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Catalog of State-Level GHG Reduction Policy Options Residential, Commercial, [Government, and] and Industrial

Prepared by The Center for Climate Strategies (CCS) for the Montana Climate Change Advisory Committee (CCAC) and its Scientific Advisory Panel (SAP) and Technical Work Groups (TWGs) based on actions undertaken or considered by all US states.

Key to Future Rankings of Options in the Table that Follows:

Potential Emission Reductions <u>1/</u>	Potential Cost or Cost Savings <u>1/ 2/</u>
High (H): At least 0.5 Million Metric Tons (MMT) carbon dioxide equivalent (CO ₂ e) per year by 2020 (~1% of current MT emissions)	High (H): \$50 per Metric Ton CO ₂ e (MTCO ₂ e) or above
Medium (M): From 0.1 to 0.5 MMT CO ₂ e per year by 2020	Medium (M): \$5-50/MTCO ₂ e
Low (L): Less than 0.1 MMT CO ₂ e per year by 2020	Low (L): Less than \$5/MTCO ₂ e
Uncertain (U): Not able to estimate at this time	Uncertain (U): Not able to estimate at this time
<p><u>1/</u> Several measures may overlap in terms of emissions reductions and/or cost impacts. Estimates assume measures would be implemented independently from other measures.</p> <p><u>2/</u> Costs are denoted by a positive number. Cost savings (i.e., “negative costs”) are denoted by a negative number.</p> <p>NOTE: October 24, 2006 - CCS has provided preliminary estimates of potential emission reductions and potential costs or cost savings for some of the options in the catalog. These estimates are based on research for Montana and for other US states and provide rough order of magnitude. These estimates are subject to review and revision by TWG members to improve the estimates based on additional information or greater specificity of the option. TWG members are encouraged to provide feedback on the estimates during the October 25, 2006 TWG call or by email to CCS facilitators.</p>	

Definition of “Priorities for Analysis”:

- **High:** High priority options will be analyzed first.
- **Medium:** Medium priority options will be analyzed next, time and resources permitting.

- **Low:** Low priority options will be analyzed last, time and resources permitting.

Notation of Options: Options will be marked with an asterisk (*) at a later date to indicate options that are at least partially “base case” policies, i.e., that have been considered or undertaken at some level in Montana. This version of the catalog includes, **in highlighted text**, new options and revisions that were suggested during the second TWG meeting (October 24, 2006). Options and revisions suggested during the first TWG meeting (September 5, 2006) and the second CCAC meeting (September 15, 2006) are also incorporated in the text, but are no longer highlighted.

Residential, Commercial, [Government, and] Industrial (RCI)

Option No.	GHG Reduction Policy Option	Priority for Analysis	Potential GHG Emissions Reduction	Potential Cost or Cost Savings	Ancillary Impacts, Feasibility Considerations	Notes
RCI-1 ENERGY EFFICIENCY PROGRAMS, FUNDS, AND GOALS						
1.1	Utility Demand Side Management (DSM) Programs for electricity, natural gas, propane, fuel oil		High	Cost savings/ low costs	Co-benefits include transmission/distribution system costs reduction. Significant potential overlap with many other options. Affordability for consumers and cross-subsidization across consumer classes, are key considerations.	TWG member suggests combining 1.1 and 1.2. (and that they are higher priority). Education is seen as an important factor in successful implementation. Examples of best practices for DSM programs can be found in recent Western Governors' Association report ¹
1.2	Energy Efficiency Funds (e.g. Public Benefit Funds) administered by State agency, utility, or 3rd party (e.g. Energy Trust)		High	Cost savings/ low costs	(as above)	TWG member notes that MT Public Benefit funds earmarked for efficiency funds have been reallocated to other areas (such as low-income bill assistance). MT DEQ staff note that funds can be used for market transformation, demonstration, education, and R&D.
1.3	Energy Efficiency Requirements (e.g. Utility Savings Goals or Energy		High	Cost savings/ low costs	(as above)	A TWG member suggested that 1.3 and 1.4 might be lower priority than 1.1 and 1.2.

