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Energy Supply Technical Work Group

Summary List of Recommended High Priority Mitigation Options

	Mitigation Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Status of Option
		2010	2020	Total 2007-2020			
Group A	**Renewable Energy and Energy Efficiency**						
ES-1	Environmental Portfolio Standard (Renewables and Energy Efficiency)	*Not Quantified*					Pending
ES-2	Renewable Energy Incentives (Biomass, Wind, Solar, Geothermal)	*Not Quantified*					Pending
ES-4	Incentives and Barrier Removal (Including Interconnection Rules and Net Metering Arrangements) for Combined Heat and Power (CHP) and Clean Distributed Generation (DG)	*Not Quantified*					Pending
ES-7	Demand-Side Management (RCI TWG will take lead for analysis, with ES TWG providing review)	*Not Quantified*					Pending
Group B	**Advanced Fossil Fuel and Other Technologies**						
ES-3	Research and Development (R&D), Including R&D for Energy Storage and Advanced Fossil Fuel Technologies	*Not Quantified*					Pending
ES-5	Incentives for Advanced Fossil Fuel Generation and Carbon Capture and Storage (CCS), Including Combined Hydrogen and Electricity Production with Carbon Sequestration	*Not Quantified*					Pending

	Mitigation Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Status of Option
		2010	2020	Total 2007-2020			
ES-6	Efficiency Improvements and Repowering of Existing Plants	*Not Quantified*					Pending
Group C	**Direct GHG Policies**						
ES-8	CO_2 Tax (to be considered jointly with RCI TWG)	*Not Quantified*					Pending
ES-9	GHG Cap-and-Trade	*Not Quantified*					Pending
ES-10	Generation Performance Standards or GHG Mitigation Requirements for New (and/or Existing) Generation Facilities, with/without GHG Offsets	*Not Quantified*					Pending
Group D	**Fossil Fuel Production and Processing**						
ES-11	Methane and CO_2 Reduction in Oil and Gas Operations, Including Fuel Use and Emissions Reduction in Venting and Flaring	*Not Quantified*					Pending
ES-12	GHG Reduction in Refinery Operations, Including in Future Coal-to-Liquids Refineries	*Not Quantified*					Pending
ES-13	CO_2 Capture and Storage or Reuse (CCSR) in O&G Operations, Including Refineries and Coal-to-Liquids Operations	*Not Quantified*					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 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 kilowatt hours (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:

- Increase the renewable requirement to 20% in 2020 and 25% by 2025. *(include coops?)*
- Require each investor and publicly-owned electric and gas utility 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.

Timing: See above.

Parties Involved: Under Development.

Other: None Cited.

Implementation Mechanisms

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

[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.

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

The TWG noted concerns as to how an RPS could be enforced electric cooperatives (since co-operatives are not regulated by the Public Service Commission). Further discussion regarding enforcement mechanisms for cooperatives is needed.

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.
- 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. [2] [text expanded based on suggestion from TWG member]

As part of its 1997 restructuring legislation, Montana established its Universal System Benefits Program (USBP).[3] Beginning January 1, 1999, all electric utilities began annually contributing 2.4% of their 1995 revenues to the USBP. This is an amount equivalent to $14.9 million annually, collected at a rate of 1.1 mills per kilowatt-hour. The funds support energy efficiency, renewable-energy resources, low-income energy assistance, and renewable-energy research and development. The distribution of the funds among these programs for NorthWestern Energy (formerly Montana Power Company), the first utility to submit a plan for implementation, was established by the Montana Public Service Commission (PSC) in February 1999:

- Large Customer Rebate – $2.5 million or 29%.
- Market Transformation – $1.1 million or 13%.
- Local Conservation – $1.8 million or 21%.
- Low-Income Assistance (includes energy efficiency measures) – $1.8 million or 21%.
- Renewable-Energy Resources – $1.1 million or 13%.
- Research and Development – $225,000 or 3%.

Already, NorthWestern Energy programs have lead to the installation of PV on residences, schools fire stations and commercial facilities throughout the state. NorthWestern Energy funding is also going toward buy-downs for central wind generation facilities. Electric cooperatives and Montana-Dakota Utilities Co. also contribute to the USBP.

Montana's USBP is effective until December 31, 2009, when it is scheduled to "sunset." Utilities may spend all or a portion of the funds on internal programs, or they may opt to contract or fund these programs externally. Large industrial customers with average monthly demand loads exceeding 1,000 kilowatts also fall under the law and may choose to "self-direct" the funds that would normally go to the USBP to internal energy programs.[4]

At present, some utilities, including NorthWestern, have shifted some of what were previously USB funds spent on energy efficiency into their rate base, and are thus supporting energy-efficiency programs in the same manner that electricity supply resources are supported.

