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Residential, Commercial, Institutional and Industrial Technical Work Group

Summary List of Recommended High Priority Mitigation Options

Yellow highlight indicates text added/revised as a result of the March 1, 2007 CCAC mtg.

Text *with italics* indicates provisional text added by CCS for TWG review (mostly in the "Types(s) of GHG Reductions" and subsequent elements of each option), and/or policy design elements where further TWG input is needed.

	Mitigation Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Status of Option
		2010	2020	Total 2007-2020			
RCII-1	Demand Side Management Programs, Efficiency Funds and Requirements	*Initial Quantification*					Pending
RCII-2	Market Transformation and Technology Development Programs	*Initial Quantification*					Pending
RCII-3	State Level Appliance Efficiency Standards and State Support for Improved Federal Standards	*Initial Quantification*					Pending
RCII-4	Building Energy Codes	*Not Quantified*					Pending
RCII-5	"Beyond Code" Building Design Incentives and Mandatory Programs	*Not Quantified*					Pending
RCII-6	Consumer Education Programs	*Not Quantified*					Pending
RCII-7	Support for Implementation of Clean Combined Heat and Power	*Not Quantified*					Pending
RCII-8	Support for Renewable Energy Applications	*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			
RCII-9	Carbon Tax	*Not Quantified*					Pending
RCII-10	Industrial Energy Audits and Recommended Measure Implementation	*Not Quantified*					Pending
RCII-11	Low income energy efficiency programs	*Not Quantified*					Pending
RCII-12	State Lead by Example	*Not Quantified*					Pending
RCII-13	Metering technologies with opportunity for load management and choice	*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.

RCII-1 Demand Side Management Programs, Efficiency Funds and Requirements

Policy Description

This policy option involves increasing the efficiency of electricity and natural gas use in Montana through Demand Side Management (DSM) programs, funds, and/or requirements. This option focuses on what are typically termed DSM activities – programs, usually delivered by utilities or government-designated agencies, designed to reduce energy consumption and/or change the timing of energy use. Examples of DSM programs include technical assistance for and implementation of energy efficiency and renewable energy measures, electrical (and in some cases fuel) demand response, alternative rate schedules, and research activities. Note that the activities described for this option may also support implementation of other options recommended by the CCAC, such as RCII-11 and RCII-12.

Policy Design

This policy design is focused on increasing energy efficiency programs through the State utilities, and is linked with the energy efficiency element of Energy Supply TWG option (ES-1), "Environmental Portfolio Standard (EPS)." ES-1 would require that each utility capture 100% of its cost-effective energy efficiency over a period of 15 years.

Goals/Timing: The goals for this option follow the goals from the ES-1 option:

Each investor-owned and public utility should:

- Meet 20% of its load using renewable energy resources by 2020, increasing to 25% by 2025.
- Implement a plan to achieve 100% of cost-effective energy conservation by 2025.
  - By 2010, identify its achievable cost-effective energy conservation for the subsequent 10 years.
  - Update its energy-efficiency assessment and plan regularly, possibly every two years.
  - *"Energy conservation" refers to both electricity and natural gas.*

Parties Involved: Investor-owned utilities, electric cooperatives, Montana PSC, state government.

Implementation Mechanisms

The goals noted above would be implemented through an Environmental Portfolio Standard, to be adopted on the basis of legislation, regulation or other agreement.

New or expanded state tax credits may provide an additional means of increasing investments in energy efficiency, particularly for appliances and equipment such as ground-source heat pumps that require a significant initial outlay on the part of consumers.

Effective implementation of expanded DSM programs may require a larger pool of qualified and reliable contractors to implement energy efficiency measures. Owners of homes and commercial buildings must also be educated to understand the benefits of energy conservation/improved energy-efficiency/DSM. Consumer and specialist education are therefore important as supporting mechanisms to enable implementation of this policy.

It is expected that additional energy efficiency programs might focus on:

- Promote ground-sources heat pumps and other technologies for heating and cooling of buildings, including homes, churches, schools, and commercial buildings, as applicable.
- Provide expanded residential and commercial energy audit programs, and offer incentives and assistance for building owners to follow up on audit recommendations.
- Conserve space-conditioning energy by promoting weatherization (insulation, high-efficiency window systems, and other measures) of homes and other buildings.
- Promote and expand water heater demand-control programs to reduce peak period electrical energy use, and promote the use of higher-efficiency water heaters.
- Promote the use of compact fluorescent lamps (CFLs) and other high-efficiency lighting and lighting control systems, including applications in the commercial sector.
- Promote ENERGY STAR® appliances.
- Promote energy-efficient construction standards for new homes.
- Expand existing effective energy efficiency activities.

Note that this listing of options is not meant to preclude any existing or future DSM options that might be applicable to Montana—it is intended only as a list of promising examples for use of expanded USB funds or funds otherwise earmarked for energy efficiency investments. In many cases, examples of such programs already exist, but could be expanded in scope and effectiveness with additional resources.

Related Policies/Programs in Place

As part of its 1997 restructuring legislation, Montana established its Universal System Benefits Program (USBP). 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%; and

- 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.[1]

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

Principally, the reduction in GHG emissions (largely CO_2) from avoided electricity production and avoided on-site fuel combustion. Less significant are the reduction in CH_4 emissions from avoided fuel combustion and avoided pipeline leakage. Other GHG impacts are also conceivable, but are likely to be small (black carbon, N_2O) and/or very difficult to estimate (materials use, life cycle, market leakage, etc.).

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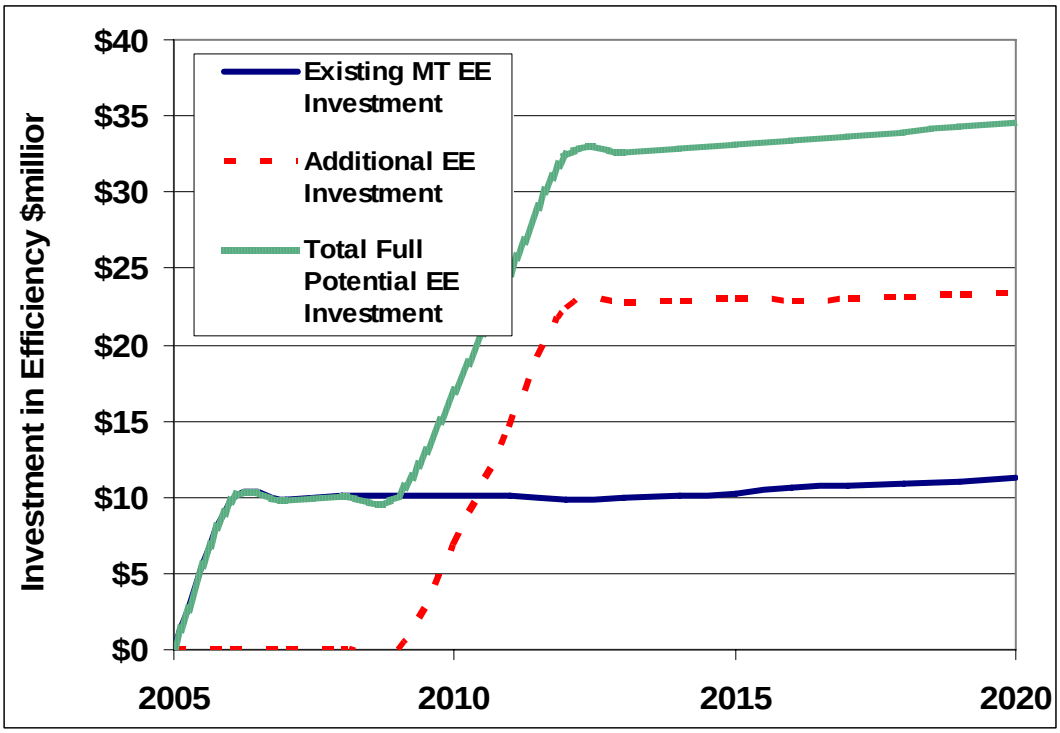
Estimated GHG Reductions and Costs (or Cost Savings)

#	Policy	Scenario/Element	Reductions ($MMTCO_2e$)			NPV (2007–2020) $ Millions	Cost-Effectiveness $/tCO$_2$
			2010	2020	Cumulative Reductions (2007 - 2020)		
RCII-1	Demand Side Management Programs, Efficiency Funds and Requirements	Current/expected Energy Efficiency Investment	0.33	0.78	6.5	N/A	N/A
RCII-1	Demand Side Management Programs, Efficiency Funds and Requirements	New/Expanded Energy Efficiency Investments	0.04	1.15	6.6	-$122	-$18

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



CCS facilitators will review information from NW Power and Conservation Council on cost-effective energy conservation as an additional/alternative input to revise the analysis done to date to estimate electricity savings.

