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IN THE MATTER OF THE INVESTIGATION OF REGULATORY AND RATE INCENTIVES FOR CUSTOMERS OF GAS AND ELECTRIC UTILITIES	)))	DOCKET NO. 08I-420EG

RESPONSE OF THE ROCKY MOUNTAIN CLIMATE ORGANIZATION TO ORDER REQUESTING COMMENTS

Pursuant to Decision No. C08-0988, Order Opening Docket, Establishing Procedures and Dates, and Seeking Comments and Information, issued by the Colorado Public Utilities Commission (Commission) on September 25, 2008 (Order), the Rocky Mountain Climate Organization (RMCO)[1] submits the following response to some of the questions contained in Appendix A to the Order. The Commission stated in its Order that it does not expect that all parties will respond to all questions included in Appendix A and that parties may select the areas on which they wish to focus their comments.

RMCO appreciates the opportunity to respond and hopes that our responses provide useful information to the Commission.

The questions that RMCO hereby responds to are based on the November 2007 report of the blue-ribbon Climate Action Panel (CAP) convened by RMCO to recommend actions to reduce Colorado's contribution and vulnerability to climate change.[2]

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[1] RMCO is a 501 (c) (3) non-profit organization with 46 partner organizations, including 17 local governments, Colorado's largest water provider, 16 businesses, and 12 nonprofit organizations. We work to keep the West a special place by reducing climate disruption and its effects here. Additional information about RMCO can be accessed at www.rockymountainclimate.org.

[2] The 34-member CAP, comprised of leaders from the state's public, private, and non-profit sectors, recommended 70 actions to be taken in Colorado, consisting of 55 recommendations to reduce heat-trapping greenhouse gases and 15 recommendations to prepare the state for the changes that may be coming. The full report of the CAP can be accessed at www.coloradoclimate.org.

Patterned after projects to develop climate action agendas in other states, including many in the West, the Colorado Climate Project is the first in the nation to be undertaken by a non-profit organization. One key similarity between the Colorado Climate Project and many of the state-government efforts around the country is that this project was carried out as a partnership between RMCO and the Center for Climate Strategies (CCS),[3] which helped design the process and provided technical analyses and facilitation services for this project, as CCS has done for state government advisory panels in other states. CCS provided considerable professional expertise in assisting with the design of policy recommendations and in performing detailed technical analyses of the greenhouse gas reduction and cost-effectiveness calculations for each policy considered by the CAP. The analyses contained in this response were performed by CCS in support of the specific CAP recommendations that are relevant to the questions posed in Appendix A of the Commission's Order.

OPENING COMMENT

Of the CAP's 55 recommendations to reduce emissions of heat-trapping gases, three were directly related to the Commission's Appendix A questions regarding inverted block rate structures, price elasticity, time-of-use pricing, and "smart grid" metering. Two of those related recommendations, described below in the responses to the questions, were among the 33 recommendations analyzed quantitatively to estimate their effects on emissions for the period 2007-2020. Those two analyzed recommendations ranked in the top three recommendations in terms of cumulative reduction in emissions by 2020, expressed in metric tons of emission reductions, calculated in carbon dioxide equivalent. Those same two recommendations were

[3] For additional information about CCS, see www.climatestrategies.us).

also among the 26 recommendations analyzed for cost-effectiveness, and ranked among the top nine in cost savings, expressed in dollars per metric ton.

RMCO's responses to some of the Commission's Appendix A questions consist of a description of the relevant CAP recommendations and commentary on them. Included in the explanation of the proposals are a summary statement of the recommendation, the nature of the CAP's adoption of the recommendation (i.e., unanimous consent, simple majority, or supermajority, plus qualifications of votes of approval[4]), and the calculated greenhouse gas reductions and cost-effectiveness numbers.

The full analyses of CAP recommendations were recorded in the appendices of the CAP's report. The full analyses of the recommendations that are described below are attached as Exhibit A.