Types(s) of GHG Reductions

Under Development.

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

[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).*

[4] Database of State Incentives for Renewables and Efficiency, at http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=MT01R&state=MT&CurrentPageID=1&RE=1&EE=1.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

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; and (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). It should also provide incentives for advanced wind energy storage.

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: Under Development.

Other: None Cited.

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.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

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

This policy could include efforts to:

- 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. (TWG member notes that demonstration projects are typically located nearby to active R&D programs.)
- 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. Choose areas for R&D that match well with the Montana resource base. Target, among other technologies, carbon sequestration technologies, compressed air, and other storage technologies to increase penetration of intermittent renewable energy (including wind power) and direct carbon fuel cells.
- 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.
- Seek industry participation and contributions (e.g. licensing fees) to help pay for R&D activities.
- Making available the results of R&D and pilot programs to inform industrial development.

A TWG member also sent the following for consideration but it has not been discussed by the TWG:

- *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: Under Development.

Timing: Under Development.

Parties Involved: Under Development.

Other: None Cited.

Implementation Mechanisms

Under Development.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

As it is difficult to predict the direct impact of R&D programs on greenhouse gas emissions, the emissions reduction resulting from this option will not be quantified, though a rough estimate of option cost is desirable.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD

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 include:[5]

- 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.

[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. These are available on the MT Energy Supply TWG website, at http://www.mtclimatechange.us/Energy_Supply.cfm.

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

- 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]
- Encourage the development of a set of state-issued licenses for renewable energy system technicians and installers. These licenses would be separate from existing electricity and plumbing trade licenses, and would be tailored to the renewable energy industry, covering, for example, DC electricity wiring and roofing skills related to installation of solar PV, solar hot water, and other renewable energy systems, as well as safety concerns related to system installation. The State licensing of renewable energy technicians/installers will increase consumer confidence in renewable energy contractors.

Goals: The CCS team will investigate studies on CHP and DG potential in the state of Montana as an input to the process.

Timing: Under Development.

Parties Involved: Under Development.

Other: None Cited.

Implementation Mechanisms

None Cited.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

[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 at http://leg.mt.gov/content/committees/interim/2005_2006/energy_telecom/staff_reports/DEG_consolidated_8-21-06%20(2).pdf.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

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 CO_2 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 CO_2 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

- This policy would: Direct DEQ or direct the State to enter into a regional collaborative effort to develop standards and protocols for CCSR.

There is ongoing discussion in the TWG (no agreement) regarding the desirability of each of the following:

- Provide tax exemptions for CCSR technologies/equipment (as in SB 105 or in Governor's tax proposal). (*One TWG member notes the speculative nature of this technology will require tax incentives, others note that tax policy is only one of government's tools in providing incentives.)*
- Enable eminent domain for pipelines to transport CO_2 (see HB 24). *(One TWG member suggests implementation certainty for the full pipeline should be established prior to enabling eminent domain; another TWG member suggests a legal framework for CCS is needed prior to enabling eminent domain proceedings.)*
- Establish moratorium on pulverized/fluidized-bed coal plants until post-combustion CCS is demonstrated to be technically and economically feasible, or establish moratorium period of 5-10 years.
- 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. *(A TWG member suggests that a liability fund be created with payments by CCS users, similar to Superfund, rather than leaving full liability to the State.)*

Goals: Under Development.

Timing: Under Development.

Parties involved: Under Development.

Other: None Cited.

Implementation Mechanisms

None Cited.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

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 TWG suggests that this option be made a lower priority for the time being, pending further consideration of the potential for the CCAC process to contribute to efficiency improvements. A TWG member noted that generation owners and operators are constantly reviewing options for improving the efficiency of generation, and suggested that State actions might do little to provide further incentives for (or reduce disincentives for) investments in repowering.

Goals: Under Development.

Timing: Under Development.

Parties involved: Under Development.

Other: None Cited.

Implementation Mechanisms

None Cited.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

ES-7 Demand-Side Management

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

The option developed by the RCII TWG, RCII-1, uses the same policy design as the energy efficiency portion of ES-1 (see above).

ES-8 CO_2 tax

(To be considered jointly with RCI TWG.)