¹ <http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf>

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	Portfolio Standards)					Another member suggested that 1.3 would be stronger if coupled with milestones and targets
1.4	Market transformation and technology development programs		Medium	Cost savings/ low costs	(as above)	Some concerns expressed about the size of the MT market limiting potential for this option. NEEA programs have been made available to Northwestern customers east of the range; but coops in E MT cannot access these programs.
RCI-2	APPLIANCE STANDARDS					
2.1	Expansion of State-level Appliance Efficiency Standards		Medium	Cost Savings/ Low Cost	Feasibility enhanced by ongoing effort in nearby states	TWG member suggests possibly combining with market transformation.
2.2	Support for Federal-level Appliance Efficiency Standards		Low/ Medium	Cost Savings/ Low Cost	Potential overlap with previous option	
RCI-3	BUILDINGS					
3.1	Improved Building Codes		Medium/ High	Cost Savings/ Low Cost	Potential to also yield water savings, comfort/air quality improvements.	

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3.2	Promotion and Incentives for Improved Design and Construction (e.g. LEED ² , green buildings)		Medium/High	Cost Savings/ Low Cost	Potential overlap with previous option [co-benefits as above]	
3.3	Training and Education for Builders and Contractors (e.g. HVAC ³ sizing, duct sealing)		Low/Medium	Cost Savings/ Low Cost	[As above]	TWG member suggests combining with 3.2 to lead to improved building codes and practices.
3.4	Training of Building Code and other Officials in Energy Code Enforcement		Low/Medium	Cost Savings/ Low Cost		
3.5	Building Commissioning and Recommissioning, including Energy Tracking and Benchmarking		Medium	Cost Savings/ Low Cost		
3.6	Energy Management Training/Training of Building Operators		Low/Medium	Cost Savings/ Low Cost		
3.7	Increased Use of Blended Cement (substituting fly ash or other pozzolans for clinker reduces CO ₂ emissions)		Low/Medium	Cost Savings/ Low Cost	May provide modest avoided waste disposal co-benefit, depending on standard practice	DEQ will check on availability of additional dry fly ash from Colstrip (and other sources).

² LEED = Leadership in Energy and Environmental Design, a national building certification program.

³ HVAC = Heating, Ventilation, and Air Conditioning

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3.8	Reduction of Emissions from Diesel Engines Used in New Construction Developments		Low	Low Cost		
3.9 (new option)	Urban, town and subdivision design		Uncertain	Uncertain		Raised both during TWG and CCAC, this option is included in the Transportation and Land Use TWG; there is potential overlap.
RCI-4	EDUCATION AND OUTREACH					
4.1	Consumer education programs		Uncertain	Cost Savings/ Low Cost		Potential contribution difficult to estimate. TWG member comments: This is one of the most important things to do, but hard to pin down savings; One member felt that consumers are often more savvy than builders, but another member felt that the level of consumer education in energy matters could be substantially improved.
4.2	Introduce in School Curriculum		Uncertain	Cost Savings/ Low Cost		(as above)
RCI-5	PRICING AND PURCHASING					
5.1	Green Power Purchasing		Medium/ High	Low - High		
5.2	Bulk Purchasing Programs		Low - High	Cost Savings/		

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	for Energy Efficiency or other Equipment (Public or Private sector)			Low Cost		
5.3	Net-metering policies		Low / Medium	Cost Savings/ Low Cost		
5.4	Time of Use Rates (and Smart Metering)		Low	Cost Savings/ Low Cost	Significant utility system co-benefits	
5.5	Tiered (Increasing Block) Rates		Low / Medium	Cost Savings/ Low Cost		
RCI-6	TECHNOLOGY-SPECIFIC POLICIES					
6.1	Incentives for Renewable Energy Applications (Solar roofs, water heaters, etc.)		Medium/ High	Medium/ High	Programs could help to lower capital and installation costs	
6.2	Clean Combined Heat and Power (CHP)		High	Cost Savings - Medium Cost	Cost dependent on price of natural gas; interconnection an issue; utility system co-benefits.	MT DEQ staff notes that CHP provides efficiency gains that can contribute to reducing GHG emissions on the supply side (e.g. less amounts of total fuel supplies--electricity and fuels--is needed to be supplied to the end-user).
6.3	Promotion and Tax or Other Incentives (e.g. EnergyStar, credits for solar hot water)		Low-High	Cost Savings/ Low Cost	Interaction with appliance standards, utility programs.	
6.4	Appliance Recycling/Pick-		Low	Cost	Long-term impact	