Data Sources: *The analysis relies on the following key sources:*

- *The Energy Efficiency Task Force Report to the Clean and Diversified Energy Advisory Committee of the Western Governors' Association, referred to here as the "WGA CDEAC EE report".*[2] *This report provides estimates of cost-effective efficiency potential, and the average cost per MWh saved ($25/MWh).*
- *Various other efficiency assessments by the Southwest Energy Efficiency Project (SWEEP), the Northwest Power Planning Council, and the California Energy Commission. Together, these sources suggest an average savings from utility energy efficiency programs of approximately 6 kWh per annual program dollar invested.*
- *Electricity avoided costs are provisionally based on the levelized value of long-term avoided costs used in NorthWestern Energy's 2005 Electric Default Supply Resource Procurement Plan ($45 per MWh). One element that needs to be reviewed is the degree to which this cost includes avoided capacity costs.*

[2] WGA, 2005. *The Potential for More Efficient Electricity Use in the Western United States, December 19, 2005.* http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency.htm

- *Average cost of gas DSM programs reported in Tegen, S. and Geller, H., 2006, Natural Gas Demand-Side Management Programs: A National Survey, Southwest Energy Efficiency Project, www.swenergy.org.*
- *Natural gas avoided costs based on costs of gas supply to Montana, with future gas costs estimated based on projections from the USDOE's Annual Energy Outlook 2006.*

Quantification Methods: *As we do not presently have in-hand Montana-specific electricity of gas efficiency potential studies, estimates of efficiency savings and costs are based on regional studies and analyses/experience in other states. These studies were used to derive an estimate of efficiency savings per $ spent on programs, which in turn, are used to translate spending levels into energy savings and program savings targets. The achievable efficiency potential was estimated based on the analysis of best practices and of other efficiency potential studies in the Western US (see WGA CDEAC EE, 2005). This analysis suggests a range from 0.8 to 1.0 percent savings per year is achievable, and we used the high end of that range here (1.0%) given the relatively low historical level of efficiency investment in Montana—at least until recent years (suggesting higher potential savings), which results in an annual energy efficiency investment level on the order of 2.5% of revenues (for electric utilities). These estimates are based on programs and policies that aim for cost-effectiveness for all measures. .*

Key Assumptions:

- *Avoided costs of electricity ($45/MWh)*
- *Avoided cost of gas ($6.1/MMBtu, levelized).*
- *Average cost of electricity efficiency measures ($25/MWh saved)*
- *Average cost of gas efficiency measures ($2.1/MMBtu saved)*
- *Full, achievable cost-effective efficiency improvements (1.0% reduction in sales per year)*
- *Savings target includes savings from existing programs*
- *Savings from existing programs estimated based on the current (2005/2006) investments in efficiency by NorthWestern Energy (electric and gas) relative to total revenue from utility sales.*
- *Avoided electricity emissions (Assumes that reductions in electricity generation requirements through 2010 will come from the average emissions rate of then-existing fossil-fueled sources; by 2020 the predominant effect is assumed to be a reduction in reference case new coal and gas builds during the 2010-2020 period.)*

Key Uncertainties

- *Montana-specific costs of DSM programs at savings levels modeled.*
- *Levels of spending/savings from Existing DSM programs in Montana (some utilities).*
- *Impact of electricity energy efficiency programs on peak demand as well as energy requirements.*

Additional Benefits and Costs

Benefits

- *Reducing use of electricity and natural gas through this option also reduces emissions of local and regional air pollutants, such as sulfur and nitrogen oxides, which in turn reduce the human health and other impacts of those emissions.*
- *Reducing peak demand and improving the utilization of the electricity system;*
- *Reducing the risk of power shortages;*
- *Supporting local businesses and stimulating economic development;*
- *Transmission/distribution system costs reduction*

Costs

None Cited.

Feasibility Issues

- *Costs and performance vary substantially between measures that might be considered for DSM programs. Some measures may present low capital costs and higher operating costs (or vice versa), and there is uncertainty about the costs and savings for other measures.*
- *Interaction with appliance standards and utility programs.*

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

RCII-2 Market Transformation and Technology Development Programs

Policy Description

Market transformation is a relatively new term for energy efficiency programs that focus on voluntary efforts implemented by non-utility organizations to encourage greater uptake by consumers (residential, commercial, and industrial, as well as the professionals that service energy-using equipment) of cost-effective energy efficiency practices. Market transformation also seeks to ensure sufficient supplies of technologies and practitioners to meet the subsequent increased demand for energy efficiency. As such, a market transformation program is designed to create a situation where the bulk of the private market automatically adopts or incorporates technologies or techniques that result in improved energy efficiency. The goal of a market transformation and technology development program is to put energy efficiency technologies and practices into a position where they will be demanded by the public, chosen by builders and manufacturers, and provided by retailers and contractors. Methods of transformation can be different for each technology or technique, but often revolve around public and private review of quality and effectiveness, including partnerships between government agencies, retailers, manufacturers, and non-governmental agencies. Market transformation programs can be statewide or regional.

Policy Design

Market transformation is an important goal for Montana, and an important mechanism to cost-effectively bring energy-efficient products and services to consumers. It is recognized, however, that Montana constitutes a limited market, by itself, for energy-efficient products. As a result, Montana should focus its efforts on joining, supporting, or increasing its participation in regional market transformation alliances (the Northwest Energy Efficiency Alliance and the Midwest Energy Efficiency Alliance are examples) that develop and implement technologies for reduction of energy use and GHG emissions. This could include, as applicable, working to extend market transformation efforts currently focused on specific parts of the state to consumers statewide, as well as expanding the number and types of different energy-efficient products included in market transformation efforts in Montana.

Market transformation and technology development efforts should stress addressing technologies of particular significance to Montana. One example is the testing and monitoring of residential and commercial high-efficiency structures to determine their performance under Montana conditions and to identify barriers to implementation of energy-efficient building practices.

The State should consider the establishment of an independent entity to assess cost-effective efficiency potential (per the EPS in RCII-1), and should work with other states in the region to assess efficiency potential.

Goals: By 2009, put in place mechanisms to allow broaden coverage of market transformation programs in Montana both to additional geographic areas and with regard to technologies covered. *Is consideration of a specific energy savings target desirable?*[3]

Timing: as above.

Parties Involved: Under Development.

Other: Under Development.

Implementation Mechanisms

Important implementation mechanisms for this Option include (*partial list at present)*:

- Consumer education.
- Electricity and gas pricing (to encourage purchase of higher-efficiency appliances and equipment or control systems).

Related Policies/Programs in Place

The Northwest Energy Efficiency Alliance (NEEA, www.nwalliance.org) is a non-profit corporation supported by electric utilities, public benefits administrators, state governments, public interest groups and energy efficiency industry representatives. These entities work together to make affordable, energy-efficient products and services available in the marketplace.[4]

NEEA participation is limited, in principle, to utilities west of the continental divide (in Bonneville Power Administration's (BPA) service area). NorthWestern Energy, Bonneville Power Administration, and electric cooperatives in the BPA service are all partners in NEEA and provide some funding. The electric co-operatives outside the BPA service area and Montana Dakota Utility are not partners.

The Midwest Energy Efficiency Alliance (www.mwalliance.org) uses a similar model of partners and goals but does not currently cover Montana, only extending as far west as Illinois. However, utilities in the eastern portion of Montana might find stronger connections with programs in this area.

Types(s) of GHG Reductions

As with RCII-1, this option would principally yield reductions in GHG emissions (largely CO_2) from avoided electricity production and avoided on-site fuel combustion. Less significant are the reduction in CH_4 emissions from avoided fuel combustion and avoided pipeline leakage. Other GHG impacts are also conceivable, but are likely to be small (black carbon, N_2O) and/or very difficult to estimate (materials use, life cycle, market leakage, etc.)

[3] The Northwest Power Planning Council (NPPC) may have information on Market Transformation within its most recent Power Plan.

[4] See http://www.nwalliance.org/aboutus/index_aboutus.aspx.

Estimated GHG Reductions and Costs (or Cost Savings)

#	Policy	Scenario/Element	Reductions ($MMTCO_2e$)			NPV (2007–2020) $ Millions	Cost-Effectiveness $/tCO_2$
			2010	2020	Cumulative Reductions (2007 - 2020)		
RCII-2	Market Transformation and Technology Development Programs		0.03	0.30	1.9	-$38	-$20

Data Sources: *Market transformation program costs and performance based on programs and experience of the Northwest Energy Efficiency Alliance.*

Quantification Methods: *Apply program results, expressed in percent savings, from the Northwest to Montana.*

Key Assumptions:

- *Market transformation programs can reduce electricity demand by 0.2% annually.*
- *Iimplementation of specific measures and programs must be timed correctly for maximum impact on market adoption of new technologies.*
- *Avoided cost for electricity as noted in RCII-1*

Key Uncertainties

Degree to which savings from regional efforts will continue to accrue as they have in the recent past; degree to which MT consumers not in the NEEA area will be able to use or replicate successful NEEA programs..