RESPONSES TO SELECTED QUESTIONS

1. ***During 2007 the Commission held public hearings in eight locations around Colorado. In several of these hearings the Commission heard from customers that electric rates should be designed using "inverted block" rates in which the price of energy in the "tail block" was priced at a higher level***
    a. ***What is your view of this proposal for customer classes that are billed on a two-part rate (monthly service charge and a commodity rate)?***
    b. ***Can "inverted block rates" be justified on the basis of cost of service?***
    c. ***Can "inverted block rates" be justified on another basis (e.g., the goal of energy efficiency, customer equity, marginal cost considerations, etc.)?***

CAP Recommendation RCI-5: Inverted Block Rates to Fund Energy Efficiency

Recommendation description:

[4] When making final decisions on adoption of recommendations, the CAP followed a voting process wherein recommendations were adopted unanimously, by super majority (with five or fewer votes against adoption), or by simple majority. Xcel Energy's CAP member helped to build consensus among the panel members by suggesting that members be enabled to express qualifications about a recommendation. These expressions of qualifications, which CAP members called "yes but" votes, allowed members to express an objection or concern to some of the specific details of a policy recommendation or the supporting analysis considered by the CAP without objecting to the overall concept of the policy.

This recommendation uses tiered, increasing surcharges to simultaneously provide a source of funding for energy efficiency through utility-funded demand side management programs and a financial incentive for consumers to reduce energy use. Recommended are standard rates up to a first threshold (set at 50% of the Architecture 2030 energy consumption reduction targets), two cents/kWh surcharge for kWh above the first threshold up to a second threshold (set at twice the average consumption level of the first threshold), and five cents/kWh surcharge for all kWh in excess of the second threshold. These thresholds are based on recent investor owned utility (IOU) experience with inverted block rates in California.

Rates would be applicable statewide for the residential and commercial sectors, commencing in 2010. Proceeds would be used to fund energy efficiency programs in the residential and commercial sectors. Implementation would be consistent with the implementation mechanisms established by HB07-1037. Municipal utilities and cooperatives would have the option of participating in a System Benefits Charge (SBC).

CAP adoption: Adopted by simple majority, with seven objections.

Summary analysis:

GHG Reductions ($MMtCO_2e$)			Costs (Savings) 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)
2012	2020	Total 2007–2020		
1.6	6.7	38.2	-$1135	-$30/ton

Note: Negative numbers indicate cost savings.

RMCO comments:

Among the CAP members' objections to this recommendation was the assertion that the Commission's current rules would not allow a rate structure designed to recover more than the

cost of service. The analyses done for this recommendation indicate substantial reductions in greenhouse gas emissions may be realized at an impressive rate of cost-effectiveness. The Commission should examine whether its rules on rate structure should be modified to accommodate demand side management applications such as the one described in this CAP recommendation.

CAP Recommendation RCI -11: Cost of Service Inverted Block Rates

Recognizing the potentially controversial nature of the RCI-5 recommendation for an inverted block rate structure to fund energy efficiency programs, the CAP also adopted an alternative recommendation for an increasing block rate design that would solely be structured to recover the cost of service, as in traditional ratemaking, without raising additional funds for demand side management programs.

CAP adoption: By unanimous consent.

Summary analysis: Because this recommendation was adopted late in the CAP process, there was neither sufficient time nor resources to perform greenhouse gas reduction and cost-effectiveness calculations.

RMCO comments:

This alternative would certainly not generate as extensive emission reductions or the overall savings of the RCI-5 recommendation described earlier, since it would provide no excess funds to specifically promote energy efficiency programs. As noted in the Exhibit A documentation of the RCI-5 analyses, the Energy Information Administration calculates the short-term price

elasticity of electricity at -0.2 for residential consumers and -0.1 for commercial consumers.[5] The analysis also notes that in reality, price elasticity differs widely among consumers, but for purposes of simplicity, the calculations are based on the assumption that the EIA price elasticity data represent uniform price elasticity for the entire residential sector and the entire commercial sector.