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	Up Programs			Savings/ Low Cost	uncertain	
6.5	White Roofs, Rooftop Gardens, and Landscaping (including Shade Tree Programs)		Medium	Cost Savings/ Low Cost	Results likely to vary substantially with design	
6.6	Focus on specific end-uses/technologies: air-conditioning, lighting, water heating, plug loads, networked PC management, power supplies, motors, pumps, boilers, etc. Consumer products programs, may include incentives, retailer training, marketing and promotion, education, etc.		(By option, range from Low to High)	Cost Savings/ Low Cost	Interaction with appliance standards, utility programs.	MT DEQ staff note that Montana may see larger changes in air conditioning loads due to higher temperatures. An opportunity to reduce current and future building air conditioning loads (direct effect of rising temperatures) should be considered in building sectors, maybe in market transformation.
RCI-7	NON-ENERGY EMISSIONS (HFCS, PFCS, SF₆, CO₂ PROCESS EMISSIONS)					
7.1	Participation in Voluntary Industry-Government Partnerships		Uncertain	Uncertain		
7.2	Process Changes/Optimization		Uncertain	Uncertain		
7.3	Leak Reduction /Capture, Recovery and Recycling of Process Gases		Low/ Medium	Uncertain		
7.4	Use of Alternative Gases		Low/	Low-		

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	(other HFCs, hydrocarbon coolants/refrigerants, etc.)		Medium	Medium		
7.5	Cement Industry: Use of Alternative Fuels		Low/ Medium	Uncertain		
RCI-8	GHG EMISSIONS-SPECIFIC GOALS AND POLICIES					
8.1	Support for switching to less carbon-intensive fuels (coal and oil to natural gas or biomass)		Low- Medium	Cost Savings/ Medium Cost	Cost dependent on relative fuel prices	
8.2	Industry-Specific Emissions Cap and Trade Programs		Medium/ High	Low/ Medium	Highly dependent on specification of trading systems	
8.3	Voluntary emissions targets		Uncertain	Uncertain		
8.4	Small-source Aggregation		Uncertain	Uncertain		
8.5	Negotiated Emissions or Energy Savings Agreements		Uncertain	Uncertain		
8.6	Carbon Tax		Low-High	Low- Medium		
RCI-9	OTHER					
9.1	Government Agency Requirements and Goals (including procurement)		Low- Medium	Cost Savings/ Low Cost		
9.2	Focus on specific market segments: existing homes (weatherization), new		Medium/ High	Cost Savings/ Low Cost		See 9.8 below.

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	construction, apartments, low income, etc.					
9.3	Reinvestment Fund		Uncertain	Cost Savings/ Low Cost		
9.4	Municipal Energy Management		Uncertain	Uncertain		
9.5	Focus on Small and Medium Enterprises (SMEs)		Uncertain	Uncertain		
9.6	Industrial ecology/ by-product synergy		Uncertain	Uncertain		
9.7	Industrial (and Residential/Commercial building) Audits		Medium/ High	Cost Savings/ Low Cost		CCAC discussion noted that this can also be included in category RCI-1 and others. Financing for retrofits needs to be considered.

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9.8	Low-income energy efficiency programs.		Low/Medium	Cost Savings/ Low Cost		CCAC members noted importance of addressing poorly insulated mobile homes, and funding programs that provide replacement homes; Habitat for Humanity noted as one example for programs that address this well. Addressing split incentive of commercial landlord/tenant issues is central to addressing this. TWG member notes that low income needs are largely heating, and thus DSM programs for gas/propane might need to be targeted. May want to fold this into 1.1 (DSM), but cognizant of limits of utilities in addressing social issues.
9.9	Right of Refusal for Utility Hookups		Uncertain	Uncertain		
9.10	Water conservation		Uncertain	Uncertain		Savings from pumping and water treatment reductions
9.11	Incentives for individuals for reducing GHG emissions through reduction in their residential consumption (natural gas, electricity, water, garbage)		Uncertain	Uncertain		Incentives for reducing energy and water may be covered by other options (1.1 through 1.4) and 9.10