



## Residential, Commercial, and Industrial (RCI) Technical Working Group

### Summary List of Pending Policy Options for Analysis

Option No.	GHG Reduction Policy Option Name	GHG Reductions (MMtCO <sub>2</sub> e)			Net Present Value (Million \$)	Cost-Effectiveness (\$/tCO <sub>2</sub> e)	Level of Support
		2015	2025	Total (2008–2025)			
RCI-1	Maximize Savings From the Utility Conservation Improvement Program (CIP)	3.8	8.7	82.8	-\$2,408	-\$29.1	Pending
RCI-2	Improved Uniform Statewide Building Codes	0.0035	0.0037	0.060	-\$11.2	-\$189.7	Pending
RCI-3	Green Building Guidelines and Standards Based on Architecture 2030	0.276	0.421	5.0	-\$1.29	-\$0.26	Pending
RCI-4	Incentives & Resources to Promote Combined Heat and Power (CHP)	1.0	4.9	32.8	\$1,803	\$27.5	Pending
RCI-5	Program To Reduce Emissions of Non-Fuel, High-Global-Warming-Potential GHGs	<i>Quantification still underway</i>					Pending
RCI-6	Non-Utility Strategies and Incentives To Encourage Energy Efficiency and Reduce GHG Emissions	0.025	0.13	0.83	-\$307	-\$37.1	Pending
RCI-7	Conservation Improvement-Type Program for Propane and Fuel Oil Efficiency	<i>Quantification still underway</i>					Pending
RCI-8	Energy Performance Disclosure	<i>Not quantified</i>					Pending
RCI-9	Promote Technology-Specific Applications to Reduce GHG Emissions	<i>Not quantified</i>					Pending
RCI-10	Support Strong Federal Appliance Standards and Require High State Standards in the Absence of Federal Standards	<i>Not quantified</i>					Pending
	<b>Sector Total After Adjusting for Overlaps</b>	<b>5.1</b>	<b>14.2</b>	<b>121.5</b>	<b>TBD</b>	<b>TBD</b>	
	<b>Reductions From Recent Actions</b>	<b>3.0</b>	<b>5.1</b>	<b>16</b>	<b>TBD</b>	<b>TBD</b>	
	<b>Sector Total Plus Recent Actions</b>	<b>8.1</b>	<b>19.3</b>	<b>137.5</b>	<b>TBD</b>	<b>TBD</b>	

## RCI-1. Maximize Savings From the Utility Conservation Improvement Program (CIP)

### Policy Description

Senate File 145 establishes an energy policy goal for the State of Minnesota to achieve annual savings equal to 1.5% of annual retail energy sales of electricity and natural gas. At least 1% of these sales should come directly through energy conservation improvement programs and rate design. The additional 0.5% of savings can come indirectly through energy codes and appliance efficiency standards, programs designed to transform the market or change consumer behavior, energy savings resulting from efficiency improvements to the utility infrastructure and system, and other activities to promote energy efficiency and energy conservation. These savings are based on the average of the last 3 years of sales for the utility.

The MCCAG recommends that the Department of Commerce work closely with the affected utilities and other parties to develop strategies and programs to achieve the increased energy savings goals in the new law. Much work is needed to support this achievement. The MCCAG also recommends that the DOC recognize the savings over the utilities' triennial plan to allow for year to year variability in savings and that the utility incentives be redesigned to encourage utilities to meet these higher goals of annual savings equal to 1.5% of annual retail energy sales of electricity and natural gas, such as through a policy to separate utility sales from revenues ("decoupling") which will encourage utilities to further promote energy efficiency.

The TWG supports the efforts of the utilities in developing and implementing cost-effective CIP programs that reduce Minnesota's energy usage and help the utilities in meeting their CIP goals. The TWG encourages the utilities to develop a standardized portfolio of energy efficiency programs and program rebates that are designed to help overcome market barriers; to maximize convenience of program participants; and capture overall system efficiencies—not just equipment efficiencies. The TWG supports joint utility efforts that help to achieve market transformation; encourage collaborative market and product research, and the development of a standardized method for program evaluation and analysis. The TWG seeks utility sponsored CIP program opportunities that complement government and non-utility efficiency programs; and work to remove any disincentives or regulatory barriers that inhibit energy efficiency.

### Policy Design

#### Goals:

**Timing:** The Department of Commerce program will begin June 1, 2008 with the exception of Xcel.

When must goals be achieved? The Department of Commerce will report back to the Legislature on CIP goals by 2010.

**Parties Involved:** Who is covered by the program? Residential, Commercial and industrial sector

**Other:**

**Implementation Mechanisms**

How should the program be implemented?

**Related Policies/Programs in Place**

Minnesota natural gas and electric utilities existing CIP programs.

**Type(s) of GHG Reductions**

Reductions from avoided fossil-fuel electricity generation and natural gas consumption **as a result of energy conservation programs**

**Estimated GHG Reductions and Net Costs or Cost Savings**

**Data Sources:** The following sources were used in the analysis

- Office of the Legislative Auditor, State of Minnesota, 2005, “Evaluation Report: Energy Conservation Improvement Program.”
- Spreadsheet attachment in an email from Peter Ciborowski to Bill Dougherty dated October 26, 2007.
- Minnesota Legislation regarding the Conservation Improvement Program, 2007.

**Quantification Methods:** See Annex 1.

**Key Assumptions:** See Annex 2.

**Key Uncertainties**

TBD – [as needed and approved by the TWGs]

**Additional Benefits and Costs**

TBD – [as needed and approved by the TWGs]

**Feasibility Issues**

TBD – [as needed and approved by the TWGs]

**Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

**Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

**Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## RCI-2. Improved Uniform Statewide Building Codes

### Policy Description

Building energy codes specify minimum energy efficiency requirements for new buildings or for existing buildings undergoing a renovation. Given the long lifetime of most buildings, amending state building codes to include minimum energy efficiency requirements and periodically updating energy efficiency codes will provide long-term GHG emission reductions.

The Minnesota Department of Labor and Industry (DOLI) has the responsibility of promulgating the building code in Minnesota. Where possible, the Department has approved the International Code Council's (ICC) "I" family of codes. In July of 2007, the 2006 International Residential Code (IRC) and the 2006 International Building Code (IBC) were both adopted with Minnesota specific amendments to address the Minnesota climate and building practices. Both were also adopted without their respective energy code chapters, as DOLI had been working for some time to amend Minnesota's existing energy code. DOLI decided some time ago that the 2006 IRC Chapter 11 (energy code chapter) would be adopted with Minnesota amendments.

Chapter 11 of the 2006 IRC is greatly simplified compared to past codes, and is expected to be widely accepted because of a US Department of Energy's initiated amendment. That amendment allows builders to comply using a simple "cookbook" compliance method, without needing to perform computer calculations of window, wall and other building component areas.

As a result of the high-energy efficiency requirements required by code since 2000, Minnesota leads the nation in producing energy efficient one- and two-family homes. The new residential code will not significantly increase the efficiency of one- and two-family residential buildings. However the applicability of the new code will be broadened to include townhouses, and by doing so will increase the energy efficiency of those structures.

The new Minnesota Commercial Energy code is based on ASHRAE 91.1-2004 standard, with important state amendments. The percentage increase energy efficiency is unknown at this time, but will be substantial, if stakeholders understand its importance and install components correctly so that efficiencies are realized.

A policy to implement and enforce the commercial and residential energy codes statewide should be addressed legislatively. Here are some facts about the current energy code requirements:

- Approximately 85% of Minnesota's population lives in an area where the building code (including the energy code) has been adopted and enforced.
- 39 of 87 Minnesota counties have adopted the State Building Code.
- In accordance with state law, virtually all cities with population 2,500 and above are enforcing the State Building Code, even if they are located in a county which is not enforcing the code.

- If a municipality or county chooses to enforce a building/energy code it must be the Minnesota State Building Code. A municipality may not adopt a code that is more or less stringent than the Minnesota State Building Code.
- A statewide building code requirement would affect 48 sparsely populated counties, outside of any cities in those with population 2,500 and above, that have not adopted the Minnesota State Building Code.
- While the code is not enforced statewide, homebuilders who are licensed by the state are required to build code-compliant homes regardless of location.

Additional measures to support the requirement that the building code be implemented statewide would include

- Consumer and realtor education about the importance of energy efficiency
- Improved enforcement of existing energy and mechanical codes
- Training for code officials on energy code compliance and its importance
- Training for builders, remodelers, and mechanical contractors on energy code compliance
- Development of a clearinghouse for information on how to provide access to software tools to calculate the impact of energy efficiency and solar technologies on building energy performance

## Policy Design

### Goals:

### Timing:

When should the building codes be revised? What goals are to be achieved?