7. ***The cost of a kilowatt-hour of electricity for a utility varies with time of the day and seasons of the year. Some advocate that electricity be priced on a time-of-use (TOU) basis to reflect those cost differences.***
    a. ***What is your opinion of TOU pricing for residential customers? For commercial customers?***
    b. ***How receptive do you think consumers would be to (mandatory) TOU rates?***
    c. ***Assuming the total revenues of a utility remain the same, which residential customers are likely to be better off if all customers are served with TOU rates? Which are likely to be worse off?***
    d. ***Must TOU rates include dynamic pricing signals to optimize the management of cost differences by time-of-day?***

15. ***What is your opinion of the "smart grid" architecture in which customers would be provided with real-time information about consumption, billed at real-time prices and have the ability to control "smart" appliances?***

CAP Recommendation RCI-7: Pricing and Purchasing (Smart Metering)

Recommendation description:

This recommendation responds to Appendix A questions number 7 and number 15 both. The recommendation is based on pilot programs that have found that adoption of smart metering, combined with time-of-use rate schedules and in-home displays, enables electricity consumers to better manage energy use, and can lead to electricity consumption reductions of 4% to 15%. The recommendation includes a Commission study of a mandatory investor-owned utility program combining advanced metering infrastructure, time-of-use electricity rates, and end-user energy displays. If found to be feasible and effective, the recommended start-up would be in 2009,

[5] See www.eia.doe.gov/oiaf/analysispaper/elasticity/table1.html.

targeting 10% of industrial, commercial, and residential consumers, ramping up to 100% by 2013. All Colorado utilities would be included in the implementation, and full recovery for the costs of the program through the utility ratemaking process should be allowed.

CAP adoption: By unanimous consent.

Summary analysis:

GHG Reductions ($MMtCO_2e$)			Costs (Savings) 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)
2012	2020	Total 2007–2020		
2.0	2.6	25.4	-$844	-$33/ton

RMCO comments:

The Commission should consider performing the study contemplated by the recommendation. The Exhibit A description of the analyses performed for this recommendation lists several studies that have been completed for different types and costs of smart metering in place in other states and localities. We note that Xcel Energy has partnered with the City of Boulder to engage in a smart metering pilot program; the results of that pilot should be factored into Commission considerations.

CONCLUDING COMMENT

RMCO appreciates the opportunity to submit these comments and we look forward to attending the panel discussions and/or workshops discussed in the Order.

DATED this 31st day of October, 2008.

Respectfully Submitted,

Tom Easley

Tom Easley, Director of Programs
Rocky Mountain Climate Organization

EXHIBIT A

Rocky Mountain Climate Organization

Response to Docket No. 08I-420EG Appendix A Questions

INVESTIGATION OF REGULATORY AND RATE INCENTIVES FOR CUSTOMERS OF GAS AND ELECTRIC UTILITIES

Submitted to

Colorado Public Utilities Commission

October 31, 2008

RCI-5. Inverted Block Rates to Fund Energy Efficiency

Policy Description

This option uses tiered, increasing surcharges to simultaneously provide a source of funding for energy efficiency and a financial incentive to adhere to high energy efficiency (low energy intensity) standards. Unlike a traditional public benefits charge, the surcharge grows with increasing use above target levels. High efficiency consumers will pay no surcharge.

Policy Design

Goals: Standard rates up to the first threshold (set at 50% of the Architecture 2030 energy consumption reduction targets), 2 cents/kWh surcharge for kWh above the first threshold up to the second threshold (set at twice the first threshold), and 5 cents/kWh surcharge for all kWh in excess of the second threshold. Proceeds are to be used to fund energy efficiency programs in the Residential and Commercial sectors.

These thresholds are based on recent investor owned utility (IOU) experience with inverted block rates in California.

Timing: Starting in 2010.

Coverage: Rates are applicable statewide for the Residential and Commercial sectors.