Additional Benefits and Costs

Benefits

- *The non-energy and non-emission benefits are almost always going to be the economic drivers behind the success of these programs. Focusing only on emission reductions or only on payback through energy efficiency of the user will eliminate many technologies when they could otherwise provide substantial economic benefits. An example is an improvement to an industrial production line that may have negligible overall energy consumption reduction at the plant, but that decreases the energy consumption per unit produced (energy intensity) while speeding up production and retaining jobs in the state.*
- *Co-benefits could include transmission/distribution system costs reduction.*
- *Programs could help to lower capital and installation costs.*

Costs

None Cited.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

RCII-3 State Level Appliance Efficiency Standards and State Support for Improved Federal Standards

Policy Description

Appliance efficiency standards reduce the market cost of energy efficiency improvements by incorporating technological advances into base appliance models, thereby creating economies of scale. Appliance efficiency standards can be implemented at the state level for appliances not covered by federal standards, or where higher-than-federal standard efficiency requirements are appropriate.[5] Regional co-ordination for state appliance standards can be used to avoid concerns that retailers or manufacturers may (1) resist supplying equipment to one state that has advanced standards or (2) focus sales of lower efficiency models on a state with less stringent efficiency standards.

Policy Design

In recognition of the fact that Montana represents, on its own, a relatively limited market for appliances and equipment, this policy is designed to encourage the State to work with other States and with regional entities[6], as applicable, to:

- Review federal appliance standards, and work with federal agencies and others toward raising federal appliance and equipment energy efficiency standards where applicable.
- Implement, in concert with other states, higher-than-federal energy efficiency standards for appliances where technological advances allow. Analyses of possible energy efficiency standards that can be enacted at the State-level are available at www.standardsasap.org. Draft legislative language can be found at http://www.apolloalliance.org/strategy_center/model_legislation/eelegis.cfm.
- Develop and implement standards for residential-sector appliances not currently covered by federal standards.
- Develop and implement standards for commercial-sector appliances and equipment not currently covered by federal standards.

It is anticipated that the process of setting higher energy-efficiency standards in Montana, in concert with other States, will encourage higher Federal standards and higher-volume manufacturing of higher-efficiency appliances and equipment, resulting in wider distribution and likely lower prices for these devices.

Goals: Review of standards and report to Governor by 2008, with adoption of changes in standards by 2009 (activities designed to be timed to coordinate with consideration of energy matters by the Montana State Legislature).

[5] In recent years, Arizona, Oregon, and Washington, among other states, adopted state standards for several appliances; this led to the inclusion of standards for these appliances in the 2005 federal Energy bill.
[6] It was suggested that the TWG review any activities that the Northwest Energy Efficiency Alliance have underway with regard to improving energy efficiency standards.

Timing: as above.

Parties Involved:

- Electric and gas utilities.
- State government agencies, including the Department of Environmental Quality and the Department of Commerce.
- Appliance manufacturers and appliance/equipment industry representatives.

Other: Under Development.

Implementation Mechanisms

Potential implementation mechanisms and supporting activities for this option include:

- *Appliance Standards promulgated by legislation or developed administratively.*
- *Assistance programs to help low-income consumers with purchase of appliances meeting more stringent standards, so as to reduce the higher-first-cost burden of higher-efficiency appliances on those consumers.*
- *Elevated energy standards for appliances and equipment purchased by public agencies.*
- *Work with manufacturers and consider impacts on manufacturers when setting new standards..*

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

GHG impacts are similar in nature to those noted for RCII-1 and RCII-2 above.

Estimated GHG Reductions and Costs (or Cost Savings)

#	Policy	Scenario/Element	Reductions ($MMTCO_2e$)			NPV (2007–2020) $ Millions	Cost-Effectiveness $/tCO$_2$
			2010	2020	Cumulative Reductions (2007 - 2020)		
RCII-3	State Level Appliance Efficiency Standards and State Support for Improved Federal Standards		0.05	0.20	1.5	-$49	-$32

Data Sources: *Fractional savings and costs drawn from ASAP and ACEEE, 2006. "Leading the Way: Continued Opportunities for New State Appliance and Equipment Efficiency Standards."*[7]

Quantification Methods: *Results for Montana from report above adapted by adjusting for different analysis period, discount rate, and energy prices.*

Key Assumptions: *Costs and savings from efficiency improvement via standards will be similar in Montana to those indicated in the ASAP/ACEEE report.*

Key Uncertainties

The effectiveness and cost-effectiveness of the higher-than-federal standards adopted by Montana will depend in part on the standards implemented by other states, including other states in the region.

Additional Benefits and Costs

Benefits

Reduction in water use for some appliance upgrades.

Costs

None Cited.

Feasibility Issues

Feasibility enhanced by ongoing efforts in nearby states.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

[7] *See, for example, the following from the Appliance Standards Awareness Project (ASAP) web site: http://www.standardsasap.org/stateops.htm and http://www.standardsasap.org/a062_mt.pdf.*

RCII-4 Building Energy Codes

Policy Description

Building energy codes specify minimum energy efficiency requirements for new buildings or for existing buildings undergoing a major renovation. Given the long lifetime of most buildings, amending state and/or local building codes to include minimum energy efficiency requirements and periodically updating energy efficiency codes could provide long-term GHG savings. Implementation of building energy codes, particularly when much of the building occurs outside of urban centers, can require additional resources.

Policy Design

The proposed policy to improve energy-efficiency-related elements of building codes in Montana, so as to reduce the amount of fossil energy input needed to operate buildings in the state, includes the following elements:

- Undertake a comprehensive review of existing building codes in Montana to determine where increased energy efficiency can be achieved.
- Increase standards such that the minimum performance of new and substantially-renovated buildings, both commercial and residential, is at least 10% higher by 2012 than that required by today's building codes (IECC 2003, see below), and 20% higher by 2020.
- Work toward achieving "carbon-neutral" status for new buildings by 2030, with an interim target of a 50% reduction in fossil energy use, relative to current standards, by 2020. Reductions in greenhouse gas emissions related to building energy use can be achieved through a combination of increased energy efficiency, switching to low- and no-carbon fuels (including solar energy) for previously fossil-fueled end-uses, purchases of "green power" from off-site providers, and/or installing on-site power generation fueled by renewable energy sources. *[**CCS note**: the above is not entirely consistent with the other elements of the design as stated; it might be useful for the TWG to consider an alternative formulation of this goal.]*
- Encourage the use of recycled and local building materials.
- Express energy efficiency standards on a per-unit floorspace basis for commercial buildings, and on a per-dwelling-unit basis for residential buildings.
- Periodically and regularly (no less frequently than every 3 years) review building codes, including energy efficiency requirements of building codes, to assure that they stay up-to-date.[8]
- Offer, and require as appropriate, education to equip building code officials, builders, designers, and others to effectively implement building energy code improvements. This

[8] It is expected the role of state agencies in the code review process will largely be to set it in motion.

might include, for example, developing a corps of licensed independent contractors who could serve to inspect buildings for compliance with the new energy codes, especially in rural areas that currently may have minimal code inspection.

- Explore new mechanisms, such as working with financial institutions, and the use of spot checks, to improve code implementation in rural areas.

Goals: see above.

Timing: see above.

Parties Involved:

- Building Codes Council (which includes representatives from the League of Cities and Towns as well as builders, engineers, local government officials, and representatives of state agencies).
- Citizens/consumer advocates (including expanding Council membership to include citizen representation).
- Department of Labor and Industry.
- Department of Environmental Quality.
- Electric utilities.

Other: Under Development.

Implementation Mechanisms

- Education is expected to be a significant component of improving building codes. It may be necessary to increase the training of code officials, builders, and others, as well as providing consumer education on building energy use. Continuing education programs for builders and others may be helpful in improving compliance with new codes.
- Institute a statewide building permit program to ensure consistency with regard to code application and enforcement among buildings built both in urban and rural areas.
- Consider providing additional code enforcement to improve understanding of/compliance with more rigorous energy-efficiency codes.
- *A TWG member suggested using utility resources to help implement building energy codes – for example, having utilities review building designs and monitor energy performance. It was also suggested that utilities might play a role in enforcement through the application of interconnection rules, tariffs, and connection charges that encourage the construction of buildings that use energy efficiently and at an appropriate level. Further information will be provided to the TWG on examples of utility programs.*

Related Policies/Programs in Place

The Building Codes Council is expected to consider, at its meeting in 2007, updating building energy codes to the 2006 IECC (International Energy Conservation Code) from the current (recently adopted) 2003 version.

Recent legislative interest in State energy-efficiency building codes is indicated by the 2003 Montana Senate Joint Resolution (No. 13), which called for a "an interim study to investigate

options for improving energy efficiency building codes laws and other energy efficiency and conservation practices."[9] However, it appears that this study was not set as a priority, at that time, and funding was not provided.

