



## **Colorado Climate Scorecard: The Implementation Status of Governor Ritter's Colorado Climate Action Plan and RMCO's Climate Action Panel Recommendations**

**Updated July 2, 2009**

This scorecard summarizes the implementation status of the Colorado Climate Action Plan announced by Governor Ritter in November 2007 and the 70 recommendations made in October 2007 by the blue-ribbon Climate Action Panel convened by the [Rocky Mountain Climate Organization](#) in its [Colorado Climate Project](#). RMCO supports both the Governor's plan and the blue-ribbon panel's recommendations, on which the Governor's plan is based in part.

### **Emissions Reductions**

The centerpieces of RMCO's Climate Action Panel ("Panel") [recommendations](#) and the state government's [Colorado Climate Action Plan](#) ("Plan") are identical: As recommended by the Panel, Governor Ritter adopted as state policy, first in the Plan and then in an executive order, goals of reducing Colorado's emissions of greenhouse gases 20% by 2020 and 80% by 2050, compared to 2005 levels. Achieving the 2020 goal will require a 37% reduction in the emissions forecast for that year under laws and practices in effect in September 2007. This will take many actions on many fronts.

The Panel's recommendations include 55 related to reducing emissions. Of those, Governor Ritter's Plan:

- Includes five of those Panel recommendations (including the statewide goals), in identical terms.
- Calls for new actions in 11 areas addressed by Panel recommendations.
- Calls for new actions in four additional areas not addressed by the Panel.
- Does not yet address the remaining 35 areas addressed by Panel recommendations.

### **Adaptation**

The Panel's recommendations include 15 related to preparing for and adapting to the effects of climate change (recommendations numbered CC-9 and WA-1 through WA-14.) Governor Ritter's Plan:

- Includes three of those Panel recommendations, in identical terms.
- Calls for new action in three areas addressed by Panel recommendations.
- Does not yet address the remaining nine areas addressed by Panel recommendations.

## Scorecard Format

The measures in this scorecard are grouped and numbered as in the Panel's report, by these subjects: (1) residential, commercial, and industrial sectors; (2) energy-supply sector; (3) transportation and land-use sectors; (4) agriculture, forestry, and waste sectors; (5) cross-cutting matters; and (6) water adaptation. Measures in Governor Ritter's Plan that were not recommended by the Panel are listed at the end of the appropriate section of the scorecard.

The first column summarizes the Panel recommendations. In some cases, rather than recommending definite policy actions, the Panel recommended a particular goal and identified a mixture of actions that could achieve the goal. In those cases, the goal is clearly labeled as such. The Panel's vote on each recommendation is listed, including the number of statements of "qualified approvals" (or "yes-but" votes) used to express no opposition to an overall policy but instead concern about the analysis or some other matter. The reasons for objections and qualified approvals are detailed in the Panel's report.

The second and third columns summarize the technical analyses done for the Panel. Not all Panel recommendations were analyzed quantitatively; some were not suitable for quantitative analysis and some overlapped nearly completely with other recommendations. Comparable analyses are not available for individual measures in Governor Ritter's Plan. The second column shows estimates of how much implementing the Panel's recommendations would reduce greenhouse gas emissions in the year 2020, compared to a forecast assuming a continuation of laws and practices in effect in September 2007. To meet the state's goal for 2020, the total emission reductions of all actions in 2020 would need to equal 54.6 million tons.<sup>1</sup> The third column indicates the estimated overall amounts which actions implementing the Panel's recommendations would cost (or save) per ton of emissions avoided.

The fourth column summarizes new measures in Governor Ritter's plan. Plan measures are listed in the same rows as comparable Panel recommendations. Plan measures for which the Panel did not recommend any comparable action are listed at the end of the appropriate section.

The fifth column indicates the status of actions taken since September 2007 to implement all or part of either Panel recommendations or Plan measures. This includes actions by the state government, local governments, water providers, or others. RMCO will update this column regularly.