Implementation Mechanisms

Implementation to be consistent with the implementation mechanisms established by HB07-1037. Municipal utilities and cooperatives would have the option of participating in a System Benefits Charge (SBC).

Related Policies/Programs in Place

Inverted block rates in California as documented in: SCE. Residential Baseline Allocation, available at http://www.sce.com/NR/rdonlyres/DF137120-E263-459E-96F4-0B4F4BA60520/0/597R0906ResidentialBaseline.pdf

Type(s) of GHG Reductions

Reduction in GHG emissions (largely CO_2) from avoided electricity production

Estimated GHG Savings and Costs per $MtCO_2e$

	GHG Reductions ($MMtCO_2e$)			Gross Costs (Million $)	Gross Benefits (Million $)	Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)
	2012	2020	Total 2007-2020				
RCI-5	1.6	6.7	38.2	$690	–$1,825	–$1,135	–$30

Data Sources, Methods, and Assumptions

Data Sources:

- *Price elasticity of electricity:* EIA, Price Responsiveness in the AEO2003 NEMS Residential and Commercial Buildings Sector Models, available at www.eia.doe.gov/oiaf/analysispaper/elasticity/index.html and www.eia.doe.gov/oiaf/analysispaper/elasticity/table1.html
- *Electricity prices:* same sources as used for RCI-1.
- *Return on investment in efficiency measures:* same sources as used for RCI-1.

The California Public Utilities Commission requires IOUs to establish inverted block rates for residential customers. In this rate structure, the baseline consumption or threshold that covers basic needs of residential customers are set higher than those originally set for RCI-5 based on Architecture 2030. The baseline consumption allocation typically covers 60-70% of the average residential energy use in each region.[1]

Quantification Methods:

Estimate base electricity consumption levels that are not subject to surcharges based on 50% of Architecture 2030 energy consumption reduction targets (first threshold). Per capita annual electric consumption for residential and per square foot annual electric consumption are used to estimate the base consumption levels. Estimate electricity consumption levels that are equal to twice the first consumption threshold (second threshold). Allocate projected total electricity consumption by residential and commercial sectors among (1) base consumption (less than or equal to the first threshold); (2) above the first threshold but less than or equal to the second threshold; and (3) greater than the second threshold. Project change in electricity consumption based on price elasticity and revenues available for energy efficiency programs. Estimate energy savings based on price elasticity as well as new energy efficiency programs funded by inverted block rates. (See the data sources, quantification methods, and assumptions for RCI-1 for an explanation of the analysis of RCI-5's enhanced energy efficiency benefits)

The Architecture 2030 energy consumption reduction targets are defined as 60% of the Year 2003 regional or national average electricity consumption during the period between 2010 and 2014, 70% of the Year 2003 average consumption between 2015 and 2019, and 80% of the Year 2003 consumption in 2020. Thus, 50% of the Architecture 2030 energy consumption reduction

[1] SCE. Residential Baseline Allocation, available at http://www.sce.com/NR/rdonlyres/DF137120-E263-459E-96F4-0B4F4BA60520/0/597R0906ResidentialBaseline.pdf

targets equals 30% of the Year 2003 regional or national average electricity consumption between 2010 and 2014, and 35% between 2015 and 2019, and 40% in 2020.

Key Assumptions:

