

# Chapter 4

## Residential, Commercial, and Industrial Sectors

### Overview of GHG Emissions

The residential, commercial, and industrial (RCI) sectors are directly responsible for only about one-tenth of New Mexico's current gross GHG emissions (8.8 MMtCO<sub>2</sub>e in 2000). Direct emissions result principally from the on-site combustion of natural gas, oil, and coal, the release of CO<sub>2</sub> and fluorinated gases (HFCs, PFCs) during industrial processing (largely cement and semi-conductors), the use of sulfur hexafluoride (SF<sub>6</sub>) in the utility industry, and the leakage of HFCs from refrigeration and related equipment.<sup>1</sup>

Considering only the direct emissions that occur within buildings and industries, however, ignores the fact that nearly all electricity sold in the state is consumed as the result of residential, commercial, and industrial activity. If the emissions associated with producing the electricity consumed in New Mexico are considered, RCI activities are associated with over half (about 53 percent) of the state's gross GHG emissions.<sup>2</sup> The State's future GHG emissions therefore will depend heavily on future trends in the consumption of electricity and other fuels in these sectors.

Figure 4-1 shows historical and projected RCI GHG emissions by fuel and source, and illustrates the large fraction of RCI emissions associated with electricity use. RCI emissions associated with electricity and natural gas use are expected to rise by nearly a third between 2000 and 2020, and are likely to account for over 40 percent of the State's growth in gross GHG emissions during this period.<sup>3</sup>

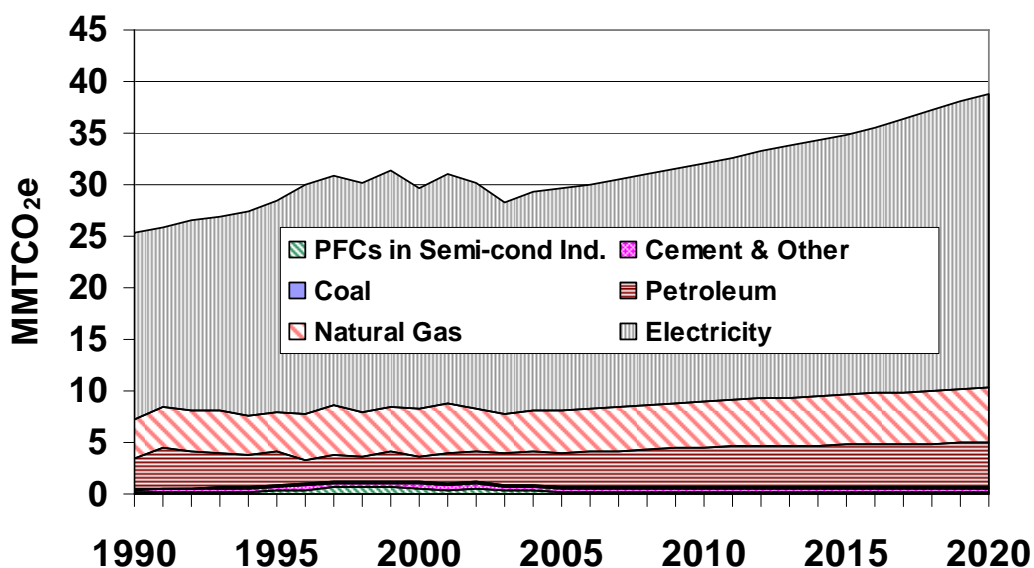
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<sup>1</sup> RCI fuel use accounted for 7.3 MMtCO<sub>2</sub>e in GHG emissions in 2000, while industrial process emissions, largely from cement production, the use of perfluorocarbons in the semi-conductor industry, the use of SF<sub>6</sub> by utilities, and the use of substitutes (such as HFCs) for ozone depleting substances accounted for 1.5 MMtCO<sub>2</sub>e.

<sup>2</sup> Gross emissions here denote greenhouse gas emissions from activities in New Mexico, adjusted for exports of electricity, oil, and gas, but not including consideration of estimated "sinks" of greenhouse gases in the forestry and land-use sectors.

<sup>3</sup> The exception is process emissions from the semi-conductor industry, which are expected to decline significantly due to voluntary efforts.

**Figure 0-1. Historical and Projected Residential Commercial and Industrial (RCI) Greenhouse Gas (GHG) Emissions in New Mexico, 1990 to 2020**



PFCs – perfluorocarbons

Table 4-1 shows estimated historical and projected emissions from management and treatment of solid wastes and wastewater from the RCI sectors. Emissions from waste management consist largely of methane leaking from landfills, while emissions from wastewater treatment include both methane and nitrous oxide. These emissions, in terms of carbon equivalents, are relatively minor compared to overall RCI emissions, yielding 2010 and 2020 estimated emissions equal to about 3% of RCI emissions.