Types(s) of GHG Reductions

- *CO_2 reduction from avoided electricity production and avoided on-site fuel combustion.*
- *Modest reduction in CH_4 emissions from avoided fuel combustion and avoided natural gas pipeline leakage, relatively small reductions in N_2O, Black Carbon emissions from avoided fuel consumption..*

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: *WGA CDEAC EE report and detailed results prepared for that report by the Building Code Assistance Project (BCAP); US DOE Building Energy Survey and related documents. State-level building activity/building stock statistics (if available). Building Code Assistance Project (BCAP) analyses by state (including Montana) to derive base savings.*

Quantification Methods: *Apply general BCAP method to estimate code savings, but apply 20% target savings figure.*

Key Assumptions: *Average costs of building code improvements, ratio of gas improvements to electricity improvements.*

Key Uncertainties

Relative cost of code improvements more aggressive than those reflected in WGA analysis.

Additional Benefits and Costs

Benefits

- *Potential to also yield water savings, comfort/indoor air quality improvements, with related improvements in health and productivity*
- *Saving consumers and businesses money on their energy bills. More stringent energy codes for buildings will benefit low-income tenants by reducing their monthly energy bills.*
- *Reducing dependence on imported fuel sources, and reducing vulnerability to energy price spikes*
- *Electricity system benefits: reduced peak demand, reduced capital and operating costs, improved utilization and performance of the electricity system, reduced pollutant emissions from power plants and related public health improvements, and reduced water use in power plants.*
- *Supporting local businesses and stimulating economic development*

Costs

None Cited. **Feasibility Issues**

[9] See http://data.opi.mt.gov/bills/2003/billhtml/SJ0013.htm.

Interaction with appliance standards and utility programs.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

RCII-5 "Beyond Code" Building Design Incentives and Mandatory Programs

Policy Description

This policy provides incentives and targets to induce the owners and developers of new and existing buildings to improve the efficiency with which energy and other resources are used in those buildings, along with provisions for raising targets periodically and resources to help achieve the desired building performance. Many "Green Building" programs have been developed that define standards for efficient energy and resource use and that encourage demand for these green buildings through recognition, incentives, and government mandates.[10] This policy includes elements to encourage the improvement and review of energy use goals over time, and to encourage flexibility in contracting arrangements to encourage integrated energy- and resource-efficient design and construction.

Policy Design

A combination of financial and regulatory incentives would be used to provide incentives for owners and developers of new and existing buildings to improve their structures, or to build new structures, that exceed energy-efficiency (and net greenhouse-gas emissions) provisions of building codes in force.

Goals:

- Reduce per-unit-floor-area consumption of grid electricity and natural gas by 20% by 2020 in existing buildings, and by 50% in new buildings by 2020. Up to 10% of the targeted reduction for new homes can come from use of off-site electricity generation from renewable energy[11]. These requirements should be phased in over time, and will have the following targets:
- Improve *X*% of existing residential units in Montana by the year 2020.
- Improve *X*% of existing commercial floorspace in Montana by the year 2020.
- Provide incentives such that *X*% of new or substantially remodeled residential units in Montana exceed building energy and greenhouse gas emissions codes in force by the amounts above by the year 2020.
- Provide incentives such that *X*% of new or substantially remodeled commercial floorspace in Montana exceeds building energy and greenhouse gas emissions codes in force by the amounts above the year 2020.

Timing: See above.

[10] Existing programs include EPA's ENERGY STAR Homes and Leadership in Energy and Environmental Design (LEED).

[11] Note that this limit on the use of renewable off-site electricity generation is assumed to count only the renewable fraction of electricity purchased that is beyond that included in any statewide renewable portfolio standard, but this restriction needs to be confirmed by the TWG and CCAC.

Parties Involved:

- State and local government permitting agencies.
- Utilities.
- Financial services industries.
- Building industries.

Other: Under Development.

Implementation Mechanisms

Implementation mechanisms, as noted above, could include a combination of financial assistance, special regulatory or administrative consideration for buildings projects that achieve "beyond code" performance, and other types of incentives. Specific examples of such mechanisms are as follows:

- Offering programs to adjust "impact fees" or "connection fees" – such as reduced fees for sewer and water hook-ups for homes that use less hot and cold water – for new and upgraded existing buildings that meet specific higher-than-code energy efficiency standards. Municipalities could be compensated for fees reduction out of a revolving loan fund or by some other mechanism. Develop systems and programs that recognize reduced impacts, and adjust fees accordingly. Such fees adjustments could be made by utilities, municipalities, or other entities, as applicable.
- Offer regulatory advantages, such as "fast-track" (expedited review) processing of applications, for buildings certified as having "beyond code" energy efficiency and environmental performance.
- Develop systems and programs that reward "beyond code" energy efficiency/emissions reduction improvements, including "green mortgages", or adding "points" in project review processes for building features that meet or exceed environmental targets.
- Consider property tax adjustments that waive all or a portion of additional taxes on investments to improve building performance to "beyond code" levels.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

- *CO_2 reduction from avoided electricity production and avoided on-site fuel combustion.*
- *Modest reduction in CH_4 emissions from avoided fuel combustion and avoided natural gas pipeline leakage, relatively small reductions in N_2O, Black Carbon emissions from avoided fuel consumption.*

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development.

Data Sources: *Costs of energy efficiency improvements based on studies of costs of building improvements and code changes.*

Quantification Methods: *Estimates fractional savings in energy intensities needed to meet targets in new commercial and residential buildings. Allocates intensity savings among energy efficiency, renewable energy sources.*

Key Assumptions: *Fractions of electric and gas intensity improvement accounted for by efficiency improvements, solar thermal, solar PV, and/or increased biomass use; fractional savings targets over (new) code levels; growth in housing stock.*

Key Uncertainties

- *Total commercial building space in Montana (regional estimates can be adapted to provide estimates if needed).*
- *Fractions of new commercial buildings, and residential units, participating in program..*

Additional Benefits and Costs

Benefits

Potential to also yield water savings, comfort/air quality improvements.

Costs

None Cited.

Feasibility Issues

Interaction with appliance standards and energy efficiency programs.

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Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

RCII-6 Consumer Education Programs

Policy Description

The ultimate effectiveness of emissions reduction activities in many cases depends on providing information and education to consumers, as well as to future consumers (primary and secondary school students), regarding the energy and GHG emissions implications of consumer choices. Public education and outreach is vital to fostering a broad awareness of climate change issues and effects (including co-benefits, such as clean air and public health) among the state's citizens. Such awareness is necessary to engage citizens in actions to reduce GHG emissions. Public education and outreach efforts should integrate with and build upon existing outreach efforts involving climate change and related issues in the state. Ultimately, public education and outreach will be the foundation for the long-term success of all of the mitigation actions proposed by the CCAC, as well as those that may evolve in the future.

In addition, in order to effectively implement many of the other options in the residential, commercial, institutional, and industrial sectors, as well as in other sectors, specific and targeted education, outreach, and licensing requirements will be required for professionals in, for example, a variety of building-related and other trades in order to ensure that those professionals have the expertise to support aggressive GHG mitigation options in Montana.

Policy Design

Elements of the design for this policy will:

- Offer consumer education related to energy efficiency and the environmental consequences of energy and other choices.[12] Dovetail with public broadcasting media.
- Direct the Office of Public Instruction and others to develop and implement curricula for primary and (particularly) secondary schools that educate students so that they can evaluate the implications of consumption choices.
- Implement and enhance professional education and certification programs for teachers and for those involved in providing products and services related to energy use and greenhouse gas emissions, so as to build the statewide pool of individuals trained to support RCII and other policy options. This training for professionals (including architects, engineers, builders, code inspectors, lighting and HVAC[13] equipment installers, and others) who advise the public on energy choices is seen as a crucial component to the success of other RCII initiatives.
- Provide education programs with a strong focus on energy savings in existing buildings that include follow-up surveys on the actions that have been implemented by participants.

[12] Note that there is overlap between this RCII option and some of the elements of an option (CC-4) being elaborated by the Cross-Cutting TWG.
[13] Heating, Ventilation, and Air Conditioning.

- Educate businesses and retailers about the GHG emissions associated with products and supply chains. Explore regional efforts to rate the GHG emissions of products.
- Discourage use of unnecessarily lights, such as yard lights and unneeded street lights. *Note that the CCAC expressed interest in investigating the energy savings associated with light pollution rules adopted in some southwest and other jurisdictions—should this be addressed in detail*?.

Goals: Under Development.

Timing: Synchronize education initiatives with development and implementation of other RCII options so that those who will make decisions related to energy efficiency and GHG emissions reduction, and those who will implement improvements, will have the background to do so effectively.

Parties Involved:

- Utilities.
- Government agencies (local, state, and federal).
- Private entities.
- Primary and secondary schools.
- Building trade organizations.

Other: Under Development.

Implementation Mechanisms

Potential implementation mechanisms for this option include:

- Financial support for energy-efficiency training sessions.
- Wide advertisement of education and training sessions, and regular and consistent offering of such services.

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

These education and information programs are crucial in enabling and supporting GHG emissions reductions in a number of RCII areas and in other sectors, but their direct GHG reduction impacts are very difficult to assess.

Estimated GHG Reductions and Costs (or Cost Savings)

As this option supports many other RCII (and some ES) options, and is difficult to attribute specific GHG-savings, the emissions reductions associated with this option will not be quantified.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

None Cited.