Anyone with information to correct or add to items in the scorecard is asked to contact Tom Easley at [easley@rockymountainclimate.org](mailto:easley@rockymountainclimate.org) or 303-861-6481.

## Residential, Commercial, and Industrial Sectors

Updated November 3, 2008

For full details of these Climate Action Panel recommendations, see [Appendix E](#) of the panel's report. For full details on these elements of the Governor's plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>RCI-1: Demand Side Management</p> <p>Expand demand-side management (DSM) programs of all electric and natural-gas utilities so that the total effects of:</p> <ul style="list-style-type: none"> <li>• those new programs,</li> <li>• House Bill 2007-1037, and</li> <li>• a 2007 DSM commitment by Xcel Energy</li> </ul> <p>would reduce electricity and natural gas use by 1% per year by 2013 and beyond, compared to current-law projections prior to those two 2007 developments. Implementation to begin in 2008, with lesser reductions required through 2012 before full reductions beginning in 2013.</p> <p>Implementation: (a) Investor-owned utilities: Public Utility Commission (PUC) requirements.</p> <p>(b) Municipal utilities and rural electric co-ops: could either meet the annual reduction goals or impose comparable system-benefit charges.</p> <p>(c) Wholesale natural-gas customers: new state legislation to require them to fund DSM actions.</p> <p>Panel vote: Unanimous (with several statements of qualified approval)</p>	5.2	-\$ 32/ton	<p>Calls for reducing emissions from electric utilities 20% below their 2005 levels by 2020. Some of these reductions will be those resulting from 2007 laws and actions, and the remainder from new laws and actions. Some of these reductions will be from DSM (this policy area) and some will be from energy supply actions to reduce GHGs (see the item at the end of the Energy Supply section).</p> <p>Implementation: (a) Investor-owned utilities – Says an executive order will be issued requesting the PUC to seek from those 2 utilities an Electric Resource Plan showing how they could reduce GHGs 20% below 2005 levels by 2020. Also says that the executive order will direct the Governor's Energy Office (GEO) to identify policy changes to provide these utilities with incentives to invest in DSM and energy supply measures to reduce GHGs.</p> <p>(b) Municipal utilities and rural electric co-ops: Says that the Governor will request GEO to develop comparable goals for these utilities, with the Governor then to request them to develop plans to meet the goals.</p> <p>(c) Wholesale natural gas customers: no comparable provision.</p>	<p>(a) Investor-owned utilities:</p> <p><a href="#">Executive Order D004 08</a> (04/22/08) does as the Plan says it would. With respect to Xcel Energy, the PUC's 6/5/08 <a href="#">PUC decision</a> on the utility's DSM program for electricity, essentially to become an element in its electric resource plan, requires greater and quicker reductions in electricity use than recommended by the Panel. With respect to Black Hills Energy (formerly Aquila), a DSM plan is pending PUC action as is its <a href="#">August 2008 electric resource plan</a> filing.</p> <p>The executive order also directs GEO and the Department of Regulatory Affairs to identify ways to provide these utilities with incentives for GHG actions, as provided in the Plan. A report to the Governor is due by April 2009. No action reported yet.</p> <p>(b) In July 2008 GEO began consulting with municipal utilities and rural electric co-ops about GHG emission reductions. March 2009 is the target date for a GEO report to the Governor on the plans those utilities will pursue.</p> <p>(c) Wholesale natural gas customers: No action yet.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>RCI-2: Revolving Loan Fund for Energy Savings in Existing Government Buildings</p> <p>The state government to set up a new loan fund to provide no- or low-interest loans for energy retrofits in existing state and local government buildings (including schools), at a level sufficient to achieve a 20% reduction in energy used in all such existing buildings., Energy savings would finance repayments of the loans. Program to start in 2008 and reach half of state and local government buildings by 2015.</p> <p>Panel vote: Super majority (1 objection)</p>	0.5	-\$ 18/ton	No comparable provision.	No action yet.