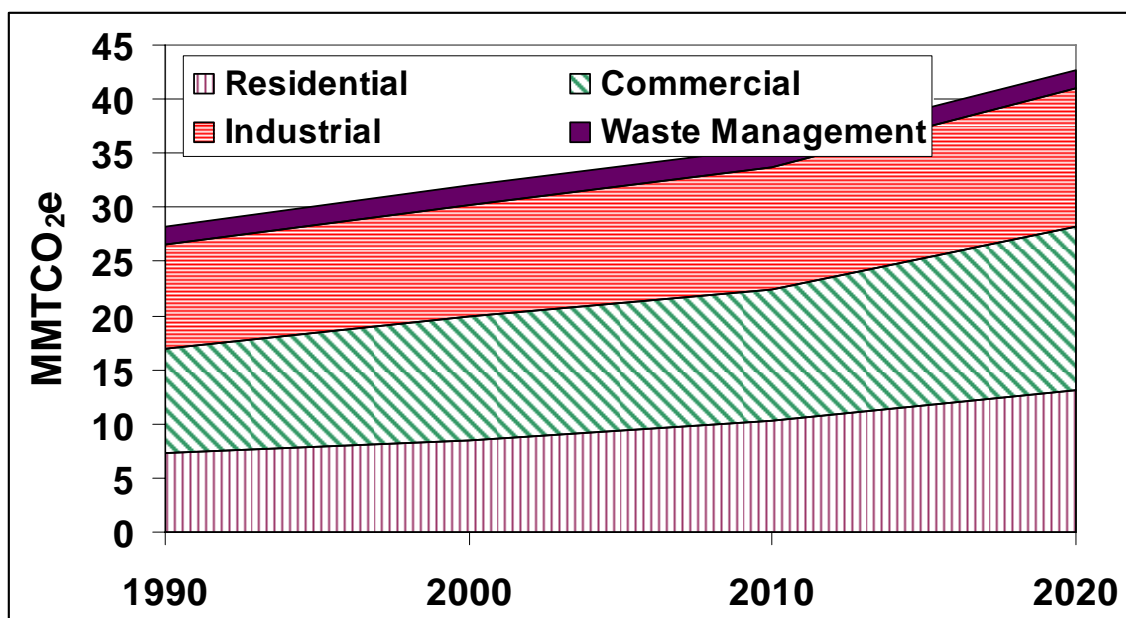
**Table 0-1. Summary of Estimated Historical and Projected Emissions from Waste and Wastewater Management in New Mexico**

(Million Metric Tons CO <sub>2</sub> equivalent)	1990	2000	2010	2020
<b>Waste Management</b>	<b>0.8</b>	<b>1.2</b>	<b>1.4</b>	<b>1.2</b>
Solid Waste Management	0.6	1.0	1.1	0.9
Wastewater Management	0.2	0.2	0.3	0.3

Overall emissions associated with residential, commercial, and industrial activity have been similar across the three sectors. The combination of moderate population growth and increasing commercial sector activity over the coming decades the residential and commercial sectors, together with relatively slow growth in emissions in the industrial sector in New Mexico, means

that the residential and commercial sectors will account for a larger share of emissions in 2020, under business as usual conditions, relative to their shares in 2000. Manufacturing activity is expected to continue to grow at a rate of about 2.1% per year, based on though this growth is likely to be offset by continuing declines in overall energy intensity due to energy efficiency gains and structural shifts to less energy-intensive industries.<sup>4</sup>

**Figure 0-2. 1990-2020 GHG Emissions by Sectors**



## Key Challenges and Opportunities

The principal means to reduce RCI emissions include improving energy efficiency, substituting electricity and natural gas with lower-emission energy resources (such as, solar water heating and biofuels), and various strategies to decrease the emissions associated with electricity production (see Energy Supply). The state's relatively limited pursuit of energy efficiency until recent years offers strong opportunities to reduce emissions through programs and initiatives to improve the efficiency of buildings, appliances, and industrial practices. At the same time, New Mexico's relatively strong population growth, and the stated commitments of New Mexico's leaders to carry out significant emissions reductions, places pressure on communities and businesses to make swift decisions. A key challenge lies in the design and implementation of strategies that address State goals and thus ensure new buildings and industries take full advantage of opportunities to reduce energy use and emissions.

<sup>4</sup> Projections of manufacturing and non-manufacturing activity (employment growth) are based on estimates from the New Mexico Department of Labor. Declines in energy intensity are based on projections by the U.S. Department of Energy (Annual Energy Outlook 2005).

New Mexico has already taken important steps in this direction. Efficient Use of Energy Act (SB 644), signed into law in 2005, directs public electric and gas utilities to develop, fund and implement comprehensive, cost-effective energy efficiency programs. In 2002, the New Mexico Public Regulation Commission (NMPRC) unanimously approved a rule that requires utilities to offer a voluntary renewable energy tariff (green pricing option for customers). While an indication of the growing momentum for improving efficiency and reducing emissions, these actions only begin to tap the overall potential of the state to slow its growth of energy use and GHG emissions.

Emissions from solid waste management practices can be addressed through the implementation of more aggressive recycling and waste reduction programs.