Parameter	Value	Notes
Price elasticity of electricity:	–0.2 Residential, –0.1 Commercial	Source: Short-term price elasticity from EIA, www.eia.doe.gov/oiaf/analysispaper/elasticity/table1.html. In reality, price elasticity differs widely among consumers. For simplicity, we assume that these price elasticity data used by EIA represent price elasticity for the entire residential sector and the entire commercial sector.
50% of Architecture 2030 Challenge Site EUI energy consumption reduction targets	30% in 2010, 35% in 2015, 40% in 2020	Architecture 2030 calls for reduction in fossil fuel energy use in all buildings by 60% by 2010, by 70% by 2015, and by 80% by 2020. For this policy option, base electric consumption is set at twice these targets (half the reduction) on a per capita basis for residential and per square foot basis for commercial use for the first threshold. The second threshold is twice the first.
Substitution effect for heating fuel (cross price elasticity)	none	This effect was not considered for this analysis. EIA reports that cross-price elasticity for electricity to natural gas for the residential sector is 0.01; for the commercial sector, it is 0.01. (AEO2003)
Assumed cost of implementation of inverted-block tariffs	$0/MWh	In practice, there will be some costs associated with implementing inverted-block tariff structures, including program administration costs and changes to billing systems. These costs are not explicitly accounted for in this analysis, but are likely to be quite small relative to the electricity cost savings achieved through the policy.
Avoided electricity cost (residential and commercial)	$61/MWh	Electricity avoided costs are based on Xcel's Colorado DSM Market Potential Assessment, March 2006 and include energy and capacity costs.
Levelized cost of electricity savings	2.5 cents/kWh (2005$ levelized)	See notes under RCI-1.
Electricity savings per $ of program investment (first year savings)	4.1 MWh/$1000 spent, or $247/MWh 1st yr savings	See notes under RCI-1.
Retail electric rates	9 cents/kWh for residential and 7.5 cents/kWh for commercial	Colorado average retail price in 2006 from EIA "Current and Historical Monthly Retail Sales, Revenues, and Average Retail Price by State and by Sector (Form EIA-826)" available at www.eia.doe.gov/cneaf/electricity/epa/epat7p4.html
Electricity emissions factors	Near-term (<2012): 0.92 tCO_2e/MWh Long -term (>2012): 0.79 tCO_2/MWh	

- Energy savings are assumed to continue until 2020 with no decay of program effects, because the study period is less than the average lifetime of the program measures.
- Annualized program costs (amortized over a period of 13 years or longer, consistent with the life of the asset) are included in the analysis through 2020.

Key Uncertainties

PUC, consumers, and utilities may be averse to adopting steep inclining block rates. Provisions for low income consumers may be required (e.g., PG&E has separate tiered rates for low income schedules.)

Additional Benefits and Costs

- Reducing dependence on imported fuel sources
- Reducing energy price increases and volatility
- Reducing peak demand and improving the utilization of the electricity system
- Reducing the risk of power shortages
- Enabling avoidance of energy supply projects
- Reducing water consumption by power plants
- Reducing pollutant emissions by power plants and improving public health

Feasibility Issues

For IOUs, this policy must go through a regulatory process. For utilities not under PUC authority, this policy may require legislation.

As constructed, this policy has received objections from some PWG members representing utilities. Cost recovery for energy supply could be difficult and complex under this policy where additional charges for higher consumption are used to fund energy efficiency, which in turn has the effect of reducing energy sales. An alternative policy construction that includes a cost-based inverted block rate consistent with ratemaking principles may find stronger support among the PWG.

This policy is mutually exclusive to RCI-7 and RCI-11.

Status of Group Approval

Approved by those CAP members present and voting, with seven objections.

Level of Group Support

Objections concerned feasibility issues on the one hand, and concerns that the policy is insufficiently aggressive with the given targets on the other. One CAP member objected on the basis that the policy is essentially structured as an electricity use tax.

Barriers to Consensus

Utility representatives do not support a rate structure that is designed to recover more than the cost of service. Proponents of the policy support it as an effective price signal to consumers.

RCI-11. Cost of Service Inverted Block Rates

Policy Description

This option is an increasing block rate design that would solely be structured to recover cost of service, as in traditional ratemaking. Such a policy might encourage greater levels of energy efficiency based on a price elasticity effect, but would provide no excess funds to specifically promote energy efficiency programs.

Policy Design

Goal: Consider implementing inverted block rates to encourage the efficient use of electricity .

Timing: Starting in 2010.

Parties Involved: Rates are applicable statewide, Residential and Commercial sectors.

Implementation Mechanisms

For IOUs: Inverted rate applied to cost of service as approved by the PUC.