Feasibility Issues

Potential contribution of consumer education programs to reducing GHG emissions is difficult to estimate.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

RCII-7 Support for Implementation of Clean Combined Heat and Power

Policy Description

Distributed generation with clean combined heat and power (CHP) systems reduces fossil fuel use and GHG emissions both through the improved efficiency of the CHP systems, relative to separate heat and power technologies, and by avoiding transmission and distribution losses associated with central power stations that are located far away from where the electricity is used. Implementation of these systems by residential, commercial, institutional and industrial energy consumers should be encouraged through a combination of regulatory changes and incentive programs.

Policy Design

The Energy Supply TWG is developing a similar option, information from that group will be provided to the RCII TWG. A review of existing studies on CHP potential in Montana is to be undertaken with help from TWG members.

Goals: Under Development.

Timing: Under Development.

Parties Involved: Under Development.

Other: Under Development.

Implementation Mechanisms

Under Development

Related Policies/Programs in Place

Under Development.

Types(s) of GHG Reductions

- *CO_2 reduction from avoided electricity production and avoided on-site fuel combustion less additional on-site CO_2 emissions from fuel used in CHP systems.*
- *Other gases: modest potential changes in emissions of CH_4: from avoided fuel combustion and avoided natural gas pipeline leakage, net of any additional on-site emissions or additional leakage from increased gas use, likely relatively small reductions in emissions of N_2O from avoided fuel combustion, net of any increased on-site emissions, and also some possible small net changes in emissions of black carbon, depending on the balance between avoided and additional consumption of oil, coal, and biomass fuels, and of emission control.*

Estimated GHG Reductions and Costs (or Cost Savings)

Under development. *(with ES TWG).*

Data Sources: Under Development, *but may include ONSITE SYCOM CHP potential estimates, estimates of potential from Western Governors' Association Clean and Diversified Energy Initiative Combined Heat and Power White Paper (January 2006).*

Quantification Methods: Under development, *but likely approach will be to model the incremental implementation of a target fraction of Montana's CHP potential achieved through adoption of CHP systems fueled with gas, coal, or biomass.*

Key Assumptions: Under development, *but will likely include combined heat and power generation capacity (as a fraction of MT potential, by sector) achieved via this option, and types of fuels used in CHP.*

Key Uncertainties

Could include:

- *Ultimate CHP potential in Montana.*
- *Heating fuels actually displaced by CHP.*

Additional Benefits and Costs

Benefits

- *Programs could help to lower capital and installation costs of CHP.*
- *Develop local expertise with CHP systems.*
- *Develop market for locally-derived biomass fuels.*
- *Utility system co-benefits.*
- *Cost savings and decreased impacts of transmission and distribution (by deferring/displacing need for additions).*

Costs

None Cited.

.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

RCII-8 Support for Renewable Energy Applications

Policy Description

Distributed electricity generation sited at residences and commercial and industrial facilities, and powered by renewable energy sources (typically solar but also wind and hydro), displaces fossil-fueled generation and avoids electricity transmission and distribution losses, thus reducing GHG emissions. This policy can also encourage consumers to switch from using fossil fuels to using renewable fuels in applications such as water, process, and space heating, as well as to supply new energy services using fuels that produce low or no GHG emissions. Increasing the use of renewable energy applications in homes, businesses, and institutions in Montana can be achieved through a combination of regulatory changes and incentives.

Policy Design

[NOTE THAT RELATED OPTIONS ARE BEING CONSIDERED BY THE ENERGY SUPPLY TWG (SEE ES-4) and the AFW TWG (BIOMASS FUELS)]

The design of this policy may include the following elements:

- Utility incentives for consumers to develop distributed generation, including net-metering policies.
- Removal of barriers to the implementation of distributed generation, including revising interconnection rules as appropriate.
- Tax or other incentives, or favorable tax treatment, for investments in distributed generation.

This policy encompasses solar (thermal and photovoltaic) systems and biomass fuels for use in homes and business, as well as geothermal (ground source) heat pumps.

Goals: *Goals for this option have not yet been set. Current penetration of solar photovoltaic systems in the NorthWestern Energy service territory in Montana suggest that about 0.1% or less of Montana homes currently use these systems. The penetration of solar thermal water heating systems is also quite limited. The RCII TWG is seeking other studies of distributed energy potential to help set program targets.*

Timing: Under Development.

Parties Involved: Under Development.

Other: Under Development.

Implementation Mechanisms

Under Development.

Related Policies/Programs in Place

National "Million Solar Roofs" program, adopted in 1997, suggests a target of 1000 home systems (of 3 kW) for Montana by 2010. NorthWestern Energy and other Montana utilities offer "net metering" programs for some distributed generation.

Types(s) of GHG Reductions

- *CO_2 reduction from avoided electricity production and avoided on-site fuel combustion.*
- *Modest reduction in CH_4 emissions from avoided fuel combustion and avoided natural gas pipeline leakage, relatively small reductions in N_2O, Black Carbon emissions from avoided fuel consumption.*

.

Estimated GHG Reductions and Costs (or Cost Savings)

Under Development *in collaboration with ES TWG*.

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

RCII-9 Carbon Tax

(To be considered jointly with ES 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 RCII TWG will coordinate with the Energy Supply TWG in considering and developing this option. The ES TWG has expressed the sense that a regional/national approach would be far preferable to Montana-alone tax (which should likely not be considered).

(At the request of the ES TWG, the CCS team is gathering additional information on the status of GHG emission taxes in US and Europe (levels, coverage, and achievements), and will provide this to the RCII TWG as well. The possibility of having a cross-group volunteer call to discuss carbon tax and cap-and-trade will be explored.)

Goals: Under Development.

Timing: Under Development.

Parties Involved: Under Development.

Other: Under Development.

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)

Under Development *(with ES TWG), but will likely be largely a qualitative analysis focusing on review of existing studies germane to the Montana situation, and on the impacts in Montana of the implementation of a national or regional carbon tax.*

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

RCII-10 Industrial Energy Audits and Recommended Measure Implementation

Policy Description

This policy option includes providing industrial-sector energy technical assistance (energy audits) to identify and recommend options for reducing fossil energy and electricity use, and for reducing non-energy emissions of GHGs. For example, an agency could be set up, or housed at an existing post-secondary institution, that hires experts who will visit industrial sites to assess current practices and equipment and provide recommendation for reducing GHG emissions. A combination of incentives, expertise, and information to implement recommended options are included in the policy to encourage the operators of industrial-sector facilities to follow up on audit recommendations.

Policy Design

(TWG members suggested further talks with industry representatives and others to develop goals for this option. Potential contacts include John Campbell, NorthWestern Energy, Don Quander (Large Customer Group), Holland and Hart, and Dave Ryan, CCAC member.)

Following the Feb 13th meeting, the CCS facilitators and TWG members will contact the above representatives and other industrial contacts to help investigate the most effective actions that the State could undertake to encourage energy and GHG emission reductions in the industrial sector. This information will be reported to the RCII TWG.

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

GHG impacts are likely similar in nature to those noted for RCII-1 and other options above, except that to the extent that audit recommendations included emissions reduction efforts that targeted non-energy emissions, GHG impacts will vary on a case-by-case basis..

Estimated GHG Reductions and Costs (or Cost Savings)

Under development, but could start with target number of audits per year, and apply estimates of fractional savings per visit (via recommended measures adopted) as a fraction of per-consumer electricity, natural gas, and other fuels demand. Estimate net costs of energy savings for

electricity and non-electric fuels, by sector, and calculate cost difference relative to electricity and gas avoided costs, and to other fuel costs..

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

RCII-11 Low Income Energy Efficiency Programs

Policy Description

Energy efficiency programs are a key component of other RCII options, and energy efficiency programs typically yield significant economic benefits (as well as greenhouse gas emissions reductions) to consumers that participate. Low-income consumers, however, are frequently unable to participate in energy efficiency programs due to a lack of funds to pay for improvements or, in the case of renters, an inability to either make changes to their residences or fully benefit from any cost savings. In recognition of this barrier, this policy urges the implementation of programs specifically targeted to the needs of low-income residents for services such as weatherization, updating or repairing inefficient appliances, and funding for renewable energy systems. These programs could be designed so as to offer low-income residents energy efficiency services with a minimum of up-front costs, and should be marketed through an aggressive campaign of outreach to low-income households and communities. Programs designed to work with both landlords and tenants could also be considered.

Policy Design

(TWG members are contacting the following people currently involved in developing low-income programs to ask about realistic approaches, goals and timing for application of this option. Proposed contacts include Jim Morton, Human Resource Development Council District XI; Jackie Boyle, AARP Montana; Kathy Hadley, National Center for Appropriate Technology)

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

GHG impacts are likely to be similar in nature to those noted for RCII-1 and other options related to building energy efficiency improvements.