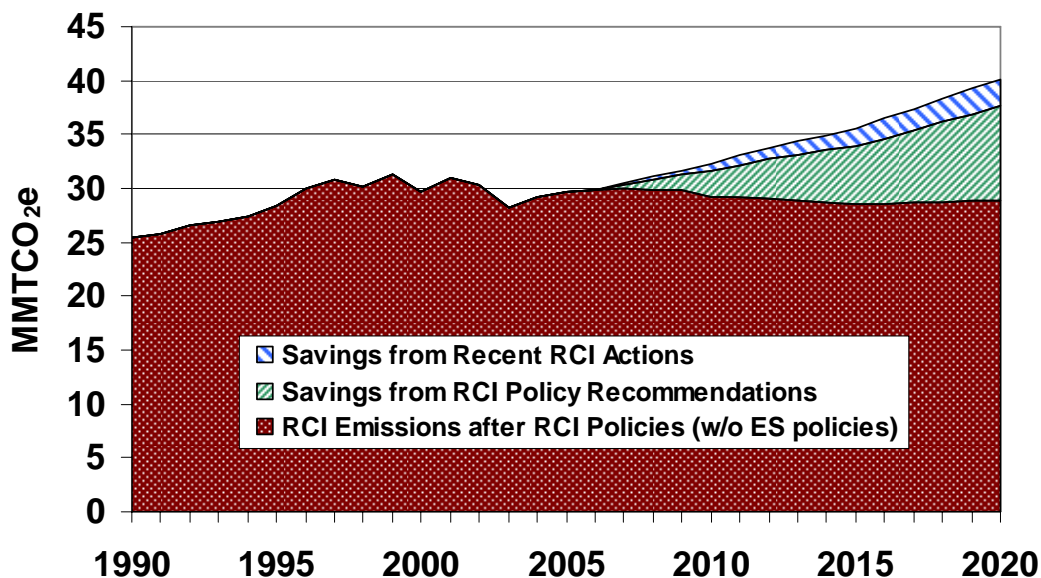
## **Overview of Policy Recommendations and Estimated Impacts**

The CCAG recommends a set of 20 policy options for the residential, commercial, and industrial sectors, plus an option focused on waste management, that offer the potential for major economic benefits and emissions savings. As summarized in Figure 4-3, these 21 policy recommendations could lead to emissions savings from reference case projections of 7.4 MMtCO<sub>2</sub>e per year by 2020, cumulative savings of over 42 MMtCO<sub>2</sub>e from 2006 through 2020, and net cost savings of over \$480 million through the year 2020 on a net present value basis (NPV).<sup>5</sup> The weighted average cost of saved carbon from the policy options for which quantitative estimates of both costs and savings were prepared was minus \$13 per metric ton of CO<sub>2</sub> equivalent, meaning that there is a net savings to the New Mexico economy in implementing this package of options. Most emissions savings from the RCI options are in the form of reduced carbon dioxide emissions, with relatively minor reductions of emissions of other greenhouse gases (principally methane and nitrous oxide) produced via leakage and/or combustion of fuels.

The estimated impacts of the RCI and solid waste policy recommended by the CCAG are shown in Table 4-2. Also shown in Table 4-2 are the results of several policies that have either been recently implemented or will be implemented as a result of earlier State policies. These “Savings from Recent RCI Actions” are not accounted for in the reference inventory and forecast, but contribute to overall emissions reduction along with savings from the CCAG-recommended measures. The combination of savings from recent actions and CCAG policies are, in the RCI sectors, estimated to be slightly greater than the projected reference case growth in emissions from 2006 through 2020, as shown by the trend in the dark area in Figure 4-3.

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<sup>5</sup> The net cost savings are based on fuel expenditures, operations, maintenance, and administrative costs, and amortized, incremental equipment costs. All NPV analyses here use a 5% real discount rate.

**Figure 0-3. Impact of Policy Recommendations on RCI Emissions**

The CCAG policy recommendations described briefly here (and in more detail in Appendix **XX** to this Report) result not only in significant emissions and costs savings, but offer a host of additional benefits as well. These benefits include (but are by no means limited to) reduction in spending on energy by homeowners and businesses, contributions to local economic development, reduced local air pollution, reduced need for electricity supply facilities, and, for example, for building improvement measures, improvements in comfort and convenience, and reduction in indoor air pollution.

In order for the RCI policy options recommended by the CCAG to yield the levels of savings described here, the options must be implemented in a timely, aggressive, and thorough manner. This means, for example, not only putting the policies themselves in place, but also attending to the development of “supporting policies” that are needed to help make the recommended options effective. Many of these supporting policies are a part of the package of RCI options, and/or are included among the policies recommended by the CCAG as being “cross-cutting” policies applicable to multiple sectors. Improved building codes (RCI-7A through RCI-7C) will not be optimally effective, for example, without training of contractors, builders, architects, financial institutions, and building inspectors, among others, in the methods and benefits of efficient building design (as recommended in RCI-10). Regulatory policies that provide incentives and lower disincentives for the adoption of consumer-sited combined heat and power and renewable electricity generation are also among the supporting policies crucial to the success of the RCI options recommended by the CCAG; some of these policies are already in the formative stages (or beyond) in New Mexico. The CCAG’s work indicates that there are considerable benefits to both the environment and to consumers from adoption of the policy options offered, but careful, comprehensive, and detailed planning and implementation, as well as consistent support, of these policies will be required if these benefits are to be achieved.

**Table 0-2. CCAG Recommended Policy Options and Results for Residential, Commercial, Industrial (RCI) and Waste Management**

**Residential Commercial and Industrial Technical Work Group**  
**Summary List of Pending Options**

<b>Option Number</b>	<b>Policy Name</b>	<b>Estimated 2012 GHG Reduction (MMtCO<sub>2</sub>e)</b>	<b>Estimated 2020 GHG Reduction (MMtCO<sub>2</sub>e)</b>	<b>Cumulative 2007-2020 GHG Reduction (MMtCO<sub>2</sub>e)</b>	<b>Estimated Cost or Cost Saving (\$/tCO<sub>2</sub>e)</b>
RCI-1	Demand Side Management (DSM) Programs, Energy Efficiency Funds, and/or Energy Efficiency Requirements for Electricity	0.2	1.0	5.5	-\$18
RCI-2	Demand Side Management (DSM) Programs, Energy Efficiency Funds, and/or Energy Efficiency Requirements for Natural Gas and Other Fuels	0.03	0.2	1.0	-\$55
RCI-3	Regional Market Transformation Alliance	0.1	0.5	2.9	-\$27
RCI-4	State Appliance Standards	0.1	0.3	2.1	-\$46
RCI-5	Green Power Purchasing	0.3	0.1	2.3	\$7
RCI-6	Rate Design (Including Time of Use Rates, Increasing Block Rates, and Seasonal Use Rates)	0.3	0.3	3.6	-\$40
RCI-7A	Improved Building Codes	0.9	2.4	16.6	-\$12
RCI-7B	RCI-7B: Solar Hot Water-ready and Solar-PV-ready Codes for New Buildings	0.05	0.2	1.3	\$96