Recognizing that the State of Minnesota will be implementing a new commercial and residential energy code in 2008 , other strategies that should be considered include:

- Implementing the energy code statewide in 2009 for all non-agriculture buildings. (Currently, agricultural buildings are exempt for building and energy code compliance)
- Updating energy codes every three years that are at least as efficient as the most recently adopted version of ICC's energy codes.
  - Three-year cycles will allow Minnesota construction and renovation to keep consistent most recent ICC national code cycles and keep the construction industry updated with new materials and methods that increase energy efficiency. The 3-year cycle will also allow policy makers to address unintended consequences to durability or structural integrity caused by well-intentioned code changes.
- Mandating education on each new energy code cycle for
  - Residential contractors seeking a Minnesota license;
  - Residential contractors renewing a Minnesota license;
  - All building code officials who perform energy efficiency or mechanical inspections; and

- All architects registered in the State of Minnesota who approve building designs or renovations that affect energy use.
- Requiring all mechanical contractors in Minnesota to be licensed and require at least 1.0 hours of continuing education on energy and mechanical code requirements during every new code cycle.
- Developing an educational program for the public and realtors through Department of Commerce's Energy Information Office explaining Home Energy Rating System (HERS) scores for different types of housing.
  - Require all realtors to complete at least 1.0 hours of continuing education about HERS ratings in existing and new residential homes by 2011.

**Parties Involved:** What buildings or projects are covered by the codes?

Current Energy Code Rules under the Building Code were adopted on April 15, 2000 for one- and two-family residential buildings and July 20, 1999 for commercial and residential buildings other than one- and two-family. The Department of Labor and Industry predicts that the new energy codes will go into effect in late 2007, or if there is a public hearing, by mid-2008: Minnesota Rules Chapter 7670 and Minnesota Rules Chapter 7672 cover new construction and remodeling of single-family and two family homes. Builders can choose from one or the other, which has led to a lot of confusion for compliance and enforcement.

- This code will be replaced by the new Residential Energy Code, Minnesota Rules Chapter 1322.

Minnesota Rules Chapter 7674 covers multi-family new construction and remodeling buildings that are 3 stories or less.

- Townhome units with separate entryways that do not share common spaces (hallways, laundry rooms, foyers, etc) will be covered under the new Residential Energy Code, Minnesota Rules Chapter 1322.
- Multi-family buildings that do not meet the townhome requirements for Chapter 1322, will be covered under the new Commercial Energy Code, Chapter 1323.

Minnesota Rules Chapter 7676 covers all buildings except low rise residential.

- All commercial buildings that do not meet the townhome requirements for Chapter 1322, will be covered under the new Commercial Energy Code, Chapter 1323.

Minnesota Rules Chapter 7678 covers requirements for insulation manufacturer's to register uniform testing of energy efficiency and equipment manufacturer to register equipment efficiencies with the Minnesota Department of Commerce. Chapter 7678 will be repealed, as all of these requirements will be embodied in standards to be adopted by reference in Chapter 1322 or 1323.

Agricultural buildings as defined in Minnesota Statutes, section 16B.60, and subdivision 5 are exempt from the Minnesota State Building Code.

## Implementation Mechanisms

How should the code revisions be implemented?

Mandating the code statewide requires a statute revision by the Minnesota Legislature. The Department of Labor and Industry has developed a *Minnesota State Building Code Adoption Guide* for local jurisdictions see: [http://www.doli.state.mn.us/pdf/bc\\_pr\\_code\\_adoption\\_guide\\_1\\_06update.pdf](http://www.doli.state.mn.us/pdf/bc_pr_code_adoption_guide_1_06update.pdf)

Code revisions should be implemented by the Department of Labor and Industry using the rule making process, which allows for public input.

## Related Policies/Programs in Place

Minnesota Rules Chapters 7670, 7672, 7674, 7676, and 7678. See <http://www.mncodes.org/energy.htm>

## Type(s) of GHG Reductions

Reductions from avoided fossil-fuel combustion for electricity and space heating.

## Estimated GHG Reductions and Net Costs or Cost Savings

**Data Sources:** The following sources were used in the analysis

- Average Retail Price for Bundled and Unbundled Consumers by Sector, Census Division, and State, 2005, available at: [http://www.eia.doe.gov/cneaf/electricity/esr/esr\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html)
- Annual Estimates of Housing Units for the United States and States: April 1, 2000 to July 1, 2005, available at U.S. Census Bureau annual data, released at the end of every July: <http://www.census.gov/popest/housing/HU-EST2005.html>
- New Privately Owned Housing Units, Authorized Unadjusted Units for Regions, Divisions, and States, U.S Census Bureau annual data, released end of every July, available at <http://www.census.gov/const/C40/Table2/t2yu200512.txt>
- 2001 EIA Residential Energy Consumption Survey, available at <http://www.eia.doe.gov/emeu/recs/recs2001/detailcetbls.html#space>
- Ratios of new residential/commercial floor space to total floor space, from EIA, available at <http://www.eia.doe.gov/emeu/cbecs/excel/b1.xls>
- Cooling degree-days in Minnesota, available from <http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/cdd.200501-200607.pdf>
- Heating degree-days in Minnesota, available from Department of Commerce (<http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/hdd.200507-200607.pdf>)
- Minnesota population projection, Minnesota State Demographic Center, available from <http://www.demography.state.mn.us/documents/MinnesotaPopulationProjections20052035.pdf>

- Utility electricity sales in 2005, available from U.S Energy Information Administration at <http://www.eia.doe.gov/cneaf/electricity/page/eia826.html>
- Sectoral electricity consumption, from EIA, available from U.S. Energy Information Administration at [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html) (file sales\_revenue.xls)
- 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, <http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf>

**Quantification Methods:** See Annex 1.

**Key Assumptions:** See Annex 2.

### **Key Uncertainties**

TBD – [as needed and approved by the TWGs]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWGs]

### **Feasibility Issues**

TBD – [as needed and approved by the TWGs]

### **Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

### **Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

### **Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## RCI-3. Green Building Guidelines and Standards Based on Architecture 2030

### Policy Description

Promote, incentivize, or adopt green building guidelines and standards for the reduction of carbon emissions for all commercial and residential buildings consistent with *Architecture 2030* targets. Clearly communicate the fact that reducing energy use does not always proportionally reduce emissions. Consider developing disincentives to technologies that do not reduce emissions.

Require state and local government agencies including school districts to adopt required building guidelines and standards for the reduction of carbon emissions for all buildings consistent with Architecture 2030 targets. New buildings must require the following reductions in carbon emissions:

2010	60% reduction
2015	70% reduction
2020	80% reduction
2025	90% reduction
2030	100% reduction

Specific energy targets for each building type are shown at: [http://www.architecture2030.org/2030\\_challenge/2030\\_Challenge\\_Targets.pdf](http://www.architecture2030.org/2030_challenge/2030_Challenge_Targets.pdf)

**These need to be converted into carbon emissions in a Minnesota context.**

All guidelines and standards for major renovations of existing buildings must require reductions in carbon emissions consistent with the *Architecture 2030* target of 50% reduction. Provide a variance process when meeting criteria is not appropriate or financially unfeasible.

Track building energy performance and associated greenhouse gas (GHG) emissions during ongoing building operations.

Provide education and training for all key decision makers and those involved in implementation of this policy. Emphasize education for design professionals such as architects, engineers, interior designers, planners and landscape architects. Also include education for building owners, developers, contractors/builders, building operators/facility managers, financing, real estate and insurance communities.

### Policy Design

#### Goals:

**Timing:** When should the program begin? Program begins in voluntary form when law passes in June, 2008 and is in place with requirements and incentives on Jan. 1, 2010. When must goals be achieved? Goal is to have program in place by 2010.

**Parties Involved:** Who is covered by the program? Mandatory program is for all public building owners (state, county, city and school). Incentives and disincentives are for all private building owners (Residential, Commercial and Industrial). Research organizations should support this effort.

### Implementation Mechanisms

How should the program be implemented?

- Pass legislation mandating that all state and local government agencies including school districts must meet *Architecture 2030* criteria for new and existing buildings. Provide funding mechanisms to assist state and local governments and school districts in meeting these criteria.
- Provide tax incentives, utility design assistance and incentive programs, financing incentives (such as “green mortgages”), or other inducements for construction of new and retrofit of existing residential and commercial buildings.
- Provide expedited code review for projects meeting certain energy and green building standards and benchmarks.
- Require designer (AE) to sign off on plans that the “best available energy technology” was used in completion of design, or explain why it wasn’t. Require building owner to sign off they have been informed of energy efficiency technologies by their design team, and accept the current design as meeting their requirements.
- Utilize performance contracting/shared savings arrangements as appropriate.
- Establish a database of ongoing building performance tracking in all sectors (building on existing database models).
- Establish a clearinghouse that provides information and assistance on green building guidelines and standards, the best available technologies for certain applications, a database of ongoing building performance tracking in all sectors, and access to design assistance and software tools to calculate the impacts of energy efficiency and renewable energy strategies buildings.
- Establish education programs for building professionals and other participants in implementing this policy.
- Mandate that State Boards of Licensing for building professionals cover knowledge of the improved building codes and building energy performance requirements reflected in various policy options in licensing exams.