For other load serving entities: Inverted rate applied to cost of service as approved by the relevant authority.

Statewide implementation would likely require legislative change.

Related Policies/Programs in Place

None noted.

Type(s) of GHG Reductions

Reduction in GHG emissions (largely CO_2) from avoided electricity production or on-site fuel combustion.

Estimated GHG Savings and Costs per $MtCO_2e$

Not applicable.

Data Sources, Methods, and Assumptions

Data Sources: Not applicable.

Quantification Methods: This policy was not analyzed.

Key Assumptions: Not applicable.

Key Uncertainties

None noted.

Additional Benefits and Costs

Potential additional benefits:

- Reducing dependence on imported fuel sources.
- Reducing energy price increases and volatility.
- Reducing peak demand and improving the utilization of the electricity system.
- Reducing the risk of power shortages.
- Enabling avoidance of energy supply projects.
- Reducing water consumption by power plants.
- Reducing pollutant emissions by power plants and improving public health.

Feasibility Issues

For IOUs, this policy must go through a regulatory process. For utilities not under PUC authority, this policy would require approval by other authorities.

This policy is mutually exclusive to RCI-5 and RCI-7.

Status of Group Approval

Unanimous consent of those CAP members present and voting.

Level of Group Support

No objections.

Barriers to Consensus

None identified.

RCI-7. Pricing and Purchasing

Policy Description

Adopt smart metering, combined with time-of-use rate schedules and in-home displays, to enable electricity consumers to better manage energy use.

Initial expectation is to reduce electricity consumption 4% to 15%.

Policy Design

Goals: Implement time of use rates with smart meters and in-home displays of energy use, cost, and associated GHG emissions for 100% of electricity customers in Colorado (including customers of investor-owned utilities, cooperatives, and municipal utilities).

Timing: Start up in 2009, targeting 10% of industrial, commercial, and residential consumers, ramping up to 100% by 2013.

Parties Involved: All industrial, commercial, and residential electricity customers in Colorado.

Implementation Mechanisms

- A legislatively-prescribed Colorado Public Utilities Commission study of a mandatory investor-owned utility program combining advanced metering infrastructure, time-of-use electricity rates, and end-user energy displays. The study would weigh the energy cost savings, peak reduction benefits, and greenhouse gas benefits against the cost of the program. Costs would be considered from both the customer and the utility perspective. The study would use Colorado-specific assumptions to determine the most cost-effective technologies and programs to apply by customer class, and
- Based upon the results of the study, adoption of mandatory time-of-use rates for all commercial and industrial customers, as well as residential customers, and
- Installation of advanced metering infrastructure with two way communications (smart meters), and
- Installation of end-user energy displays with hourly usage, pricing, and greenhouse gas emissions display capabilities, and
- Allowing full recovery for the costs of the program through the utility ratemaking process if the program is proven cost-effective.

Related Policies/Programs in Place

Xcel's Critical Peak Pricing pilot and Saver's Switch program

Type(s) of GHG Reductions

Reduction in GHG emissions (largely CO_2) from avoided electricity production

Estimated GHG Savings and Costs per $MtCO_2e$

	GHG Reductions ($MMtCO_2e$)			Gross Costs (Million $)	Gross Benefits (Million $)	Net Present Value 2007–2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)
	2012	2020	Total 2007-2020				
RCI-7	2.0	2.6	25.4	$347	–$1,191	–$844	–$33

Data Sources, Methods, and Assumptions

Data Sources:

Impacts of Different Types of Smart Metering:

- "Smart Metering Study Summary" (smart-metering-append.pdf) compiled by CU Denver for the City and County of Denver
- Primen, Inc. 2004. California Information Display Pilot Technology Assessment, www.ucop.edu/ciee/dretd/documents/idp_tech_assess_final1221.pdf
- Summit Blue Consulting, Inc. 2006. Evaluation of the 2005 Energy-Smart Pricing PlanSM, prepared for Community Energy Cooperative, August 2006, available at www.energycooperative.org/pdf/ESPP-Evaluation-Executive-Summary-2005.pdf and www.energycooperative.org/energy-smart-pricing-plan.php