Option Number	Policy Name	Estimated 2012 GHG Reduction (MMtCO <sub>2</sub> e)	Estimated 2020 GHG Reduction (MMtCO <sub>2</sub> e)	Cumulative 2007-2020 GHG Reduction (MMtCO <sub>2</sub> e)	Estimated Cost or Cost Saving (\$/tCO <sub>2</sub> e)
RCI-7C	Solar Hot Water Systems as an Element of Building Codes for New Buildings	0.2	0.4	2.7	\$22
RCI-8A	Building Energy Performance Requirements for State-funded and Other Government Buildings (“Reach Codes”)	0.01	0.04	0.2	\$1
RCI-8B	Building Energy Performance Promotion and Incentives for Energy Performance Enhancements (Attaining “Reach Codes”) in Non-Government Buildings (Including Existing Buildings)	0.3	1.3	7.4	-\$2
RCI-9	Government Agency Requirements and Goals (including procurement) - - Focus on operations	0.04	0.2	0.9	-\$20
RCI-10	Education and Outreach for Building Professionals	Not Quantified			
RCI-11	Consumer Education Programs	Not Quantified			
RCI-12	Increased Emphasis on Energy and Environmental Consideration in Higher Education	<b>[These policies being considered jointly with the Cross-Cutting Issues TWG]</b>			

Option Number	Policy Name	Estimated 2012 GHG Reduction (MMtCO <sub>2</sub> e)	Estimated 2020 GHG Reduction (MMtCO <sub>2</sub> e)	Cumulative 2007-2020 GHG Reduction (MMtCO <sub>2</sub> e)	Estimated Cost or Cost Saving (\$/tCO <sub>2</sub> e)
RCI-13	Incentives and Promotion for Renewable Energy and Clean Combined Heat and Power	<b>[These policies are being considered jointly with the Energy Supply TWG]</b>			
RCI-14	Regulatory/Legislative Grid, Pricing, and other Policies to Support Distributed Generation				
RCI-16	Participation in Regional (or National) Industry Emissions Cap and Trade Programs	<b>[This policy is being considered jointly with the Energy Supply TWG]</b>			
RCI-17	Voluntary Emissions Targets	0.3	0.7	4.6	Not Estimated
RCI-18	Use of Alternative Gases (Non-Energy Emissions, Industrial Process Gases)	Not Quantified			
RCI-19	Solid Waste Recycling, Source Reduction, and Composting				
	Scenario A: Financial/Technical Support	0.2	0.5	3.6	Not Estimated
	Scenario B: Financial/Technical Support and Mandatory Recycling	0.5	1.1	8.4	Not Estimated

**Emissions Reductions Associated with Recently Enacted Policies (and not included in baseline projections) that Are Related (\*) to RCI Policy Options**

Option Number	Policy Name	Estimated 2012 GHG Reduction (MMtCO <sub>2</sub> e)	Estimated 2020 GHG Reduction (MMtCO <sub>2</sub> e)	Cumulative 2007-2020 GHG Reduction (MMtCO <sub>2</sub> e)
RCI-1*	Electricity DSM: Spending 1.5% of revenues as allowed by Efficient Use of Energy Act	0.7	1.7	12.4
RCI-2*	Natural Gas DSM: Spending 1.5% of revenues as allowed by Efficient Use of Energy Act	0.2	0.6	4.0
RCI-7A*	Improved Building Codes: "Current Activities", Estimated as Part of Western Governors Association Energy Efficiency Task Force Work	0.1	0.3	2.4

**Emissions Reductions – Preliminary (incomplete) totals**

Option Number	Status	Estimated 2012 GHG Reduction (MMtCO <sub>2</sub> e)	Estimated 2020 GHG Reduction (MMtCO <sub>2</sub> e)	Cumulative 2007-2020 GHG Reduction (MMtCO <sub>2</sub> e)	Estimated Cost or Cost Saving (\$/tCO <sub>2</sub> e)
RCI-1 thru RCI-9, & RCI-17	<b>Preliminary results completed, Gross Total</b>	<b>3.2</b>	<b>8.7</b>	<b>59.5</b>	<b>-\$10</b>
Other Options	Not yet estimated or not to be quantified	--	--	--	--
	Accounting for Options Overlaps (those estimated thus far)	- 0.4	- 1.3	- 8.8	n/a
(RCI-1, RCI-2, RCI-7A)	Recent Actions not included in baseline projections	1.1	2.6	18.8	n/a
	<b>Total Emissions Reductions Net of Overlaps (including recent actions)</b>	<b>3.8</b>	<b>9.9</b>	<b>69.4</b>	<b>-\$13</b>

## **Residential, Commercial, Industrial (RCI) CCAG Policy Descriptions**

The Residential, Commercial, Industrial Sectors include emissions reduction opportunities related to improving energy (and sometimes water) use efficiency, using lower GHG energy sources, and enhancing waste management practices.

