing parts and devices to reduce leaks and improve efficiency, among others..

There are a number of ways in which CO₂ emissions in the oil and gas industry can be reduced by improving energy efficiency , including (1) new efficient compressors, (2) optimize gas flow to improve compressor efficiency, (3) improve performance of compressor cylinder ends, (4) capture compressor waste heat, (5) replace compressor driver engines, and (6) waste heat recovery boilers.

Regulations, incentives, and/or support programs can be applied to achieve these reductions (see ES-5 for some examples).

Policy Design

[Insert text as appropriate]

- **Goals:**
- **Timing:**
- **Parties Involved:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-12 GHG reduction in refinery operations, including in future coal-to-liquids refineries

Policy Description

There are a number of ways in which methane and CO₂ emissions can be reduced in the production of liquid fuels, at oil refineries or a coal-to-liquids plant. These options include various efficiency measures including enhanced combined heat and power along with carbon capture and storage. Coal-to-liquids (CTL) plants are energy-intensive, and produce about 10 times more CO₂ emissions as conventional oil refineries in order to produce liquid fuels; however, with carbon capture and storage (and co-production of electricity and liquid fuels) such emissions can be substantially reduced.¹¹ Regulations, incentives, and/or support programs can be applied to achieve these reductions (see ES-5 for some examples).

Policy Design

The following are some initial ideas to begin the discussion (*there was limited discussion and no consensus on these ideas during the Volunteer call*):

- CTL facilities should be required to capture and store CO₂ from the start of operations.
- CTL facilities should be required to co-fire some fraction of biomass.
- CTL facilities should not be permitted to operate in Montana.
 - **Goals:**
 - **Timing:**
 - **Parties Involved:**
 - **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

¹¹ International Energy Agency, 2006. *Energy Technology Perspectives*. Well-to-wheel GHG emissions from coal liquids are approximately twice those of conventional oil products. Cogeneration and carbon capture and storage can reduce those emissions to levels similar to, or slightly below, those of conventional oil products.

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]

ES-13 CO₂ capture and storage or reuse (CCSR) in O&G operations, including refineries and coal-to-liquids operations

Policy Description

Carbon capture and storage or reuse (CCSR) involves capturing carbon dioxide and either (1) sequestering it permanently in a geologically sound reservoir or (2) reusing it to aid in oil and gas extraction or as a feedstock for industrial processes, and perhaps eventually as a feedstock that when combined with water can be reformed into liquid fuels. Where excess CO₂ is found in some natural gas reservoirs -- pipeline natural gas can contain only up to 2.5% CO₂ by volume, and some gas fields have a higher concentration – it is typically vented to the atmosphere in gas processing plants. Carbon can also be captured in the process of gasifying coal to liquid fuels. This process is well established in the chemical industry and forms the basis for Integrated Gasification Combined Cycle electricity generating plants.

Policies to encourage CCSR could include a state agency or department within an existing agency tasked with promoting CCSR, evaluation studies to identify geologically sound reservoirs, R&D funding to improve CCSR technologies, financial incentives to capture and store carbon or to capture and reuse it, and/or mandates – coupled with technical feasibility and cost and investment recovery mechanisms, if appropriate – to capture and store carbon or capture and reuse it.

Policy Design

See initial ideas for further discussion listed under the previous option, ES-12.

- **Goals:**
- **Timing:**
- **Parties Involved:**
- **Other:** [Insert text if/as appropriate]

Implementation Mechanisms

[Insert text as appropriate]

Related Policies/Programs in Place

[Insert text as appropriate]

Types(s) of GHG Reductions

[Insert text as appropriate]

Estimated GHG Reductions and Costs (or Cost Savings)

[Insert text as appropriate]

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

Key Uncertainties

[Insert text as appropriate]

Additional Benefits and Costs

[Insert text as appropriate]

Feasibility Issues

[Insert text as appropriate]

Status of Group Approval

[Pending or Completed]

Level of Group Support

[Insert text as appropriate]

Barriers to Consensus

[Insert text as appropriate]