

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

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-6	Non-utility Strategies and Incentives to Encourage Energy Efficiency and Reduce GHG Emissions	0.25	1.30	8.3	-\$307	-\$37	Approved

## 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 reduce greenhouse gas (GHG) emissions through energy efficiency (E2) and adoption of renewable energy technologies. 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
- Remove 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 categories: technical assistance for implementation of energy efficiency and renewable energy, tax incentives or benefits, state economic assistance, and direct reduction of GHGs from industry.

### Implementation Mechanisms

#### 1) **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 GHG reductions through energy efficiency savings and adoption of renewable energy technologies**

- Provide **technical assistance to industrial and commercial 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 and utilities
  - evaluate renewable energy technology options
- 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.

- 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, boiler turndown, load balancing for buildings with multiple boilers, and improvements to boiler efficiency.
- Develop **benchmarks for industrial and commercial 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. d 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 and renewable energy 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.

## 2) **Direct reduction of GHGs from industry (in addition to RCI-5 and others)**

- a. **Encourage the reduction of industrial emissions of GHGs (defined as climate change greenhouse gases 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.

## 3) **Tax Incentive Programs (that are not already in place)**

- **Provide tax incentives for capital equipment that reduces energy use per unit of product by more than 10% (possibly on a sliding scale)**. 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. Equipment suppliers or businesses would need to measure energy consumption before and after installation of equipment.
- **Offer tax incentives for specific technologies (ie, pumps, motors, fans, boilers, compressed air systems) known to deliver energy efficiency**. NEMA (National Electrical Manufacturers Association) 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. 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, etc). 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.
- Provide tax incentives for reducing GHGs by adopting renewable energy technologies such as biomass, biofuels, and biogas. Implementing renewable energy technologies offset the use of fossil fuels, thus helping reduce greenhouse gas emissions.

#### 4) State Economic Assistance

- **Low/no interest loans or other economic assistance** for those companies and public entities 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.

### 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

- Retrospective Examination of Demand-Side Energy Efficiency Policies, Discussion Paper, June 2004; revised September 2004 RFF DP 04-19 REV, 2004 Resources for the Future, Kenneth Gillingham, Richard Newell, and Karen Palmer
- 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**

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: MN Dept of Commerce, State Energy Office grants; MPCA grants and loans

Direct reduction of GHGs from industry: Industry program initiatives and MnTAP

## **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.

Next Generation Act of 2007: It is the energy policy of the state of Minnesota to achieve annual energy savings equal to 1.5 percent of annual retail energy sales of electricity and natural gas directly through energy conservation improvement programs and rate design, and indirectly through energy codes and appliance 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 efforts to promote energy efficiency and energy conservation.

Section 1605b of the 1992 Energy Policy Act (Public Law 102-485) mandated the creation of a national inventory of greenhouse gases and a national database of voluntary reductions in greenhouse gas emissions. In doing so, Section 1605b directed the Department of Energy to establish a procedure for voluntary reporting of greenhouse gas 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 greenhouse gas emissions reductions by utilities.

**Key Uncertainties**

Cost effectiveness of technical assistance visits

**Additional Benefits and Costs**

Reduced local air pollution

**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.

**Status of Group Approval**

Approved

**Level of Group Support**

Approved

**Barriers to Consensus**

None

## Annex 2. Key Assumptions

### 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 commercial 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	