### **RCI-1: Demand Side Management (DSM) Programs, Energy Efficiency Funds, and/or Energy Efficiency Requirements for Electricity**

The CCAG recommends that New Mexico increase the efficiency of electricity use in New Mexico by increasing investment in demand-side management programs through programs run by utilities or others, energy efficiency funds, and/or energy efficiency requirements. This option focuses on what are typically termed DSM activities, and is designed to work in tandem with other strategies recommended by the CCAG that can also encourage efficiency gains.

The policy design includes two key and linked dimensions: achievable/desirable energy savings and policy/administrative mechanisms to achieve these savings. It is recommended that investment in electricity efficiency programs rise to the level needed capture the state's full, achievable energy efficiency potential, which is currently estimated to be an approximately 1.0% reduction in total electricity demand each year (relative to baseline levels). This savings level is consistent with the findings and recommendations of the Western Governors' Association Energy Efficiency Task Force, and can be achieved by increasing investment in cost-effective energy efficiency to the level of about 3% of utility revenues (that is receipts from customer bills) by 2012. This spending level exceeds the base level 1.5% of utility revenues currently allowed under the recent Efficient Use of Energy Act.

In order to implement expanded DSM programs, the CCAG recommends that a number of mechanisms be considered. Candidate mechanisms include revising existing statutes to enable utility investments in energy efficiency at the levels indicated above, to consider as potentially eligible programs that are cost-effective taking into account the valuation of for CO<sub>2</sub> emissions. Policy and administrative mechanisms that might be applied include regulator-verified savings targets, public benefit charges, portfolio standards, "energy trusts", integrated resource planning, performance-based incentives, decoupling of rates and revenues, appropriate rate treatment for efficiency, and/or others. Note that it is not the intent to specify here how this policy might be implemented; the mechanisms above are offered only as options to be considered.

**RCI-2: Demand Side Management (DSM) Programs, Energy Efficiency Funds, and/or Energy Efficiency Requirements for Natural Gas and Other Fuels**

The CCAG recommends that New Mexico should increase the efficiency of natural gas and other fuel use in New Mexico through programs, funds, and/or requirements. The options for pursuing natural gas efficiency savings are similar in nature to those described for electricity efficiency in option RCI-1 above. As in RCI-1, two key and linked dimensions are achievable/desirable energy savings and policy/administrative mechanisms to achieve those savings. Under the recommended policy, investment in natural gas efficiency programs rises to the level needed capture the state's full, achievable energy efficiency potential, which is currently estimated to be an approximately a 1.16% reduction in total natural gas demand each year (relative to baseline levels). This savings level can be achieved by increasing investment in energy efficiency to the level of about 2.2% of gas utility revenues by 2012. This spending level exceeds the base level 1.5% of utility revenues currently allowed under the recent Efficient Use of Energy Act.

Implementation of this policy will require a combination of revising existing statutes to enable investment spending sufficient to reach savings goals, and to consider as potentially eligible programs that are cost-effective even taking into the valuation of CO2 emissions. Additional policy and administrative mechanisms to be used might include regulator-verified savings targets, public benefit charges, portfolio standards, "energy trusts", integrated resource planning, performance-based incentives, decoupling of rates and revenues, appropriate rate treatment for efficiency, and/or others. These mechanisms above are offered as options to be considered.

**RCI-3: Regional Market Transformation Alliance**

The CCAG recommends that New Mexico work with other states in the region and non-governmental organizations to form a regional market transformation organization, modeled on the successful Northwest Energy Efficiency Alliance (NEEA), as recommended by the WGA CDEAC EE Task Force, and to pursue other regional efforts that use voluntary efforts implemented by non-utility organizations to encourage greater uptake by consumers (residential, commercial, and industrial, as well as the professionals that service energy-using equipment) of cost-effective energy conservation practices.

This organization would be a useful complement to the electricity and natural gas efficiency options RCI-1 and RCI-2. Such an organization could focus on products and sectors (such as evaporative swamp coolers or formation of energy service companies) in a manner that could complement what utilities would otherwise be providing through their efficiency programs. It is recommended that the organization be set up by 2008, and fully implemented by 2010

**RCI-4: State Appliance Standards**

The CCAG recommends that New Mexico should adopt more stringent appliance efficiency standards. Appliance efficiency standards reduce the market cost of energy efficiency improvements by incorporating technological advances into base appliance models, thereby creating economies of scale. This policy option involves the replication of standards first adopted in nearby states (such as California) for appliances not covered by federal standards. It also involves the State, together with other Western states, advocating for stronger federal appliance efficiency standards where this is technically feasible and economically justified. New standards should come into force in 2007/2008 for standards already implemented by nearby states, and following by 6 months to 1 year future adoption in nearby states of standards for

additional appliance/equipment and/or more stringent energy-efficiency requirements for appliances and equipment now included in standards.

### **RCI-5: Green Power Purchasing**

The CCAG recommends that New Mexico should expand implement and promote its green power purchasing. This option comprises a variety of consumer-driven strategies to increase the production and delivery of low-GHG power sources, above and beyond levels achieved through Renewable Portfolio Standards and other mandatory programs. Green power, as defined here, includes power from renewable energy technologies recognized by the state Renewable Portfolio Standard.