### Related Policies/Programs in Place

Guidelines that are either required or voluntary in Minnesota include: Minnesota Sustainable Building Guidelines (B3), LEED, Green Globes, NAHB Guidelines, GreenStar, Green Communities (Minnesota Housing Process), and Energy Star.

Existing federal and state tax credits. Need to inventory other current incentives in the state.

Current legislative goal of 100 LEED or Green Globes and 1000 Energy Star Buildings in Minnesota.

Existing continuing education mechanisms for professional education and development of new models as needed.

### **Type(s) of GHG Reductions**

Reductions from avoided fossil-fuel combustion for electricity and space heating.

### **Estimated GHG Reductions and Net Costs or Cost Savings**

**Data Sources:** The following sources were used in the analysis

- Minnesota GHG forecast developed for this process (based on the worksheet called “Energy Use and CO<sub>2</sub>” in a spreadsheet called GHGemitsum07\_Working.xls)
- Average Retail Price for Bundled and Unbundled Consumers by Sector, Census Division, and State, 2005, available at: [http://www.eia.doe.gov/cneaf/electricity/esr/esr\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html)
- Annual Estimates of Housing Units for the United States and States: April 1, 2000, to July 1, 2005, available at U.S. Census Bureau annual data, released at the end of every July: <http://www.census.gov/popest/housing/HU-EST2005.html>
- New Privately Owned Housing Units, Authorized Unadjusted Units for Regions, Divisions, and States, U.S. Census Bureau annual data, released at the end of every July, available at <http://www.census.gov/const/C40/Table2/t2yu200512.txt>
- 2001 EIA Residential Energy Consumption Survey, available at <http://www.eia.doe.gov/emeu/recs/recs2001/detailcetbls.html#space>
- Ratios of new residential/commercial floor space to total floor space, from EIA, available at <http://www.eia.doe.gov/emeu/cbecs/excel/b1.xls>
- Cooling degree-days in Minnesota, available from <http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/cdd.200501-200607.pdf>
- Heating degree-days in Minnesota, available from Department of Commerce at: <http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/hdd.200507-200607.pdf>
- Minnesota population projection, Minnesota State Demographic Center, available from <http://www.demography.state.mn.us/documents/MinnesotaPopulationProjections20052035.pdf>
- Utility electricity sales in 2005, available from U.S. Energy Information Administration at: <http://www.eia.doe.gov/cneaf/electricity/page/eia826.html>
- Sectoral electricity consumption, from EIA, available from U.S. Energy Information Administration, [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html) (file sales\_revenue.xls)
- 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, <http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf>)

**Quantification Methods:** See Annex 1.

**Key Assumptions:** See Annex 2.

### **Key Uncertainties**

TBD – [as needed and approved by the TWGs]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWGs]

### **Feasibility Issues**

TBD – [as needed and approved by the TWGs]

### **Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

### **Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

### **Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## RCI-4 Incentives & Resources to Promote Combined Heat and Power (CHP)

### Policy Description

Combined heat and power (CHP) systems reduce 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 moving power from central power stations that are located far away from where the electricity is used. This Policy Option should include the following:

- Promotion of the use of natural gas-fired CHP systems
- Promotion of the use of biomass-fired CHP systems
- Creation/expansion of markets for, and incentives designed to promote implementation of, CHP units in capacities suitable for residential, commercial, and industrial users.
- Provision of tax benefits, attractive financing arrangements, utility rebates and other incentives to promote CHP technologies.
- Removal of barriers to CHP development, such as utility rate structures (discounted electric rates that compete with CHP) and interconnection standards (should be designed to facilitate economical and efficient CHP connection to the grid).
- Full consideration of the economic and environmental benefits of CHP as a resource in each electric utility's Integrated Resource Plan.
- Needs to be integrated with MCCAG Energy Sector work.

Potential supporting measures for this option include training/certification of installers/contractors, net metering and other pricing arrangements, establishment of clear, and consistent interconnection standards, and creation/support of markets for biomass fuels.

### Policy Design

**Goals:**

**Timing:** 2008 Legislature

**Parties Involved:** Who is covered by the program?

**Other:**

### Implementation Mechanisms

How should the program be implemented?

### Related Policies/Programs in Place

None.

### **Type(s) of GHG Reductions**

Reductions from avoided emissions from more efficient delivery of heat and electricity to buildings on-site.

### **Estimated GHG Reductions and Net Costs or Cost Savings**

**Data Sources:** The following sources were used in the analysis:

- Form EIA-906, available at: [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html)
- Inventory of Cogeneration Potential in Minnesota, Minnesota Planning Minnesota Environmental Quality Board August, 2001; page iv, available at: <http://www.eqb.state.mn.us/pdf/2001/CogenInventory.pdf>
- Energy Information Administration, “Assumptions to the Annual Energy Outlook 2007,” DOE/EIA-0554, April 2007, available at: <http://www.eia.doe.gov/oiaf/aeo/assumption/pdf/electricity.pdf>

**Quantification Methods:** See Annex 1.

**Key Assumptions:** See Annex 2.

### **Key Uncertainties**

TBD – [as needed and approved by the TWGs]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWGs]

### **Feasibility Issues**

TBD – [as needed and approved by the TWGs]

### **Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

### **Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

### **Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## RCI-5. Program to Reduce Emissions of Non-Fuel, High-Global-Warming-Potential GHGs

### Policy Description

High Potential GHGs include the hydrofluorocarbons (HFCs) perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). The HFCs and PFCs are classes of chemical species rather than individual species. The United States is a signatory to the International Convention on Climate Change and is required to report emissions of these gases annually. The intent of this proposal is to address those gases reported by EPA pursuant to that convention, excluding CO<sub>2</sub>, methane, N<sub>2</sub>O, and gases controlled by the Montreal Protocol, [http://www.ipcc-wg1.ucar.edu/wg1/Report/AR4WG1\\_Print\\_Ch02.pdf](http://www.ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch02.pdf)

Some of the HPGHGs have a global warming effect up to 23,000 times the impact of CO<sub>2</sub>. For example, a pound of sulfur hexafluoride is equal to the global warming impacts of 11 tons of CO<sub>2</sub>.

In many cases, the cost of reducing these gases can be very low. Thus, an overall percentage reduction of GHGs (including CO<sub>2</sub>) will be more cost-effective if this subject is effectively addressed at an early date.

The major sources include

- Air conditioning (mobile),
- Refrigerants,
- Aerosols,
- Foam insulations,
- Aluminum smelting,
- Electric power systems,
- Semi conductor manufacture,
- Solvents,
- Fire extinguishers, and
- Aerosol products.

In many cases alternative substances or methods are available. Also the maintenance and disposal of equipment or building materials, which contain these substances, can be a large source of emissions. EPA's website on this subject (<http://www.epa.gov/highgwp/projections.html>) states: "EPA is actively working to reduce emissions of high GWP gases given their potency and long atmospheric lifetimes. Through a set of voluntary partnerships, EPA and industry are making substantial progress in reducing emissions by developing and implementing cost-effective improvements to industrial processes."

For example EPA held a seminar to instruct utilities on proper methods of decommissioning equipment containing SF6. EPA has established voluntary partnerships in the electrical, aluminum, Semi conductor and magnesium industries. In addition, EPA has published list of acceptable substitutes for ozone depleting substances, which are controlled by the Montreal Protocol, <http://www.epa.gov/ozone/snap/index.html>

EPA's web site also contains extensive information on the costs of control at <http://www.epa.gov/highgwp/projections.html>

See also the "Meeting Report of the Joint IPCC/TEAP on Options for the Limitation of Emissions of HFCs and PFCs." Petten, May 1999.

Slide 83 of the First Meeting of the MCCAG demonstrates a dramatic growth in the emission of these substances, absent some remedial measures.

## Policy Design

### 1. Elimination of Emissions of High Potential Global Warming Gases (HPGWGs) at Reasonable Cost

The MCCAG recommends that the Minnesota Pollution Control Agency undertake a rulemaking process to identify uses and emission sources of HPGWGs, and to eliminate the use of such gases where that can be done at a reasonable cost.