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

RCII-12 State Lead by Example

Policy Description

The Montana State Government can provide leadership in moving the state toward a stock of buildings with much higher energy efficiency, and toward improving efficiency in the operations of state buildings. The proposed policy provides energy efficiency targets that are much higher than code standards for new state-funded and other government buildings. The proposed policy also includes elements to encourage the improvement and review of efficiency goals over time and to encourage flexibility in contracting arrangements to encourage integrated energy-efficient design and construction. Targets are also provided for the upgrading of energy efficiency in existing state government facilities.

Policy Design

Key elements of this policy include:

- New state government buildings should be LEED-certified at the "silver" level[14].
- State government purchasers should purchase ENERGY STAR-Certified appliances and equipment where available.

(The TWG has not yet considered whether the following elements should be included in the policy: In addition, "green power" use targets for new and existing State facilities are provided in this policy to help encourage the use of electricity generated from renewable resources like the sun, wind and organic matter. Also included in this option is a program for the bulk purchase of appliances and equipment with higher-than-standard energy efficiency by public agencies.)

The Cross-Cutting TWG suggested having the option include a requirement for carbon-neutral bonding. Climate neutral bonding means that there is no net increase in GHG emissions within the bond issuing agency's geographical jurisdiction after the project becomes operational. A climate neutral performance standard will challenge architects and engineers to design buildings that minimize the amount of energy they use in the first place. High performance buildings meeting a climate neutral requirement and built to meet or exceed the State's existing sustainable building guidelines will save taxpayers money over the long term as a result of their lower operating costs.

Funding should be provided to analyze and benchmark the energy performance of all existing State government buildings.

Goals: Reduce per-unit-floor-area consumption of grid electricity and natural gas by 20% by 2020 in existing buildings, and by 40% in new buildings by 2020. These requirements should be phased in over time.

Timing: See above. Begin implementing program by 2010, with full implementation as above.

[14] "LEED" is Leadership in Energy and Environmental Design. See www.usgbc.org. Note also that an analysis by KEMA of DSM options for buildings in Montana is currently underway.

Parties Involved: State agencies such as DEQ, building owners, developers, municipal governments, financial institutions (for climate-neutral bonding), building inspectors, architects, engineers, and air monitoring professionals.

Other: *The following design elements and goals have been suggested by the Cross Cutting TWG, but have not yet been considered in detail by the RCII TWG:*

- *Climate neutral bonding will require that any building projects financed with the issuance of state bonds result in no net increase in GHG emissions.*
- *If a new construction project is projected to result in an emissions increase, there must be GHG emissions offsets within the state or particular jurisdiction. Offsets could include on-site renewable energy development, renewable energy purchases, energy efficiency (in existing state buildings), carbon sequestration (tree planting), and switching to cleaner or renewable fuels. So, any GHGs emitted after the bond-financed project becomes operational will have to be offset.*
- *The new buildings could also offset their emissions by purchasing renewable electricity from their local utility. Paying a premium for what's known as "green pricing" electricity will usually be a more expensive offset option than energy efficiency.*
- *Buildings under this program should be designed in the most economically and energy-efficient manner.*
- *A community or state could install their own renewable energy project as a way to offset their GHG emissions.*
- *Monitor building emissions over time.*

Implementation Mechanisms

A key implementation mechanism for this option will be to first provide a thorough assessment of the status and energy consumption of all existing state buildings, including establishing a database of buildings and building attributes including floor area, insulation level, energy-using equipment, and history of energy consumption. This assessment would serve as the basis for evaluation of efficiency improvement opportunities in State buildings.

Related Policies/Programs in Place

The Montana State Bonding Energy Conservation Program provides some funding for energy conservation in state buildings.[15] Some monitoring of building energy use has been carried out under the program.

Types(s) of GHG Reductions

As with RCI-1 and other energy-efficiency/building improvement options, this option would principally yield reductions in GHG emissions (largely CO_2) from avoided electricity production and avoided on-site fuel combustion. Less significant are the reduction in CH_4 emissions from avoided fuel combustion and avoided pipeline leakage. Other GHG impacts are also

[15] See, for example, State Bonding Program Update, available at http://leg.mt.gov/content/publications/fiscal/interim/financecmty_dec2001/state_bonding_program.pdf.

conceivable, but are likely to be small (black carbon, N_2O) and/or very difficult to estimate (materials use, life cycle, market leakage, etc.).

Estimated GHG Reductions and Costs (or Cost Savings)

Data Sources: *Costs of energy efficiency improvements based on studies of costs of building improvements and code changes.*

Quantification Methods: *Estimates fractional savings in energy intensities needed, after code improvements, in new and existing government buildings. Allocates intensity savings among energy efficiency, renewable energy sources.*

Key Assumptions: *Fractions of electric and gas intensity improvement accounted for by efficiency improvements, solar thermal, solar PV, and/or increased biomass use; fractional savings targets over new code levels..*

Key Uncertainties

- *Total government building space in Montana (regional estimates currently used).*
- *Fraction of government agencies occupying leased space in Montana*
- *Rate of building renovations versus new construction in the government sector.*

Additional Benefits and Costs

Benefits

Co-benefits could include transmission/distribution system costs reduction.

Costs

None Cited.

Feasibility Issues

- *Costs for this option are uncertain, depending on the measures included.*
- *Potential interaction with appliance standards and utility programs.*

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

RCII-13 Metering Technologies with Opportunity for Load Management and Choice

Policy Description

Providing energy consumers with price and other information via metering that allow consumers to more clearly identify the outcomes of their choices is a potentially useful tool in improving energy efficiency, reducing greenhouse gas emissions, and saving consumers money in Montana. This policy encourages the implementation of electricity metering technologies and tariff systems, including real-time energy pricing and rates that reflect the cost and greenhouse gas implications of the resources that must be used to provide power. This provides consumers incentives to manage their energy consumption so as to both reduce costs and GHG emissions.

Policy Design

Building on experience in Europe[16] and elsewhere,[17] Montana utilities would implement a system of metering of electricity demand and consumption that: (a) allows a consumer to purchase electricity from specific types of generating resources (b) allows the distribution utility and electricity generators to provide information on the cost and source of the electricity that the consumer is using at any given time. This system allows for interaction on a time-sensitive basis between the consumer, the utility, and the generating source. Through utility reports, the state can review the choices made by the consumers, and target state incentives and rules/tax structures so as to move electricity consumption/production toward choices that produce lower GHG emissions. *(The text above was added after the most recent TWG meeting, and has not yet been reviewed).*

This option could accommodate different types of electricity tariff structures, including time of use rates (which typically have impacts on the overall cost of generation, but modest if any impacts on GHG emissions) and increasing-cost block rate structures (in which tier rate structures charge more per unit used as consumers use more electricity per month), which can encourage electricity conservation. The metering system can also be used by the customer to place restrictions on the timing and amount of energy use, including to restrict overall demand.

Goals: Develop and implement smart meters at residential and non-residential customers' sites by 20*XX*.

Timing: Under Development.

Parties Involved: Utilities, electricity generators, electricity consumers, state regulatory agencies.

Other: Under Development.

Implementation Mechanisms

A TWG member suggests the following process (yet to be discussed in the larger group):

[16] For example, see the ENEL Contatore Elettronico program offered in Italy.
[17] References to be provided.

- Set up a stakeholder technical committee to consider the option, and report back with technical recommendations, which could include including a recommendation to move forward with one or more pilot program in applicable consumer classes.
- Design pilot program (stakeholder/utility representatives/consumers).
- Implement and evaluate pilot program.
- Publish results of pilot program with recommendations.
- If the pilot program is successful, proceed with statewide implementation of meters.

Related Policies/Programs in Place

NorthWestern Utilities offered a pilot program in Missoula on time-of-use rates.

Types(s) of GHG Reductions

As with RCI-1 and other energy-efficiency and conservation options, this option would principally yield reductions in GHG emissions (largely CO_2) from avoided electricity production and avoided on-site fuel combustion. Less significant are the reduction in CH_4 emissions from avoided fuel combustion and avoided pipeline leakage. Other GHG impacts are also conceivable, but are likely to be small (black carbon, N_2O) and/or very difficult to estimate (materials use, life cycle, market leakage, etc.).

Estimated GHG Reductions and Costs (or Cost Savings)

Under development, but a possible approach is to adopt savings estimates from documents such as Smart Meters: Commercial, Policy and Regulatory Drivers, by Gill Owen and Judith Ward[18], which reports on experience with smart meters in the UK, and reports one to several percent net savings in electricity consumption from implementation of smart meters, as well as peak reduction impacts.

Data Sources: Under Development.

Quantification Methods: Under Development.

Key Assumptions: Under Development.

Key Uncertainties

None Cited.

Additional Benefits and Costs

Benefits

Under Development.

Costs

To the extent that low-income households may be covered by new metering and rate policies, low-income residents may be adversely affected, as they often live in substandard rental housing

[18] Dated March 2006, Published by Sustainability First, and available as http://www.sustainabilityfirst.org.uk/docs/smart%20meters%20pdf%20version.pdf.

that uses a significant amount of energy, but they lack both the ability and incentive to upgrade appliances, heating equipment, or the building envelope.

Feasibility Issues

None Cited.