This policy involves the following components:

- The Public Regulatory Commission (PRC) should consider adopting and encouraging utilities to develop green power tariff structures that a) enable "quantity savings" for large purchases. (such as Pacificorp's Blue Sky QS program) ; b) are stable thus avoiding the volatility associated with standard rates due to fluctuating gas or other fuel prices (such as Austin Energy's program); and c) are based on cost-of-service principles.
- The PRC would also provide for the reporting power sources and emissions data in consumer bills.
- The State should set a goal that, by 2010, a minimum total of 30% of electricity should come from green power purchases or the renewable fraction of standard purchased electricity, possibly modeled on the federal purchasing requirements in EPACT 2005. This goal would apply to all non-federal government buildings, including local government, public schools, and public universities.
- The State and other entities should also promote voluntary purchasing of green power (through provision of information and promotional materials).

The CCAG recommends that this policy start in 2010, with goals reviewed every 5 years. The CCAG suggests that programs and goals for local governments might be phased in more slowly than for state government power purchasers.

### **RCI-6: Rate Design (Including Time of Use Rates, Increasing Block Rates, and Seasonal Use Rates)**

The CCAG recommends that New Mexico utilities should propose, and the state regulatory commission should adopt, rate designs that promote reduction in GHG emissions and/or improvements in energy efficiency. This option includes reducing customer charges, discouraging existing decreasing block rates, pursuing peak season surcharge rates, and encouraging the use of steep increasing block rates for appropriate customer classes as a means reducing GHG emissions through promotion of energy efficiency. It will be important to consider interaction with potential efforts to decouple utility revenues from levels of sales (see RCI-1 and RCI-2), and to ensure that higher marginal electricity costs do not lead consumers to switch to other, more GHG-intensive energy.

**RCI-7A: Improved Building Codes**

The CCAG recommends that New Mexico should upgrade the energy-efficiency provisions of its building codes. Building energy codes specify minimum energy efficiency requirements for new buildings or for existing buildings undergoing a major renovation. As energy use (largely electricity and gas) in buildings in New Mexico accounts for about 36 percent of current emissions, amending the existing New Mexico Building Codes will have a considerable immediate impact towards the reduction of greenhouse gas emissions. An ongoing process of code amendments for new and renovated residential and commercial buildings is recommended by the CCAG, and includes the following aspects:

- Building codes will be amended to reduce the building energy needs in areas including but not limited to HVAC systems, daylighting design to reduce lighting needs, electric lighting design, building envelope design, using integrated building design strategies.
- New Mexico should update its energy codes regularly. A three-year cycle could be timed to coincide with release of national model codes. Local adoption of new statewide codes should occur within 6 months of statewide code adoption.
- New Mexico should adopt innovative features building energy codes in other states that go beyond the IECC codes in force, as appropriate to conditions in New Mexico.
- To mitigate the problem of rapid growth in the number of homes using energy intensive, compressor-based cooling systems for central air conditioning (CAC) in lieu of the traditional evaporative cooler, building codes should include a combination of offsetting measures for any newly constructed or renovated home that includes CAC.
- By 2010, buildings in New Mexico should be required to consume 50 percent less energy per square foot than average US buildings, as reflected in the most recently available information on similar building types (on a climate-adjusted basis).
- Building professionals, including building inspectors, should be provided with training in the use of analytical and design tools that allow building energy performance to be estimated in the design phase, so that compliance with energy performance codes can be tested.
- After 2010, the required percentage improvement in energy performance should be reviewed every 3 years and updated through a combination of codes revision and legislative action based on consideration of new developments in building energy efficiency, national and international energy codes, New Mexico state targets for reduction of greenhouse gas emissions, and the overall goal that buildings be “carbon neutral” by 2030.
- New Mexico should join a regional “Building Energy Codes Collaborative”, as recommended by the WGA.

**RCI-7B: Solar Hot Water-ready and Solar-PV-ready Codes for New Buildings**

The CCAG recommends that New Mexico should modify building energy codes to require new residential buildings and new commercial buildings to be configured for, and to include plumbing and wiring for mounting and installation of, solar hot water heaters and solar photovoltaic (PV) panels.

Amending building energy codes to take advantage of the very good solar resource found in most of New Mexico, this policy would specify that all new buildings, as applicable, would be

required to be built so as to accommodate systems for solar water heat, and would also be required to be built “solar PV ready”, that is, designed to have solar PV systems mounted in an unobstructed location, and including wiring and other facilities for mounting and connecting solar PV systems to the building’s electricity system and, as applicable, to the local power grid. These codes will apply to major renovations as well as new buildings, but exceptions to the “solar-ready” building code requirements may be granted when applicable. Solar-ready building code requirements should be implemented on the same schedule as the building energy codes revisions in RCI-7A.

### **RCI-7C: Solar Hot Water Systems as an Element of Building Codes for New Buildings**

The CCAG recommends that New Mexico should modify building energy codes to require new residential buildings and new commercial buildings with substantial water heat demand to install solar water heaters.

Amending building energy codes to take advantage of the very good solar resource found in most of New Mexico, this policy would specify that all new buildings, and buildings undergoing major renovations, would, as applicable, and with appropriate exclusions, limitations, and alternatives, be required to implement solar water heat.

Solar hot water building code requirements should be implemented on the same schedule as the building energy codes revisions in RCI-7A.

### **RCI-8A: Building Energy Performance Requirements for State-funded and Other Government Buildings (“Reach Codes”)**

The CCAG recommends that the New Mexico State Government provide leadership in moving the State toward a stock of buildings with much higher energy efficiency by the example of requiring all new state- and state-funded government buildings to meet increasingly stringent energy performance and renewable energy use standards.