Policy Description

A CO_2 tax would be a tax on each ton of CO_2 emitted from an emissions source covered by the tax. A CO_2 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 CO_2 emissions in products and services, and would adjust their behavior to purchase substitute goods and services that result in lower CO_2 emissions. CO_2 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 CO_2 reductions. CO_2 tax revenue can also be directed to helping the competitiveness of industries or assisting communities most affected by the tax.

Policy Design

The TWG recommends an analysis that compares alternative national CO_2 tax and cap-and-trade configurations.

The TWG feels that the appropriate scale for implementing a CO_2 tax would be at the national level. One design element that the TWG may consider is a recommendation that Montana's representatives in the US Congress should be encouraged to work with colleagues toward establishment of a national carbon tax.

Some TWG members also suggest consideration of a small tax (such as in Boulder Colorado) to provide funding for some of the CCAC's strategies (e.g., education). *Note this may be considered under the cross-cutting TWG.*

(Note: Note that carbon tax 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: Under Development.

Timing: Under Development.

Parties Involved: Under Development.

Other: None Cited.

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.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

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 a Montana-only CO_2 tax would put the state at a competitive disadvantage for attracting and retaining businesses.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

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 CO_2). 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 CO_2 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

As noted under ES-8, the TWG recommends analysis of alternative national CO_2 tax and cap-and-trade configurations. One design element that the TWG may consider is a recommendation that Montana should ask its congressional delegation to support cap-and-trade (or CO_2 tax, per outcome of further deliberations) nationwide.

Cap-and-trade options should be explored on a regional basis (e.g. ,with West Coast and/or Intermountain states) as well, but not on a Montana-alone basis.[8] Such a system should:

- Cover electricity generation and other large point sources.

[8] 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.

- (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.)*

Goals: Under Development.

Timing: Under Development.

Parties Involved: Under Development.

Other: None Cited.

Implementation Mechanisms

None Cited.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

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 build and operate new generation (e.g., in OR and WA), with an emission rate (e.g., X lbs CO_2/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 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 located in Montana, as well as to imported power.[9] 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.

Goals: The TWG will explore specific legislation and regulation options in other states (e.g. WA) and aim to line up MT policy as closely as possible with those in use or proposed in other states.

Timing: Under Development.

Parties involved: Under Development.

Other: None Cited.

[9] 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.

Implementation Mechanisms

None Cited.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

ES-11 Methane and CO_2 Reduction in Oil and Gas Operations, Including Fuel Use and Emissions Reduction in Venting and Flaring

Policy Description

There are a number of ways in which methane (CH_4) and CO_2 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 CO_2 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

Discussion of this policy is quite preliminary:

- Assist or require natural gas companies in the State to participate in EPA's Natural Gas Star program, and provide enforcement and verification of participation. Consider whether participation by smaller companies would be a significant burden and possibly provide incentives if needed. Apply penalties (fines) to companies whose equipment does not comply. (TWG member will be following up to assess current utility participation in Gas STAR.).[10]

Goals: Under Development.

Timing: Under Development.

Parties involved: Under Development.

[10] It was noted that technologies for detecting pipeline leaks are becoming available, though they are still quite expensive.

Other: None Cited.

Implementation Mechanisms

None Cited.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

ES-12 GHG Reduction in Refinery Operations, Including in Future Coal-to-Liquids Refineries

Policy Description

There are a number of ways in which CH_4 and CO_2 emissions can be reduced in the production of liquid fuels at oil refineries or coal-to-liquids plants. 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 CO_2 emissions than 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 initial ideas are still under discussion (*no agreement yet)*:

- CTL facilities should be required to capture and store CO_2 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.
- Any CTL plant should also be a poly-generation plant—should produce electricity along with fuel products.
- Improve maintenance at oil refineries and ensure that best practice is being followed (cross-cut with safety issues).

Goals: Under Development.

Timing: Under Development.

Parties involved: Under Development.

Other: None Cited.

Implementation Mechanisms

None Cited.

Related Policies/Programs in Place

Under Development.

[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.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

ES-13 CO_2 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 CO_2 is found in some natural gas reservoirs – pipeline natural gas can contain only up to 2.5% CO_2 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 (IGCC) 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

The TWG suggests addressing oil and gas operations with incentives and/or requirements related to carbon capture and storage or reuse in a manner yet to be determined. CCSR requirements for oil and gas operations should be consistent with those for the electricity generation sector. See ES-5 and ES-12.

Goals: Under Development.

Timing: Under Development.

Parties involved: Under Development.

Other: None Cited.

Implementation Mechanisms

None Cited.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

Under Development.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending

Level of Group Support

TBD

Barriers to Consensus

TBD