- The rulemaking process should include an initial scoping process to determine
  - which industries are the subject of an EPA voluntary partnership, or some other voluntary program, or EPA regulation resulting in reasonable measures to reduce emissions of HPGWGs.
  - In those industries which are the subject of an EPA voluntary partnership, or some other program, which of the companies in Minnesota in those industries have taken reasonable measures to reduce their emissions of HPGWGs.
  - On the basis of the scoping process, MPCA should determine which industries should be exempted from the rulemaking process, because all reasonable reductions in emissions of HPGWGs that can be accomplished at reasonable costs are being accomplished voluntarily. Individual companies not participating in such industry programs would not be exempted, nor would industries or companies where reductions of emissions which are possible at reasonable costs are not being achieved.
  - To the extent that tradable credits result from the rulemaking process for reductions in emission, PCA should develop a mechanism to provide such credits for companies that have reduced such emissions voluntarily.
- The rulemaking process of the MPCA would:
  - Require the elimination of such gases, on a phased basis, where this can be done at a zero or negative cost.
  - Require the elimination or reduction of such gases by the use prudent managerial practices, process changes, and improved technology or by substitution of other

substances, or other means, where the cost of CO<sub>2</sub> equivalent reduction can be accomplished at a reasonable cost.

- The reasonable cost per ton of CO<sub>2</sub> equivalent reduction should be established by the agency in the rule making process, taking into account the availability of alternatives, but should not be less than \$15 per CO<sub>2</sub> equivalent ton, or 25% of the average costs of control of all greenhouse gases per CO<sub>2</sub> equivalent ton across all sectors and sources, whichever is greater, as determined by the agency.

## **2. Promotion and Funding for Process Optimization**

- Where the elimination of HPGWGs can be undertaken at a reasonable cost, that should be accomplished through the rulemaking process where it has not been done voluntarily through the EPA programs or otherwise. In other cases the state should provide funding and incentives for the reduction and phase out of HPGWGs, through tax incentives. and funding for programs which offer education and technical assistance.
- <http://www.epa.gov/highgwp/sources.html> EPA Web site on voluntary programs in several industries.

## **3. Use of Lower Impact Alternatives for Coolants, Refrigerants, Aerosols, Solvents, and Insulation**

- Again, where substitutes can be used at a reasonable cost, that should be done, pursuant to the rulemaking described above if not voluntarily. Where substitutes are not available at reasonable costs, the state should undertake to reduce the use and emissions of HPGWGs through incentives, and through the funding of programs that can provide technical assistance.
- <http://www.epa.gov/ozone/snap/> EPA's Web site on

### **Implementation Mechanisms**

Minnesota Pollution Control Agency.

Legislative action to provide tax incentives, and funding for technical support and assistance.

Technical support through MNTAPP or similar entities.

### **Related Policies/Programs in Place**

MNTAPP technical assistance program.

### **Type(s) of GHG Reductions**

Reductions from avoided emissions of High Potential GHGs.

### **Estimated GHG Reductions and Net Costs or Cost Savings**

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

**Data Sources:** [TBD by CCS on TWG approval]

**Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as needed on TWG approval]

Note that the EPA has calculated the cost of eliminating these high potential GHGs on a cost per ton basis. See <http://www.epa.gov/highwp/projections.html>. Some of the costs are negative.

### **Key Uncertainties**

TBD – [as needed and approved by the TWGs]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWGs]

### **Feasibility Issues**

TBD – [as needed and approved by the TWGs]

### **Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

### **Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

### **Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## RCI-6. Non-Utility Strategies and Incentives To Encourage Energy Efficiency and Reduce GHG Emissions

### Policy Description

Implement cost-effective non-utility strategies and incentives **for industrial processes in manufacturing and commercial facilities** that complement (but not duplicate) utility-based programs to encourage energy efficiency (E2) and reduce GHG emissions. These strategies must include mechanisms to

- Maximize convenience for program users/participants
- Capture overall technology and system efficiencies
- Conduct research, evaluation, and analysis of E2 opportunities
- Provide market, cost, and other incentives to implement
- Removal of disincentives and/or regulatory barriers
- Partner with appropriate groups
- Provide technical assistance for implementation of energy efficient technologies

The proposed programs/strategies/mechanisms fall into four (we can add more) categories: tax **incentives or benefits**, energy efficiency technical assistance for implementation, state economic assistance, and direct reduction of GHGs from industry.

### Implementation Mechanisms

#### 1. Tax Incentive Programs (That Are Not Already in Place)

- **Tax incentives for capital equipment that reduces energy use per unit of product by more than 10%** (that would be the benchmark). Projects would be done in collaboration with their local utility. To protect public interest, applicants would adhere to the same measurement and verification protocols required by DOC of Minnesota utility CIP custom energy efficiency projects of similar size. It might be possible for them to provide DOC with equipment invoices, and pre-project energy use and production data (non-public) and post-project data that showed 10% improvement as a means to provide some safeguard to protect public interest. There needs to be some method of verifying claims and evaluating cause/effect behavior change. Equipment suppliers or businesses would need to measure energy consumption before and after installation of equipment.
- **Tax incentives for specific technologies (i.e., pumps, motors, fans, boilers, compressed air systems) known to deliver energy efficiency.** NEMA Premium motors and adjustable speed drives (ASDs) in the right applications are possible technologies, but there are many others. The EPA and DOE Web sites list many Energy Star products for commercial facilities (food, service, lighting, office equipment, etc) that could be given a tax incentive. This would be the simplest to administer because no verification (other than receipt for filing taxes) would be needed. Exempting qualifying items from sales tax would be even simpler to

administer, such as is done for groceries. Quantifying energy savings and resulting GHG reduction would be a wild card because base lines would not be known, however, tracking of sales of the selected projects could be used to develop estimates. Naturally, there needs to be targeted marketing with any behavior change project. Projects would be done in collaboration with their local utility. To protect public interest, applicants would use the same measurement and verification protocols required by DOC of Minnesota utility CIP prescriptive energy efficiency projects.

- **Identify the large energy users and offer a tax incentive for energy reduction per ton of production.** Discussions may be needed to determine what size credit might serve as an incentive. Large energy users are probably relatively efficient now, but still represent a substantial opportunity. A screening of energy intensity per ton of product may be needed to determine if variation in credit is warranted. Facility benchmarks might be available but not shared with the public. Pre and post testing would help ensure savings are achieved.
  - **Offer tax incentives for facilities that can move into the top 10% of a benchmark.** Various building energy benchmarks (energy/ft<sup>2</sup>) exist for different sectors (schools, warehouses, churches). For example, give a credit for making it into the top 10% or 25% or give a credit based on how far they moved toward conservation. There is an existing federal tax credit for buildings that reduce their energy consumption. The program grants a tax deduction of \$1.80 per ft<sup>2</sup> for reducing energy consumption by 50% or more. If the reduction is at least 16.67%, then the tax deduction is \$0.60 per ft<sup>2</sup>. The program requires using DOE approved software programs to calculate the energy savings.
- 2. Energy Efficiency Technical Assistance—Voluntary, Non-Regulatory Assistance for Residential/Commercial/Industrial Entities as a Mechanism To Implement Policies and Expand Related Programs That Would Result in Energy Efficiency Savings**
- Provide energy efficiency (E2) technical assistance to industrial and business facilities including:
    - site assessments and student intern projects for E2 opportunities related to compressed air, steam systems, process heat, process refrigeration, pumps, fans, motors, etc.
    - energy efficient technology demonstrations and pilots
    - resource development including Web resources and Best Practices documents
    - workshops and seminars, including DOE Best Practices trainings
    - partnering with relevant industry associations/utilities
  - Assist industries with implementation of **the low hanging fruit of energy savings** through the above services. These four seem to be easy to implement with quick payback: process-related insulation, steam traps, lighting, and compressed air.
  - Assist in the formation of **process energy conservation teams** within industrial facilities, or within an industry sector working with industry associations. The people in the plant have the most knowledge about their process but they might get stalled on implementation. Energy conservation teams would be best suited initially for the quick hits that come from focusing on operation and maintenance activities. Over time these groups will provide the ideas for the larger capital projects. The EPA Energy Star program currently has nine focus industries (most relevant to Minnesota are: food processing, water/wastewater treatment, cement, petroleum refining, glass mfg, pharmaceuticals, and wet corn milling) where specific energy

management tools are available for that industry. All these industries have networking meetings where companies can share ideas and best practices. Six of the nine have energy guides that have been developed specifically for that industry so they can implement energy saving ideas for their facility. Minnesota industries should participate in these efforts.