Status of Group Approval

Pending.

Level of Group Support

TBD

Barriers to Consensus

TBD

ANNEX TO POLICY OPTIONS DESCRIPTIONS:

PRINTOUTS OF SELECTED PORTIONS OF WORKSHEETS USED TO PREPARE ESTIMATES OF COSTS AND BENEFITS OF RESIDENTIAL, COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL MITIGATION OPTIONS

Printouts below reflect status of analyses of several options as of 3/27/2007

Estimate of Mitigation Option Costs and Benefits for Montana RCII GHG Analysis

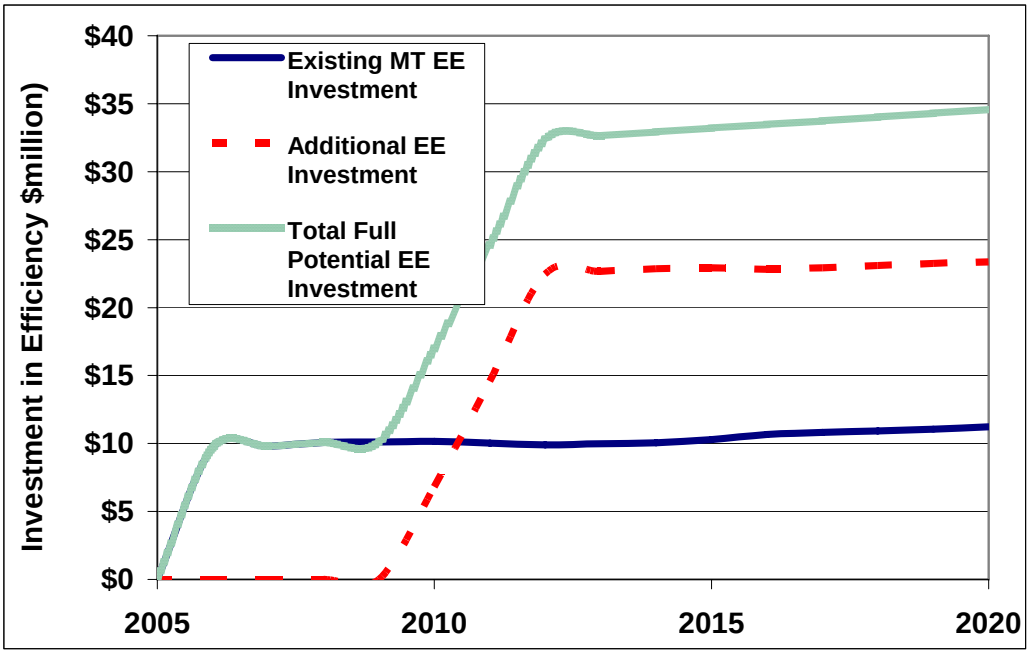
RCII-1 **Expand Energy Efficiency Funds**

Date Last Modified: 3/27/2007 D. Von Hippel/C. Lee

Key Data and Assumptions	2010	2020/all	Units
First Year Results Accrue		2010	
Electricity			
Current/expected Energy Efficiency Investments			
Extrapolating from the current rate of spending by MT utilities			
Implied fraction of electric utility revenues funding current PBF		0.8428%	
Temporary approximation calculated from NorthWestern Energy's 2005/2006 "trued-up" DSM spending ($3.2 million) on electricity efficiency programs, and assuming at present that all other electric utilities in MT had similar levels of energy efficiency spending. This assumption will need to be revisited as more data become available. (see "RCII-1 (MT DATA)" worksheet in this workbook.)			
At current rate of spending by NorthWestern Enegy on gas energy efficiency			
Implied fraction of gas utility revenues funding current spending		0.5132%	
Temporary approximation calculated from NorthWestern Energy's 2006 reported gas DSM spending of about $1.016 million (including administration expenses), and assuming at present that all other gas utilities in MT had similar levels of energy efficiency spending. This assumption will need to be revisited as more data become available. (see "RCII-1 (MT DATA)" worksheet in this workbook.)			
Year that current/expected action begins		2006	
Year that target is achieved (fully phased-in)		2006	
Fraction of Statewide Utility Sales Covered			
Residential		100%	Assumption
Commercial		100%	Assumption
Industrial		100%	Assumption
Full Cost-effective Potential Energy Efficiency Investments			
Annual reduction in sales achievable		1.0%	per year
Until results of electricity efficiency studies more specific to MT are obtained, the achievable efficiency potential is estimated based on the analysis of best practices and of other efficiency potential studies in the Western US (see WGA CDEAC EE , 2005). This analysis suggests a range from 0.8 to 1.0 percent total savings per year is achievable, and we used the high end of that range here (1.0%). These estimates are based on programs and policies that aim for cost-effectiveness for all measures. For this analysis, this level of savings is assumed from year of full ramp-in through 2025.			
Year that action begins		2010	
Year that target is achieved		2012	
Fraction of Sales by Sector Covered			
Residential		100%	Assumption
Commercial		100%	Assumption
Industrial		100%	Assumption
Levelized Cost of Electricity Savings		$25	$/MWh
*A report prepared for the Western Governors Association (CDEAC EE Report, 2006--See **Note 1**), which in turn is based on Funding and Savings for Energy Efficiency Programs in Program Years 2000 through 2004 (CEC Rogers, Messenger Bender 2005) and on The Fifth Northwest Electric Power and Conservation Plan (Northwest Power and Conservation Council 2005), cites an average levelized cost of electricity savings of $25/MWh. This is somewhat higher than the $21/MWh (nominal dollars, presumably 2005) cited by NorthWestern Energy in its filing before the MT PSC (Montana PSC Docket No.: D2005.5.88 07/12/06, available as http://psc.mt.gov/eDocs/DocketsAndOrders/D2005-5-88_6682d.pdf).*			
Electricity Savings per Program Investment (first year savings)		6.0	MWh/$1000 spent, or
		$167	$/MWh 1st yr savings
Based on rough average of several sources. Since 2000, NW utilities have achieved around 7 MWh/$1000 (T. Eckman, 2006, ttp://www.nwcouncil.org/energy/present/idaho.pdf), while CA utilities have averaged closer to 5 MWh/$1000 (M. Messenger, 2003, http://www.energy.ca.gov/reports/2003-09-24_400-03-022D.PDF).			
Avoided Delivered Electricity Cost		$45	$/MWh
See common assumptions ("Common Factors" worksheet in this workbook)			
Natural Gas Savings per Program Investment		72,700	MCF/yr per $million
		74,881	MMBtu/yr per $million
Based on average cost of gas DSM programs reported in Tegen, S. and Geller, H., 2006. Natural Gas Demand-Side Management Programs: A National Survey, Southwest Energy Efficiency Project, www.swenergy.org.			
Levelized Cost of Natural Gas Savings		$2.1	$/MMBtu
Based on the first year costs above and average measure lifetime assumption below			
Assumed average measure lifetime		8	years
Avoided Delivered Natural Gas Cost		$6.1	$/MMBtu
See common factors			

Other Data, Assumptions, Calculations		2010	2020/all	Units
Analysis				
RCII Electricity Sales	*(from inventory)*	14,283	15,684	GWh
Residential		4,245	4,329	GWh
Commercial		4,889	5,469	GWh
Industrial		5,150	5,885	GWh
Conversion Factor:GWh/Billion Btu			0.29306	
RCII Electricity Prices (statewide averages, real 2005 dollars)				
Residential		$78	$81	$/MWh
Commercial		$66	$70	$/MWh
Industrial		$49	$51	$/MWh
2005 electricity prices are from EIA (see "Retail_Prices_Elec" worksheet in this workbook). http://tonto.eia.doe.gov/dnav/ng/ Changes in sectoral electricity prices indexed to DOE EIA Annual Energy Outlook 2006 national forecast.				
Total Implied Electricity Revenues (RCII, statewide)		$906	$1,029	$million
Residential		$331	$350	$million
Commercial		$323	$380	$million
Industrial		$252	$299	$million
RCII Gas Sales	*(from inventory)*	60,107	63,216	Billion Btu
Residential		21,876	24,123	Billion Btu
Commercial		14,255	17,694	Billion Btu
Industrial		23,976	21,398	Billion Btu
Conversion Factor: Million Btu per Thousand Cubic feet			1.03	MMBtu/Mcf
RCII Gas Prices (statewide averages, real 2005 dollars)				
Residential		$9.12	$8.86	$/MMBtu
Commercial		$8.68	$8.08	$/MMBtu
Industrial		$7.01	$6.46	$/MMBtu
2005 gas prices are from EIA (see "NGPrices current" worksheet in this workbook). http://tonto.eia.doe.gov/dnav/ng/xls/ng_sum_lsum_dcu_SNC_a.xls. Changes in sectoral gas prices indexed to future gas prices from DOE EIA Annual Energy Outlook 2006 national forecast.				
Total Implied Gas Revenues (RCII, statewide)		$491	$495	$million
Residential		$199	$214	$million
Commercial		$124	$143	$million
Industrial		$168	$138	$million
Energy Efficiency Investment				
Recent Actions				
Fraction of Electricity Revenues Invested		0.8428%	0.8428%	
Efficiency Spending for Recent Actions (Electricity)		$7.6	$8.7	$million
Cumulative reduction in sales from existing investment		1.541%	4.463%	(Electric)
Fraction of Gas Revenues Invested		0.5132%	0.5132%	
Efficiency Spending for Recent Actions (Gas)		$2.5	$2.5	$million
Cumulative reduction in sales from existing investment		1.635%	4.511%	(Gas)
Full Potential Efficiency investment				
Target New Electricity Savings per Year		30.35	104.78	GWh
Fraction of Electricity Revenues Invested		0.6%	1.7%	
Implied Electricity Energy Efficiency investment per Year		$5.1	$17.5	$million
Target New Gas Savings per Year		131.76	442.06	Billion Btu
Fraction of Gas Revenues Invested		0.4%	1.2%	
Efficiency investment, New/Expanded (Gas)		$1.8	$5.9	$million