Cost of Metering

- Primen, Inc. 2004. California Information Display Pilot Technology Assessment, www.ucop.edu/ciee/dretd/documents/idp_tech_assess_final1221.pdf
- Idaho Power 2005. Phase One AMR Implementation Status Report under IPC-E-02-12, December 30, 2005
- CA PUC 2006. Advanced Metering Infrastructure (AMI) Update, available at www.cpuc.ca.gov/Static/hottopics/1energy/ami_update+june+2006.pdf

Quantification Methods: Cost will be based on costs of smart metering experienced by other states/localities. Economic savings in reduced energy use will also be estimated.

Key Assumptions:

Parameter	Value	Notes
Cost of smart meters and in-home displays	$250	The Cost of smart metering infrastructure appears to range from $200 to $300 per meter. This range is based on the following studies: The Primen, Inc. 2004. California Information Display Pilot Technology Assessment, www.ucop.edu/ciee/dretd/documents/idp_tech_assess_final1221.pdf Idaho Power 2005. Phase One AMR Implementation Status Report under IPC-E-02-12, December 30, 2005 CA PUC 2006. Advanced Metering Infrastructure (AMI) Update, available at www.cpuc.ca.gov/Static/hottopics/1energy/ami_update+june+2006.pdf

Parameter	Value	Notes
Economic life of smart meters and in-home displays	20 years	Assumes equipment lasts for 20 years.
Energy reduction due to real time pricing and in-home display	5%	Primen (2004) cites studies documenting that useful feedback can result in energy reduction by 4% to 15%. "Smart Metering Study Summary" (smart-metering-append.pdf) compiled by CU Denver for the City and County of Denver indicate that savings differ widely from 0% to 26%. Five percent savings is a conservative or reasonable estimate given that some of these studies might be only reporting peak energy use or demand reduction.
Real discount rate for levelized cost of natural gas savings	5%	Consistent with utility operation of program
Emissions factors	Electricity near-term (2008–2011): 0.92 tCO_2e/MWh Electricity long-term (2012–2020): 0.79 tCO_2/MWh	

- Energy savings are assumed to continue until 2020 with no decay of program effects, because the study period is less than the average lifetime of the program measures.
- Annualized program costs (amortized over a period of 13 years or longer, consistent with the life of the asset) are included in the analysis through 2020.

Key Uncertainties

The level of energy savings is uncertain. Since 5% savings is a conservative estimate, actual savings might be higher.

Technological progress in this field is very fast and cost-effectiveness (benefit-cost ratio) of each technology is uncertain. Thus stakeholders, utilities, and the public utility commission need to be careful about the choice of technology.

Time-of-Use rates tend to encourage consumers to shift electricity usage to off-peak times. A policy that moves consumption from peak to off-peak times may or may not decrease GHG emissions, depending on whether the generation avoided during times of reduced consumption has lower emissions than the generation that is dispatched when consumption is increased.

Additional Benefits and Costs

- Reducing peak demand and improving the utilization of the electricity system
- Electric utilities can save operating and maintenance expense through this measure. Examples include (1) reduced labor cost due to remote meter reading, (2) better outage management, and (3) more accurate meter reading and consumption forecasting.
- Consumers may be able to have more flexible retail choice under this program.

- Reducing the risk of power shortages
- Reducing energy price increases and volatility
- Enabling avoidance of energy supply projects
- Reducing water consumption by power plants
- Reducing pollutant emissions by power plants and improving public health

Feasibility Issues

Implementing meters and in-home displays for all electric customers will cost ratepayers significantly. Some consumer groups might oppose this program.

This policy is mutually exclusive to RCI-5 and RCI-11.

Status of Group Approval

Unanimous consent of those CAP members present and voting.

Level of Group Support

No objections.

Barriers to Consensus

None identified.