- Assist facilities that run their own boilers to look at **optimizing the operation of the steam system**. Examples include right sizing boilers, waste heat recovery from steam systems, load balancing for buildings with multiple boilers, and improvements to boiler efficiency.
- Develop **benchmarks for industrial operations** where they don't exist or are not widely known, for industrial/commercial facilities or operations. The EPA Energy Star program currently has three industries that have specific energy performance indicators that can be used to benchmark a facility to help prioritize where efforts should be focused. These include cement manufacturing, wet corn milling, and auto manufacturing. The energy performance indicator for a cement plant is based on the total amount of energy required to produce a short ton or MMBtu/short ton of clinker. Even those industries that do not have published benchmarks probably have their own benchmarks but are not comfortable sharing those. If industry could be convinced that data would be confidential they may be more willing to share their benchmarks. Focus groups could be formed to promote energy conservation in high energy use industries.
- Promote, develop information and resources, provide assistance for the following **industrial energy efficient technologies** that are not frequently used and also help reduce GHG emissions:
  - waste heat recovery (Example: metal casting)
  - pumping systems (potential 20% savings)
  - combined heat and power (cogeneration)
  - boiler blow down heat exchangers or flash steam recovery systems
- Have an outside party **work with utilities and companies to track why energy efficient technologies are not being implemented**. This work would be “field proofing” ideas about barriers, such as getting industry feedback before beginning on a project. If this information already exists, it could be useful guidance on how to improve implementation.

### 3. State Economic Assistance

- **Require energy efficiency to be part of publicly financed economic development projects**. Mandate projects go beyond the building code minimum, maybe move toward a benchmark. EPA Energy Star has a program called “Target Finder” for building designers and architects so they have a target energy consumption to shoot for. The requirement could be for the design to be in the top 10% of the target.
- **Low/no interest loans or other economic assistance** for those companies that do audits, identify energy goals, are doing their first energy project, or implement their energy efficient technologies. The loans may require that an energy analysis is performed to calculate the energy savings that will be achieved which will help ensure the loan will be paid off.
- Conduct a **review of all Minnesota economic development assistance projects to ensure that they encourage/require state of the art efficiency and environmental technologies** (key to Minnesota industrial competitiveness).

- Promote and pilot test **performance contracting** in energy areas. Performance contracting is defined as a contract between a building owner and a contractor for the purpose of saving energy in the owner’s building. The contractor agrees to research, design, build, and maintain capital improvements which are expected to save energy and dollars. The owner agrees to pay the contractor from savings realized during the contract period. The Energy Star Program has information on performance contracting which could be used as a guide to provide outreach and education (e.g., a contractor agrees to provide all compressed air services including equipment, maintenance, supply/demand adjustments).
- 4. Direct Reduction of GHGs From Industry (in Addition to RCI-5 and Others)**
- Encourage the reduction of industrial emissions of GHGs (defined as climate change GHGs including CO<sub>2</sub>, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) from industries that have the greatest volumes: food processing, ethanol, petroleum refining, and taconite mining. This could be achieved via voluntary initiatives, technical assistance, best practices checklists, policy (cap and trade), and/or regulatory and other incentives. Educate industries that these activities result in carbon offset credits that they can use as revenues.

## Policy Design

### Goals—program begins:

Tax benefits: 2010  
 Technical assistance: 2008–2009  
 State economic assistance: 2010  
 Direct reduction of GHGs from industry: 2010

### Goals—goals achieved:

Tax benefits: 2012  
 Technical assistance: 2010  
 State economic assistance: 2012  
 Direct reduction of GHGs from industry: 2012

### Parties Involved:

Tax benefits: residential/commercial/industrial  
 Technical assistance: commercial/industrial  
 State economic assistance: residential/commercial/industrial  
 Direct reduction of GHGs from industry: industrial

## Type(s) of GHG Reductions

- Reductions from avoided fossil-fuel electricity generation as a result of implementation of energy efficient practices and technologies.
- Reductions of industrial based GHGs of methane and nitrous oxides.

## Estimated GHG Reductions and Net Costs or Cost Savings

**Data Sources:** The following sources were used in the analysis

- Minnesota GHG forecast developed for this process (based on the worksheet called “Energy Use and CO<sub>2</sub>” in a spreadsheet called GHGemitsum07\_Working.xls)
- Residential and commercial electricity customers, available at [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html)
- Average Retail Price for Bundled and Unbundled Consumers by Sector, Census Division, and State, 2005, available at: [http://www.eia.doe.gov/cneaf/electricity/esr/esr\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html)
- Annual Estimates of Housing Units for the United States and States: April 1, 2000, to July 1, 2005, available at U.S. Census Bureau annual data, released at the end of every July, available at: <http://www.census.gov/popest/housing/HU-EST2005.html>
- New Privately Owned Housing Units, Authorized Unadjusted Units for Regions, Divisions, and States, U.S. Census Bureau annual data, released at the end of every July, available at: <http://www.census.gov/const/C40/Table2/t2yu200512.txt>
- 2001 EIA Residential Energy Consumption Survey available at: <http://www.eia.doe.gov/emeu/recs/recs2001/detailcetbls.html#space>)
- Ratios of new residential/commercial floor space to total floor space, from EIA, available at <http://www.eia.doe.gov/emeu/cbecs/excel/b1.xls>
- Cooling degree-days in Minnesota, available at: <http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/cdd.200501-200607.pdf>
- Heating degree-days in Minnesota, available from Department of Commerce at: <http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/hdd.200507-200607.pdf>
- Minnesota population projection, Minnesota State Demographic Center, available at: <http://www.demography.state.mn.us/documents/MinnesotaPopulationProjections20052035.pdf>
- Utility electricity sales in 2005, available from U.S Energy Information Administration at: <http://www.eia.doe.gov/cneaf/electricity/page/eia826.html>
- Sectoral electricity consumption, from EIA, available from U.S Energy Information Administration at: [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html) (file sales\_revenue.xls)
- 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, <http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf>)

**Quantification Methods:** See Annex 1

**Key Assumptions:** See Annex 2

## Related Policies and Programs in Place

Tax benefits: Commerce? Revenue?

Technical assistance: Build on existing energy efficiency services of the Minnesota Technical Assistance Program (MNTAP) at the University of Minnesota (for manufacturers) and the Center for Energy and the Environment (CEE) (for small business and commercial firms)

State economic assistance: Minnesota Dept of Commerce, State Energy Office grants; MPCA grants and loans

Direct reduction of GHGs from industry: ??

## Other Related Policies/Programs in Place

Minnesota Department of Commerce, Conservation Improvement Program (CIP).

Goals of utility conservation programs are to: promote consumer and industry awareness of energy conservation and its positive effect on the environment; reduce utility bills for homes and businesses; generate innovations in developing energy efficient products and technologies; and promote new energy resource development. Electric utilities are required to show energy savings of 1.5% of their annual revenues in CIP (except Xcel Energy, which must show 2% energy savings). Natural gas utilities are required to show savings of 0.5% of their annual revenues into CIP. (is this correct?)

Section 1605b of the 1992 Energy Policy Act (Public Law 102-485) mandated the creation of a national inventory of GHGs and a national database of voluntary reductions in GHG emissions. In doing so, Section 1605b directed the Department of Energy to establish a procedure for voluntary reporting of GHG emissions and emissions reductions by companies from the year 1987 forward, on a yearly basis.

The Department of Energy runs a suite of programs dedicated to improving the energy efficiency of buildings. These programs include: Building America, Rebuild America, the High Performance Buildings Initiative, and the Zero Energy Buildings Initiative. All of these programs work through the development of voluntary public-private partnerships.

The Department of Energy Office of Industrial Technologies runs two programs primarily focused on industrial energy audits: Industrial Assessment Centers (IAC) and Plant-wide Assessments (PWA).

The Partnership for Advanced Technology in Housing (PATH) program is a voluntary public-private partnership between homebuilders, product manufacturers, insurance companies, and financial companies and the U.S. Department of Housing and Urban Development (HUD). It is dedicated to improving the energy efficiency, affordability, durability, environmental sustainability, and resistance to natural disasters of residential housing.

Energy Star is an umbrella term encompassing a broad range of programs, all designed to encourage energy efficient investments.

DOE Weatherization Assistance Program (WAP) was authorized under Title IV of the Energy Conservation and Production Act (Public Law 94-385) in 1976 to fund weatherization measures for low-income households to reduce their energy use. WAP prioritizes services to low-income families with children, the elderly, people with disabilities, and low-income households with a high energy burden. The program works through partnerships between DOE and state and local agencies in which DOE provides program grants.

The DOE Climate Challenge program is a voluntary partnership between electric utilities and DOE designed to facilitate voluntary GHG emissions reductions by utilities.

### Feasibility Issues

Measuring the effectiveness or total energy savings from a conservation initiative or program can be problematic due to difficulties in defining the right baseline, failure to correct for free riding or the “rebound” effect, use of inappropriate discount rates, and double counting of the same energy savings attributed to multiple government programs. A major question that arises when measuring program costs or cost-effectiveness is whether or not all of the salient costs (costs to business, costs to consumers, including consumer surplus losses due to quality changes, and costs to the government) are being accounted for. Equally important, the benefits of the programs (including otherwise unaccounted for spillovers) must be properly accounted for. All of these issues combined suggest that considerable care must be taken in interpreting existing estimates of the effectiveness and cost of energy efficiency programs.