Additional Results	2010	2020	Units
Current/expected Energy Efficiency Investments			
Reduction in Electricity Use	220	700	GWh
as % of overall projected sales in that year	1.541%	4.463%	
Reduction in Generation Requirements	238	756	GWh
GHG Emission Savings from Electricity Use Reduction	**0.24**	**0.63**	$MMtCO_2e$
Reduction in Gas Use	983	2,851	Billion Btu
as % of overall projected sales in that year	1.635%	4.511%	
Reduction in Gas Consumption	983	2,851	Billion Btu
GHG Emission Savings from Gas Use Reduction	**0.05**	**0.15**	$MMtCO_2e$
Cumulative Emissions Reductions, Electricity (2007-2020)		**5.3**	
Cumulative Emissions Reductions, Gas (2007-2020)		**1.2**	
Cumulative Emissions Reductions, Electricity plus Gas (2007-2020)		**6.5**	
Full Cost-effective Potential Energy Efficiency Investments			
Reduction in Electricity Use from New/Expanded Investments	30	1,021	GWh
as % of overall projected sales	0.2%	6.5%	(Electric)
Incremental Reduction in Generation Requirements	33	1,102	GWh
GHG Emission Savings	**0.03**	**0.92**	$MMtCO_2e$
Reduction in Gas Use	132	4,315	Billion Btu
as % of overall projected sales in that year	0.2%	6.8%	
Reduction in Gas Consumption	132	4,315	Billion Btu
GHG Emission Savings from Gas Use Reduction	**0.01**	**0.23**	$MMtCO_2e$
Economic Analysis - New/Expanded Energy Efficiency Invesments			
Net Present Value, Electricity Savings (2007-2020)		**-$66**	$million
Cumulative Emissions Reductions, Electricity (2007-2020)		**5.4**	$MMtCO_2e$
Cost-Effectiveness, Electricity		**-$12**	$/tCO_2e$
Net Present Value, Gas Savings (2007-2020)		**-$56**	$million
Cumulative Emissions Reductions, Gas (2007-2020)		**1.2**	$MMtCO_2e$
Cost-Effectiveness, Gas		**-$45**	$/tCO_2e$
Incremental GHG Emission Savings, Electricity and Gas	**0.04**	**1.15**	$MMtCO_2e$
Net Present Value, Electricity Savings (2007-2020)		**-$122**	$million
Cumulative Emissions Reductions, Electricity plus Gas (2007-2020)		**6.6**	$MMtCO_2e$
Cost-Effectiveness, Electricity plus Gas		**-$18**	$/tCO_2e$



NOTES AND DATA FROM SOURCES

Note 1:

The Energy Efficiency Task Force Report to the Clean and Diversified Energy Advisory Committee of the Western Governors Association,
The Potential for More Efficient Electricity Use in the Western United States, January, 2006. This report is referred to here as the "WGA CDEAC EE report" and can be found at: http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf.

Estimate of Mitigation Option Costs and Benefits for Montana RCII GHG Analysis

RCII-2 Market Transformation and Technology Development Programs

Date Last Modified:	*3/26/2007*	*D. Von Hippel/A Bailie/C. Lee*

Key Data and Assumptions	2010	2020/all	Units
First Year Results Accrue		**2010**	
Savings from Alliance Programs			
Reduction in overall electricity use		**0.2%**	per year
Based on WGA (2005) - The Potential for More Efficient Electricity Use in the Western United States, Energy Efficiency Task Force Report to the Clean and Diversified Energy Advisory Committee of the Western Governors' Association. This study estimates that market transformation programs could achieve reductions in electricity consumption of about 0.2% per year, based on programs and experience similar to those of the Northwest Energy Efficiency Alliance. See NEEA 2004 Annual Report. www.nwalliance.org/resources/documents/A_2004AR.pdf. These savings are in addition to those achieved through building energy codes and utility DSM programs (no double counting).			
For Montana, a key implementation strategy could be support for and expansion of programs similar to NEEA's into areas of MT not now covered by those programs.			
Assumed Cost of Market Transformation Program Savings		**$12**	$/MWh
From WGA EE Task Force study (2005), which cites the Retrospective Analysis of the Northwest Energy Efficiency Alliance (Violette, Ozog, and Cooney, 2003).			
Avoided Electricity Cost		**$45**	$/MWh
See common assumptions.			

Other Data, Assumptions, Calculations	2010	2020/all	Units
Total Statewide Electricity Sales	**14,283**	**15,684**	**GWh**

Results	2010	2020	Units
Total Net GHG Emission Savings	**0.03**	**0.30**	$MMtCO_2e$
Net Present Value (2007-2020)		**-$38**	$million
Cumulative Emissions Reductions (2007-2020)		1.9	$MMtCO_2e$
Cost-Effectiveness		**-$20**	$/tCO_2e$
TOTAL Reduction in Electricity Sales	29	329	GWh (sales)
as share of projected sales	0.2%	2.1%	
Reduction in Generation Requirements	31	354	GWh (generation)

Estimate of Mitigation Option Costs and Benefits for Montana RCII GHG Analysis

RCII-3 **State Level Appliance Efficiency Standards and State Support for Improved Federal Standards**

Date Last Modified:	*3/26/2007*	*D. Von Hippel/A Bailie/C. Lee*

Key Data and Assumptions	2010	2020/all	Units
First Year Results Accrue		**2010**	
Projected Electricity Savings from 15 Proposed Standards (in 2020)		**184**	GWh
Projected Natural Gas Savings from 15 Proposed Standards (in 2020)		**553**	million ft^3
Projected NPV Savings (to 2030, $2005)		**$185**	million

The above findings are drawn from ASAP and ACEEE, 2006. "Leading the Way: Continued Opportunities for New State Appliance and Equipment Efficiency Standards", http://www.standardsasap.org/stateops.htm and http://www.standardsasap.org/a062_mt.pdf. The NPV results were derived using a 5% discount rate, and electricity prices of 8.7c/kWh ($13.6/thousand cubic ft gas) residential and 6.9c/kWh ($11.7/thousand cubic ft gas) commercial. The resulting NPV savings are thus slightly higher than would be obtained using our avoided delivered electricity and gas cost estimates.

Adjustment factor for NPV timespan		**0.527**	

This is the ratio of NPV values from 2007-2020 vs. 2005-2030 for a constant net benefit starting in 2012.

Adjustment factor for different electricity and gas avoided costs		**0.501**	

Simple adjustment assumes the benefits are largely on the electricity side, and equals the ratio of incremental cost savings per MWh using the following values (appliance standards cost from WGA 2005; ASAP/ACEEE assumes average of res and comm):

Average cost of efficiency improvements via standards		**$12**	$/MWh
Average cost of electricity in ASAP/ACEEE study		**$78**	$/MWh
Avoided cost of electricity used here (res/comm avg)		**$45**	$/MWh

Other Data, Assumptions, Calculations	2010	2020/all	Units
National Savings	14	52	TWh

ASAP/ACEEE, 2006. Assume here same ratio of 2010 to 2020 savings in MT for electricity. All gas-saving standards come into force in 2012, so no 2010 gas savings

Results	2010	2020	Units
Electricity			
Reduction in Electricity Sales	50	184	GWh (sales
Reduction in Generation Requirements	54	198	GWh (gene
GHG Emission Savings	**0.05**	**0.17**	$MMtCO_2e$
Cumulative Emissions Reductions (2007-2020)		1.3	$MMtCO_2e$
Natural Gas			
Reduction in Gas Use	0	570	Billion BTU
GHG Emission Savings	**0.00**	**0.03**	$MMtCO_2e$
Cumulative Emissions Reductions (2007-2020)		0.20	$MMtCO_2e$
Total for Policy (Natural gas and electricity)			
GHG Emission Savings	**0.05**	**0.20**	$MMtCO_2e$
Net Present Value (2007-2020)		**-$49**	$million
Cumulative Emissions Reductions (2007-2020)		1.5	$MMtCO_2e$
Cost-Effectiveness		**-$32**	$/tCO_2e$