New Mexico sets as its goal that all buildings be “carbon neutral” by 2030, meaning that any energy needs in a building, net of efficiency gains through building design to reduce energy use and of on-site renewable energy use, should be supplied by renewable energy sources (“green power”). The CCAG recommends that building energy performance standards should be implemented in State-funded government buildings, including the Higher Education Department, such that new buildings achieve high standards of energy efficiency, and existing buildings are retrofitted to yield significant energy efficiency improvements.

Specifically, it is recommended:

- That all State-funded new buildings and building renovation projects of 5,000 square feet and above and/or using over 50 kW electrical demand are mandated to build to a minimum rating of "Silver" using the U.S. Green Building Council's LEED-NC™, LEED-EB™, LEED-CS™, or LEED-CI™ rating system - or verifiable equivalent - in effect as of the project registration date by 2007.
- In addition to achieving one of the ratings above, or their equivalent, state-funded buildings and building renovations must achieve at least an 50% reduction in energy use on a weather-normalized per square-foot basis relative to average buildings of the same type in the US, as determined by modeling . Additionally, requirements for the minimum delivered fossil fuel energy consumption performance standard shall be increased to 60% reduction in 2010; 70%

in 2015; 80% in 2020; 90% in 2025 and to “carbon neutral” (as defined above) in 2030. No more than 25% of the building’s reduction goal may be met through the use of off-site green power. These requirements would be reviewed every three years.

- Modify the State procurement processes to facilitate reaching the requirements above.
- Whenever possible, design and build State-funded and other Government buildings incorporating features designed not only to reduce energy use within the buildings, but to reduce energy use in the surrounding community through incorporation of considerations of transport access, the availability of necessary commercial services, and other aspects of community life that affect energy use.
- Carry out starting in 2007, and completed by 2010, a program to audit energy use and energy efficiency opportunities in State buildings.

#### **RCI-8B: Building Energy Performance Promotion and Incentives for Energy Performance Enhancements (Attaining “Reach Codes”) in Non-Government Buildings (Including Existing Buildings)**

The CCAG recommends that energy efficiency in existing buildings and in non-government-funded new buildings in New Mexico should be substantially improved, and use of renewable energy expanded, through a combination of financial incentives, education and information resources, and technical assistance. The CCAG recommends that New Mexico should develop policies and programs to promote and implement in new and existing non-State public and private buildings, on a voluntary basis, energy “reach codes”. “Reach codes” are higher-than-prevailing-code energy performance levels for buildings, which are suggested to be mandated for state-owned and state-funded buildings under Policy Option RCI-8A, above. Specifically, it is recommended to:

- Create a “high performance buildings” initiative that provides incentives, technical support, and other assistance to induce private developers of commercial new buildings and building renovation projects to meet the same requirements of proposed policy 8A, above.
- Include a residential program in the “high performance buildings” initiative that provides incentives for private developers, including designers, developers, and builders of residential and manufactured housing. The program requirements would have the same energy goals as those for commercial buildings.
- Provide incentives for the undertaking of substantial building energy efficiency measures and retrofits in existing buildings (including manufactured housing).
- Provide incentives and other support to encourage non-government buildings to be designed and built, and, where applicable, retrofitted, so as to incorporate features designed not only to reduce energy use within the buildings, but to reduce energy use in the surrounding community.
- Provide incentives and other support to encourage residential and commercial-sector consumers to switch to the use of less carbon-intensive fuels to provide key energy services.

**RCI-9: Government Agency Requirements and Goals (including procurement) -- Focus on Operations**

The CCAG recommends that New Mexico should improve the efficiency of energy use in existing government buildings and other facilities by emphasizing energy efficiency as a criterion in procurement of energy-using equipment and systems, and in the improvement in operation of buildings and other facilities. Municipal Energy Management systems and initiatives, as well as audits of energy performance and operations of State and other government buildings (in tandem with the audit program proposed in RCI-8A), are included as elements of this policy. Audit results will be used to target and prioritize investments in improving government building energy efficiency. It is recommended that the infrastructure for implementation (meters, bookkeeping systems, staff, etc.) be established as soon as possible so as to be able to report results in 2009, and implement improvements starting in 2010.

**RCI-10: Education and Outreach for Building Professionals**

The CCAG recommends that New Mexico should require specific and targeted education, outreach, and licensing requirements for professionals in a variety of building-related trades. The building code improvement and building energy efficiency options described above depend for their effectiveness on the availability of trained, committed design, construction, and operations professionals to make sure that buildings are designed, constructed, and run so as to make those buildings as energy-efficient as possible within the restrictions of their function. The CCAG finds that a combination of education of and outreach to building professionals is needed to make sure that as many of those professionals as possible incorporate energy-efficiency and greenhouse gas emissions-reduction considerations as they do their jobs. Specifically, it is recommended that:

- Mandate that State Boards of Licensing for building professionals cover in licensing exams knowledge of the improved building codes and building energy performance requirements reflected in policy options 7-RCI and 8A- and 8B-RCI.
- Implement code training and technical assistance for architects, builders, and local code inspectors.
- Implement programs to train builders and contractors on proper heating and air conditioning sizing and installation.
- Train commercial building energy managers, for example by making use of the building operator training and certification program developed in the Pacific Northwest.
- Train industrial energy and facility managers in techniques for improving the efficiency of their steam, process heat, pumping, compressed air, motors, and other systems, partnering with the U.S. DOE in doing so.
- As appropriate and applicable for each professional discipline, include training and outreach to encourage design of energy-efficient communities.
- The implementation of these actions should be timed as required to support other buildings-related policies recommended by the CCAG.