- Minnesota GHG forecast developed for this process (based on the worksheet called “Energy Use and CO<sub>2</sub>” in a spreadsheet called GHGemitsum07\_Working.xls)
- Average Retail Price for Bundled and Unbundled Consumers by Sector, Census Division, and State, 2005, available at: [http://www.eia.doe.gov/cneaf/electricity/esr/esr\\_sum.html](http://www.eia.doe.gov/cneaf/electricity/esr/esr_sum.html)
- Annual Estimates of Housing Units for the United States and States: April 1, 2000, to July 1, 2005, available at U.S. Census Bureau annual data, released at the end of every July, available at: <http://www.census.gov/popest/housing/HU-EST2005.html>
- New Privately Owned Housing Units, Authorized Unadjusted Units for Regions, Divisions, and States, U.S. Census Bureau annual data, released at the end of every July, available at: <http://www.census.gov/const/C40/Table2/t2yu200512.txt>
- 2001 EIA Residential Energy Consumption Survey, available at: <http://www.eia.doe.gov/emeu/recs/recs2001/detailcetbls.html#space>
- Ratios of new residential/commercial floor space to total floor space, from EIA, available at: <http://www.eia.doe.gov/emeu/cbecs/excel/b1.xls>
- Cooling degree-days in Minnesota, available at: <http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/cdd.200501-200607.pdf>
- Heating degree-days in Minnesota, available from Department of Commerce at: <http://lwf.ncdc.noaa.gov/oa/documentlibrary/hcs/hdd.200507-200607.pdf>

- Minnesota population projection, Minnesota State Demographic Center, available at: <http://www.demography.state.mn.us/documents/MinnesotaPopulationProjections20052035.pdf>
- Utility electricity sales in 2005, available from U.S. Energy Information Administration at: <http://www.eia.doe.gov/cneaf/electricity/page/eia826.html>
- Sectoral electricity consumption, from EIA, available from U.S. Energy Information Administration at: [http://www.eia.doe.gov/cneaf/electricity/epa/epa\\_sprdshts.html](http://www.eia.doe.gov/cneaf/electricity/epa/epa_sprdshts.html) (file sales\_revenue.xls)
- 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, <http://www.westgov.org/wga/initiatives/cdeac/Energy%20Efficiency-full.pdf>

### **Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

### **Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

### **Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## RCI-7. Conservation Improvement-Type Program for Propane and Fuel Oil Efficiency

### Policy Description

Implement cost-effective programs to reduce propane and fuel-oil use; target rebates to overcome market barriers; maximize convenience to program participants; capture overall system efficiencies, not just equipment efficiencies; joint efforts to achieve market transformation; ongoing research, evaluation and analysis; complement government, utility and non-utility efficiency programs; and seek to remove any disincentives or regulatory barriers to energy efficiency.

### Policy Design

#### Goals:

- Establish minimum efficiency heating plant standards consistent with the United States Department of Energy's Energy Star program. Current Energy Star efficiency standards are 80% for fuel oil, and 85% for propane (including water heating). Recommend rebates for high efficiency models starting at 85% for fuel oil, and 90% for propane.
- Establish and implement plan for inspection and tune up of all existing in- use heating systems and establish inspection cycle. This plan should include inspection of fuel storage and delivery systems. Inspections are to be conducted and certified by certified and trained personnel.
- Remove fuel rate disincentives and/or penalties for reduced energy consumption as a result of installing high efficiency heating equipment.
- Train and certify fuel hauler drivers in efficiency standards to recognize and tag storage and furnace systems for non-compliance.
- Provide low interest loans for low income households to encourage installation of higher efficiency models.
- Encourage manufactures to take advantage of new technological developments such as alarm systems for leaks, monoxide, etc. and for component failure (i.e. filter plug, restricted heat exchanger).
- Provide public recognition to those individuals or companies that are successful leaders in promoting efficiency standards.

**Timing:** 2009. All goals must be initiated and progress evaluated.

**Parties Involved:** All Parties with interest.

**Other:**

### **Implementation Mechanisms**

Create an ongoing state task force of consumers, state agencies, utilities; and business representatives' to annually review Conservation Improvement Program initiatives and make changes according to program effectiveness, technological changes, and critical fuel changes.

### **Related Policies/Programs in Place**

Xcel's CIP Program.

### **Type(s) of GHG Reductions**

Reductions from avoided propane and fuel oil combustion.

### **Estimated GHG Reductions and Net Costs or Cost Savings**

TBD – [CCS should provide a worksheet and other reference material as needed for transparency]

**Data Sources:** [TBD by CCS on TWG approval]

**Quantification Methods:** [e.g. Full life-cycle analysis with supply/demand equilibrium adjustments on TWG approval]

**Key Assumptions:** [TBD, as needed on TWG approval]

### **Key Uncertainties**

TBD – [as needed and approved by the TWGs]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWGs]

### **Feasibility Issues**

TBD – [as needed and approved by the TWGs]

### **Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

### **Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

### **Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## RCI-8. Energy Performance Disclosure

### Policy Description

In order to engage utility consumers to actively take a role in Minnesota's energy future by considering efficiency and environmental impacts when using energy or purchasing energy consuming appliances, we propose the following:

Propose that utilities provide an energy performance disclosure to parties owning any public, commercial or residential property, preferably in an electronic format. It is proposed that this information be made available by the property owner to the prospective buyer or renter to allow for energy efficiency and environmental impacts to be an integral part of the decision to buy or rent.

Energy consumption history shall be provided by the utility to the owner to share with a perspective purchaser or renter of the property. The owner is obligated to provide the performance disclosure of their account for the term of their ownership, up to a maximum of the 12 most recent months. Additional information that would continue to encourage sound energy decisions such as a rating factor based upon kBtu/SF/year (from the owner) and CO<sub>2</sub> emissions (from the utility company) should also be included.

Develop a task force of utilities and parties of concern to devise a uniform utility information standard that would provide relevant energy efficiency and environmental impact information to customers; for example, information that indicates the incremental cost of energy per the quantity of billable units, a comparison to an average customer's energy usage, environmental impacts of such usage, and fuel portfolios, if applicable. The purpose of this action is to quantify the consumer's energy usage and to raise the level of interest.

### Policy Design

#### Goals:

**Timing:** When should the program begin? Program begins in voluntary form after law passes in mid 2008 and is mandatory on Jan 1, 2010. When must goals be achieved? In this case, the goal is the implementation of the program. See "Timing" above.

**Parties Involved:** Who is covered by the program? All building owners, public and private and all utility companies.

Take on the issue of the difference in performance based on the occupant's usage. An example would be to measure on an occupant versus SF basis or average out a number of units.

That each utility bill include relevant energy efficiency and environmental impact information, such as the monthly incremental energy unit charge (less tax), and for comparison, the historical charge for the same period from the previous billing year.

To engage and educate the consumer regarding their incremental monthly billing charges, and as an outcome, initiate sound knowledge based energy decisions.

### **Implementation Mechanisms**

How should the program be implemented? We need to do some research and get into the systems in place for distributing information on commercial and residential buildings for sale or lease (i.e. the MLS system). We also need to make sure the utilities are able to produce the information required. Eventually, more detailed information may be required to be disclosed.

### **Related Policies/Programs in Place**

None. Verify.

### **Type(s) of GHG Reductions**

Reductions from avoided fossil-fuel electricity generation and fuels combustion. (consumption?)

### **Estimated GHG Reductions and Net Costs or Cost Savings**

**Data Sources:** N/A

**Quantification Methods:** N/A

**Key Assumptions:** N/A

### **Key Uncertainties**

TBD – [as needed and approved by the TWGs]

### **Additional Benefits and Costs**

TBD – [as needed and approved by the TWGs]

### **Feasibility Issues**

TBD – [as needed and approved by the TWGs]

### **Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

### **Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

### **Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## RCI-9. Promote Technology-Specific Applications to Reduce GHG Emissions

### Policy Description

Promote through incentives, technology-specific applications that reduce GHG emissions. Identify the options through research and organize in categories such as space heating, lighting, water heating, and plug loads. Include a process to determine and clarify which applications work best in reducing GHG emissions. Clearly communicate the fact that reducing energy use does not always proportionally reduce emissions. Consider developing disincentives to technologies that do not reduce emissions.

Emphasize producing on-site renewable energy as a technology specific application. Clarify what is considered as renewable (i.e. solar hot water heat, photovoltaics and wind generation, as determined by current state law). Require 2% of energy used by state funded buildings to be on site renewable. Provide incentives to owners of other public and private buildings who produce at least 2% of their required building energy on-site.