### **RCI-11: Consumer Education Programs, and RCI-12: Increased Emphasis on Energy and Environmental Consideration in Higher Education (option shared with CC-3)**

The CCAG recommends that New Mexico lead by example in its own education and outreach activities by establishing a pro-active public education and outreach capability, and using it to target education and outreach activities to five specific audiences:

- Policymakers (legislators, regulators, executive branch, agencies) – because implementation of climate actions hinges on policymakers’ approval.
- Younger Generations – by integrating climate change into educational curricula, post-secondary degree programs, and professional licensing programs.
- Community Leaders & Community-Based Organizations (e.g., institutions, municipalities, service clubs, social & affinity groups, non-governmental organizations, etc.) – in order to recognize leadership; share success stories and role models; and expand climate involvement and participation within civic society.
- General Public – to increase awareness and engage citizens in climate actions in their personal and professional lives.
- Industrial and Economic Sectors – in order to recognize leadership; share success stories and role models; and expand climate involvement and participation within the business community.

Specific public education and outreach efforts suggested for these policies are provided in [Appendix YY \[Cross-cutting Issues\]](#) under “CC-3 State Climate Public Education and Outreach”.

### **RCI-13: Incentives and Promotion for Renewable Energy and Clean Combined Heat and Power (Option same as ES-X)**

***[TO BE COMPLETED WHEN TEXT FOR CORRESPONDING ES OPTION IS AVAILABLE]***

### **RCI-14: Regulatory/Legislative Grid, Pricing, and other Policies to Support Distributed Generation (Option same as ES-Y)**

***[TO BE COMPLETED WHEN TEXT FOR CORRESPONDING ES OPTION IS AVAILABLE]***

### **RCI-16: Participation in Regional (or National) Industry Emissions Cap and Trade Programs (Option same as ES-Z)**

***[TO BE COMPLETED WHEN TEXT FOR CORRESPONDING ES OPTION IS AVAILABLE]***

### **RCI-17: Voluntary Emissions Targets**

The CCAG recommends that New Mexico should work with industrial and other large users of energy (and/or of process gases that are greenhouse gases) to encourage those organizations to

set emissions reduction targets. Fuel-switching, where applicable, may be used as a means of emissions reduction. This recommendation may be implemented through a combination of financial and other incentives, public-private partnerships and agreements, provision of information and technical assistance, and other methods.

Reductions in greenhouse gas emissions can be achieved in the industrial sector through energy efficiency, process changes, and/or switching to the use of less carbon-intensive fuels to provide key energy services. Fuel switching opportunities can include using natural gas in the place of electricity for thermal end-uses, natural gas in the place of coal for key industrial end-uses, biomass fuels in the place of electricity or natural gas for thermal end-uses, and solar thermal energy in the place of electricity or natural gas for thermal end-uses. As a goal for this option, industrial sector entities (other than fossil fuel industries) would be encouraged to establish and meet emission goals that meet or exceed the overall state goal for reduction of GHG emissions (that is, return to 2000 emission levels by 2012, and move to 10% below 2000 levels by 2020).

#### **RCI-18: Use of Alternative Gases (Non-Energy Emissions, Industrial Process Gases)**

The CCAG recommends that New Mexico should reduce HFC emissions through leakage management efforts and the substitution of HFCs with lower-GWP refrigerants, including lower-GWP HFCs, carbon dioxide, and hydrocarbons (HCs - propane or isobutene/propane blend).

Many of these opportunities lie in the transportation sector (mobile air conditioning). For the RCI sector, the adoption of specifications for new commercial refrigeration is recommended. These specifications could limit the global warming potential of refrigerants used in refrigerators in retail food stores, restaurants, and refrigerated transport vehicles (trucks and railcars) and/or require that centralized systems with large refrigerant charges and long distribution lines be avoided in favor of systems that use much less refrigerant and lack long distribution lines. Another suggestion for implementation of this policy is that the state could “lead by example” by implementing such improvements in relevant state facilities. In addition, the State should continue to monitor and review approaches that the Federal Government and other jurisdictions are taking toward the regulation of HFCs and similar substances, including consideration of whether the use and emissions of HFCs can be regulated under the laws of the State of New Mexico.

#### **RCI-19: Solid Waste Recycling, Source Reduction, and Composting**

The CCAG recommends that New Mexico undertake efforts to increase recycling, composting and other waste management activities. Legislative efforts to require recycling by businesses and individuals and/or to provide grant and staffing support to the Solid Waste Bureau may be essential to significantly increase the state recycling rate, which is currently 3%. This rate falls well short of the state’s recycling (diversion) goals. The current manpower and financial tools available to the Solid Waste Bureau are insufficient to achieve significant improvements. Several states and municipalities have used mandatory recycling as a means to achieve more ambitious recycling goals.

In terms of financial and technical support to recycling programs, it is recommended that the NM legislature provide: a) an adequate budget recharge to the Solid Waste Facility Grant Fund (to support a range of solid waste activities and investments); b) appropriations for a grant/loan program to be used for hazardous, e-waste, recycling and diversion programs; c) expanding (to

previous levels) SWB staffing to provide more technical assistance/consulting into the field. These outcomes could drive up the state's recycling rate, perhaps to six to eight percent by 2010, and 10 to 14 percent by 2020.