### Policy Design

#### Goals:

**Timing:** When should the program begin? Program begins in voluntary form when law passes in June, 2008 and is in place with requirements and incentives on Jan. 1, 2010. When must goals be achieved? Goal is to have program in place by 2010.

**Parties Involved:** Who is covered by the program? Mandatory program is for state funded building owners. Incentives and disincentives are for all other public and private building owners (Residential, Commercial and Industrial). Research organizations should support this effort.

Supplement with research of technology specific applications for GHG reductions.

### Implementation Mechanisms

How should the program be implemented? Inform all building owners about the program, determine and fund possible private incentives and coordinate with education and training programs handled in other Programs.

### Related Policies/Programs in Place

Need to inventory all current incentives in the state (including an evaluation of the current cap on requiring utility companies to buy back renewable power at the cost of purchase).

### Type(s) of GHG Reductions

Reductions from avoided fossil-fuel electricity generation and energy generation.

### Estimated GHG Reductions and Net Costs or Cost Savings

**Data Sources:** N/A

**Quantification Methods:** N/A

**Key Assumptions:** N/A

**Key Uncertainties**

TBD – [as needed and approved by the TWGs]

**Additional Benefits and Costs**

TBD – [as needed and approved by the TWGs]

**Feasibility Issues**

TBD – [as needed and approved by the TWGs]

**Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

**Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

**Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## **RCI-10. Support Strong Federal Appliance Standards and Require High State Standards in the Absence of Federal Standards**

### **Policy Description**

Implementation of State appliance efficiency standards for appliances not covered by federal standards or where higher-than-federal standard efficiency requirements are appropriate.

Appliance efficiency standards reduce the market cost of energy efficiency improvements by incorporating technological advances into base appliance models, thereby, thereby creating economies of scale. Minnesota should adopt appliance efficiency standards at the state level not covered by federal standards. California has established appliance efficiency standards for a number of appliances not currently included in national legislation, such as consumer electronics (standby power use), and general service incandescent lamps.

The specific policy approach suggested by the RCI TWG is to

- Address existing federal appliance efficiency standards by developing a State of Minnesota Residential Appliance Efficiency Standard. (Consider adoption of the appliance efficiency standards already adopted by California.). Request that the Governor through the National Governors Association provide the leadership to seek adoption of the Minnesota Residential Appliance Efficiency Standard by the Federal Government.
- As part of a Minnesota Residential Appliance Efficiency Standard, require that all energy consuming appliances be labeled for average annual energy consumption (kilowatt-hours, or thermal units). The information provided in the label would be in addition to any existing Energy Star information that may already be provided for comparison purposes.
- Also as part of a Minnesota Residential Appliance Efficiency Standard require the development of a consumer education program on appliance efficiency. Insist that all utilities and appliance retailers in the state of Minnesota provide appliance efficiency information to their consumers/customers.
- Require high-efficiency Energy Star appliances be installed in all new residential construction and major retrofits.
- Require utilities to provide Energy Star appliance rebates where they are deemed cost-effective. (The Minnesota DOC commissioner will determine cost effectiveness in the CIP process.)
- Advocate for the adoption of a State of Minnesota Residential Appliance Upgrade Program. The program would require the seller of a home to establish an appliance escrow account for any of the major appliances within the home that are older than 15 years. The escrow account would only be made available to the home buyer for upgrading of the major appliances in the home to Energy Star-rated appliances.

- Where possible, require and/or encourage appliance manufacturers to adopt grid-friendly “smart chip” technology into their appliances that will allow utilities to communicate with “smart chip” appliances to curtail energy usage and/or respond to energy pricing changes.

## **Policy Design**

### **Goals:**

**Timing:** When should the program begin? When must goals be achieved?

**Parties Involved:** Who is covered by the program?

### **Other:**

## **Implementation Mechanisms**

How should the program be implemented?

## **Related Policies/Programs in Place**

None.

## **Type(s) of GHG Reductions**

Reductions from avoided fossil-fuel electricity generation.

## **Estimated GHG Reductions and Net Costs or Cost Savings**

**Data Sources:** N/A

**Quantification Methods:** N/A

**Key Assumptions:** N/A

## **Key Uncertainties**

TBD – [as needed and approved by the TWGs]

## **Additional Benefits and Costs**

TBD – [as needed and approved by the TWGs]

## **Feasibility Issues**

TBD – [as needed and approved by the TWGs]

## **Status of Group Approval**

Pending – [until MCCAG moves to final agreement at meeting #6 or #7]

## **Level of Group Support**

TBD – [blank until MCCAG meeting #6 or #7]

## **Barriers to Consensus**

TBD – [blank until final vote by the MCCAG]

## **Annex 1. Methodology for the Quantification of Energy Supply Mitigation Options**

This Annex outlines key elements of the methodology used for quantifying the GHG reduction benefits and associated costs for energy supply policy options that are considered amenable to quantification. The list of topics addressed in this Annex is summarized below. Feedback from energy supply TWG members has been solicited in the finalization of this methodological approach.

- A. Premises
- B. Outputs
- C. Methodology
- D. Assumptions
- E. Cost Inclusion
- F. Proposed Schedule and Process

### **A. Premises**

There are a number of key premises upon which the analysis was based, as briefly outlined below.

- *CCS role*: CCS has undertaken the analysis of the ES options, with input and feedback from energy supply TWG members
- *Transparency*: Data sources, methods, key assumptions, and key uncertainties are to be clearly indicated.
- *Analytical approach*: The general approach was adopted of cost-effectiveness (and NPV) analysis, as widely applied to GHG mitigation policy options.<sup>1</sup> We include direct, economic costs from the perspective of the state as whole (e.g. avoided costs of electricity rather than consumer electricity prices).
- *Bottom-up analysis*: A bottom-up approach was adopted which is amenable to transparency and is capable of reflecting the costs (and cost savings) associated with individual policy options, in contrast to macroeconomic analysis, which aims to capture flows and interactions across all sectors of the economy. Potential macroeconomic impacts, cost or benefits that fall disproportionately on specific groups or actors, as well external costs and benefits, should be noted qualitatively where studies or other information are available.

### **B. Outputs**

The analysis of mitigation options was organized so as to produce the following results:

---

<sup>1</sup> See, for example, Section 2.4 of the IPCC Fourth Assessment Report, Working Group III, for more discussion of various economic analysis approaches, [http://www.mnp.nl/ipcc/pages\\_media/AR4-chapters.html](http://www.mnp.nl/ipcc/pages_media/AR4-chapters.html)

- *Net GHG reduction potential* in million metric tons carbon dioxide equivalent (MMtCO<sub>2</sub>e) using IPCC 100 yr global warming potential, reported annually for the years 2015, 2020, and 2025, as cumulatively for the period 2008-2025. Where significant additional GHG reductions or costs occur beyond the project period as a direct result of actions taken during the project period, these will be indicated as appropriate.
- *Net present value (NPV) cost* (or cost savings) for the period 2008-2025 in 2006 constant dollars, using a 5% real discount rate.<sup>2</sup> Positive numbers represent options with net costs; negative numbers represent options with net cost savings.
- *Cost per metric ton of CO<sub>2</sub> equivalent* emissions reduced (or removed) in units of dollar per metric ton of carbon dioxide equivalent (\$/tCO<sub>2</sub>e). This figure represents the NPV cost divided by the cumulative emission reductions, both over the 2008–2025 period.

### C. Methodology

The analysis proceeded using simple spreadsheet modeling techniques in which assumptions were transparent and readily accessible to any TWG member for review and adjustment. In order to ensure consistent results across options, common factors and assumptions were used for items such as

- *Electricity avoided costs and emissions:* Common values (\$/MWh and tCO<sub>2</sub>/MWh) were developed based on available studies. Each mitigation option was a) first analyzed individually and then b) addressed as part of an overall integrated analysis.
- *Fuel costs and projected escalation:* Fuel cost estimates were based on common sources, wherever possible. For example, fossil fuel price escalation were indexed to USDOE projections as indicated in their most recent Annual Energy Outlook (i.e., 2007).
- *Overlap with other TWGs:* There were some RCI options that overlapped with options considered in the ES TWG. The analysis for these options took place in close coordination with the assumptions other inputs used in the ES TWG.
- *Consumption-based approach:* this approach was used which aims to reflect the emissions associated with electricity sources used to deliver electricity to consumers in Minnesota. It is distinct from a production-basis approach which considers the emissions from Minnesota power plants, regardless of where the electricity is delivered.
- *Full fuel cycle approach:* Related to the previous point, a fuel cycle analysis was applied wherever emissions impacts upstream (e.g., production, extraction) or downstream (e.g. waste disposal) from a specific activity constitute a significant fraction of a policy option's emissions impacts *and* studies were sufficient to enable estimation.

### D. Assumptions

As much as possible, the analysis sought to rely on data sources that are Minnesota-specific, and which TWG members were in a good position to obtain and provide. The success of this approach depended on how accessible the information was to TWG members and the timeliness in which it was provided to the CCS analysis team. Where Minnesota-specific information could

<sup>2</sup> Capital investments with lifetimes longer than 2025 are represented in terms of levelized or amortized costs to avoid “end effects.”

not be readily obtained, the analysis relied on published data from the US Department of Energy, National Laboratories, and other state climate change processes.

### **E. Cost Inclusion**

There are several types of costs that were explicitly considered in the analysis and several types that were excluded, as summarized below.

- *Costs included:* Examples include the following:
  - Capital costs levelized (amortized) where appropriate, e.g. for new energy efficient equipment
  - O&M and other labor costs (or incremental costs relative to standard practice),
  - Fuel and material costs, e.g. for natural gas, electricity, biomass resources, water, fertilizer, material use, electricity transmission and distribution
  - Other direct costs administrative and other costs (where readily estimated).
- *Costs excluded:* Examples include the following:
  - External costs such as the monetized environmental or social benefits/impacts (value of damage by air pollutants on structures, crops, etc.), quality-of-life improvements, or improved road safety, or other health impacts and benefits
  - Energy security benefits
  - Macroeconomic impacts related to the impact reduced or increased consumer spending, shifting of cost and benefits among actors in the economy

### **F. Proposed Schedule and Process**

## Annex 2. Key Assumptions

### RCI-1: Maximize Savings From the Utility Conservation Improvement Program (CIP)

**Assumed start year for the new CIP legislation**

2008

**Current estimates of accumulated embedded energy efficiency and conservation in 2003 (new CIP activities as a percentage of total sales):**

	1
1	0.8%
2	0.5%
3	0.4%

**Future program spending of the new CIP**

	1
1	Future spending proportional to 2003 levels (default)
2	User-defined

**Marginal resource associated with electricity savings**

	1
1	coal & natural gas, prorata (default)
2	100% coal
3	system average

**Current estimates of accumulated embedded energy efficiency and conservation in 2003 (new CIP activities as a percentage of total sales):**

Estimate #	1	is the assumption used in the analysis
Estimate #1 (default)	0.8%	source: Office of the Legislative Auditor, State of Minnesota, 2005, "Evaluation Report: Energy Conservation Improvement Program", January, page 5
Estimate #2	0.5%	source: RCI TWG estimate as proposed during the TWG meeting held on 23 October 2007
Estimate #3	0.4%	source: spreadsheet attachment in an email from Peter Ciborowski to Bill Dougherty dated 26 October 2007

**Current estimates of first year cost effectiveness of MN CIP**

2003 expenditures by regulated utilities (million \$)	\$52	source: Office of the Auditor
2003 savings from utility expenditures (GWh)	325	source: Office of the Auditor
Average lifetime of measures (years)	15	
Lifetime savings from 2003 utility expenditures (GWh)	4,875	

**Program spending in 2003 (2005\$/MWh of sales avoided)**

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
All measures/sectors (nominal dollars)	168	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Levelized cost associated with 2003 program spending (2005 \$/MWh of sales avoided)**

projected inflation rate (2003-2005)	2.5%
real discount rate (%)	5%
Levelization period (years)	15
NPV (million 2005\$/MWh)	\$160
Real levelized cost (2005\$/MWh)	\$15.4

**Levelized cost associated with future cost effectiveness of the MN CIP (2005\$ per MWh of sales avoided)**

Growth rate in program spending (%/yr)	0%
Most recent estimate - all costs (2005\$/MWh)	\$15.4

## RCI-2. Improved Uniform Statewide Building Codes

Assumed start year for the new CIP legislation

2009

Assumption for improvement of the residential building code relative to the current residential building code in areas where the building code HAS BEEN adopted and IS BEING enforced

1

1	no improvement in energy efficiency (default)
2	User-defined

Assumption for improvement of the residential building code relative to the current residential building code in areas where the building code has NOT been adopted

1

1	improvement in energy efficiency of	3%	(default)
2	User-defined		

Assumption for percent of the state population covered by current residential building codes

1

1	The percent of MN's population is	85%	covered by the current building code (default)
2	User-defined		

Assumption for future enforcement of the residential building code

1

1	100% Statewide (default)
2	User-defined

Assumption for improvement of the commercial building code relative to the current commercial building code in areas where the building code HAS BEEN adopted and IS BEING enforced

1

1	no improvement in energy efficiency (default)
2	User-defined

Assumption for improvement of the commercial building code relative to the current commercial building code in areas where the building code has NOT been adopted

1

1	improvement in energy efficiency of	5%	(default)
2	User-defined		

Assumption for percent of the state commercial activity covered by current commercial building codes

1

1	Percent of MN's commercial sector,	85%	is covered by the current building code (default)
2	User-defined		

Assumption for future enforcement of the commercial building code

1

1	100% Statewide (default)
2	User-defined

Marginal resource associated with electricity savings

1

1	coal & natural gas, prorata (default)
2	100% coal
3	system average

Real discount rate

1

1	Use	5%
2	User-defined	

### RCI-3. Green Building Guidelines and Standards Based on Architecture 2030

Assumed CO2 reduction targets to meet the Architecture 2030 Challenge (% relative to Reference Case)																				
2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
0%	0%	0%	0%	0%	60%	62%	64%	66%	68%	70%	72%	74%	76%	78%	80%	82%	84%	86%	88%	90%

#### Real discount rate

	1	
1	Use	5%
2	User-defined	

4% since not user-defined, ignore value in cell at left

### RCI-4. Incentives and Resources to Promote Combined Heat and Power (CHP)

**Assumed start year for the new CHP facilities**

2013

**Assumption for CHP potential in MN based on most recent available estimates**

1

1	Maximum of:	2,100 MW (default)
2	Minimum of:	1,600 MW (default)
3	User-defined	

**Assumption for percentage of installed CHP by 2025**

1

1	Up to specified potential (default)
2	User-defined

**Marginal resource associated with electricity savings**

1

1	coal & natural gas, prorata (default)
2	100% coal
3	system average

**Combined heat and power (CHP) cost and performance**

Parameter	2010					2025				
	NG	Biomass	Coal	electricity	oil	NG	Biomass	Coal	electricity	oil
Average full-capacity-equivalent hours of operation	5,000	5,000	5,000			5,000	5,000	5,000		
Fraction of new capacity	90%	5%	5%			83%	18%	0%		
Average net heat rate by fuel (btu per kWh)	10,000	13,000	12,000			10,000	13,000	12,000		
Useable cogenerated heat output (% energy input)	40%	40%	40%			40%	40%	40%		
Fraction useable heat output replacing space/water/process heat	90%	90%	90%			90%	90%	90%		
Fraction of CHP heat output displacing thermal energy	75%	5%	0%	15%	5%	75%	5%	0%	15%	5%
Net efficiency of displaced boiler/heater thermal energy	85%	80%	80%	92%	80%	85%	80%	80%	92%	80%
Average overnight installed captial costs by fuel type (2005\$/kW)	\$2,000	\$2,500	\$2,500			\$2,000	\$2,500	\$2,500		
CHP transmission cost (2005\$/kW)	\$0	\$0	\$0			\$0	\$0	\$0		
Economic life of system (years)	20	20	20			20	20	20		
Fixed O&M costs (2005\$/kW)	0	0	0			0	0	0		
Variable O&M costs (2005 \$/MWh)	16.00	20.00	20.00			16.00	20.00	20.00		

**RCI-5. Program to reduce emissions of non-fuel, high-global-warming-potential GHGs**

Still under development

**RCI-6. Non-utility Strategies and Incentives to Encourage Energy Efficiency and Reduce**

**Start-up year for option**

<b>1</b>		
1	Use	2013
2	User-defined	

**Average energy savings from application of measures associated with non-utility strategies and incentives in the residential sector (% relative to Reference Case)**

<b>1</b>		
1	Use	13%
2	User-defined	

**Average energy savings from application of measures associated with non-utility strategies and incentives in the commercial sector (% relative to Reference Case)**

<b>1</b>		
1	Use	13%
2	User-defined	

**Average energy savings from application of measures associated with non-utility strategies and incentives in the industrial sector (% relative to Reference Case)**

<b>1</b>		
1	Use	15%
2	User-defined	

**Annual technical assistance visits to residential sector customers**

<b>1</b>		
1	Use	10,000
2	User-defined	

**Annual technical assistance visits to comercial sector customers**

<b>1</b>		
1	Use	1,500
2	User-defined	

**Annual technical assistance visits to industrial sector customers**

<b>1</b>		
1	Use	300
2	User-defined	