<p>RCI-3: Building Codes</p> <p>(1) GEO to upgrade every 3 years the state's energy requirements that must be met by local residential and commercial building codes, using upgrades in the International Energy Code (IECC) as the standard. The first upgraded state requirement to be adopted in 2010.</p> <p>(2) GEO to spend \$1 million per year starting in 2008 for technical assistance to local communities towards adoption and improved enforcement of building codes.</p> <p>Panel vote: Unanimous.</p>	2.7	Not analyzed	(1) Says GEO will continually update the state's minimum building codes.	<p>(1) No action by GEO reported yet.</p> <p>(2) GEO held 30 workshops in 2008 to assist local governments in adopting and enforcing building codes. GEO tells RMCO it intends to hold more workshops in 2009, and in those workshops to encourage local adoption of IECC 2009 standards.</p>
<p>RCI-4: Beyond Code Building Planning &amp; Design</p> <p>(1) For state and local government buildings, including schools and public hospitals, mandate that 30% of all new construction or major modifications achieve 37% reductions in energy use (i.e., LEED Gold compliance) and the remainder achieve 30% reductions (LEED silver). Mandates would be set by all relevant jurisdictions, including home-rule cities. Mandates to apply to new buildings and major modifications for which design begins after 12/31/07.</p>	2.4	\$ 76/ton	No comparable provision.	<p>(1) No action yet.</p> <p>(2) GEO has set up an <a href="#">Energy Star New Homes Program</a> to support the construction and testing of Energy Star-certified new homes. GEO tells RMCO it anticipates Energy Star housing starts will increase from 7% in 2007 to 10-15% in 2008-09</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>(2) For new residential buildings, achieve by 2015 voluntary 15% reduction in energy consumption in 70% of all new homes, consistent with the Energy Star "high performing" standard.</p> <p>(3) As part of (2), for new residential buildings comprised of 4 or more attached residential units, provide a one-year, 100% tax credit to offset property taxes.</p> <p>(4) For commercial buildings: achieve by 2015 voluntary 50% to 70% reductions in energy consumption in 70% of new buildings, consistent with the Architecture 2030 standards. Provide a partial county property tax credit based on the incremental construction cost for new, private commercial buildings that achieve Architecture 2030 standards, capped at 10 years.</p> <p>Panel vote: Unanimous.</p>				<p>with a target of increasing 5% per year.</p> <p><a href="#">Built Green Colorado</a> (a voluntary program of the Home Builders Association of Metro Denver offered to builders across the state) in October 2008 started using the Energy Star rating as its minimum threshold for certifying energy-efficient homes.</p> <p>(3) No action yet.</p> <p>(4) No action yet.</p>
<i>Government subtotal:</i>	0.6	\$ 58/ton		
<i>Commercial subtotal:</i>	1.4	\$ 109/ton		
<i>Residential subtotal:</i>	0.4	-\$ 5/ton		
<p>RCI-5: Steep Inverted Block Rates to Fund Energy Efficiency</p> <p>Electric utilities to impose by 2010 two tiers of surcharges for residential and commercial customers using more than certain levels of electricity. The surcharges would be an additional 2¢ per kilowatt-hour for consumption above the first threshold and 5¢ per kilowatt-hour above the second threshold. The first threshold would be 50% of the Architecture 2030 energy consumption reduction targets, the second threshold would be 100%. All additional money paid to the utilities would be used by them to fund demand side management (energy efficiency) programs by residential and commercial customers.</p> <p>Implementation: (a) For investor-owned utilities, regulations by the PUC.</p> <p>(b) Municipal utilities and rural electric co-ops could either impose block-rate surcharges or comparable system benefit charges.</p>	6.7	-\$ 30/ton	No comparable provision.	<p>(a) In September 2008 the PUC opened an <a href="#">investigatory docket</a> on regulatory and rate incentives, including inverted block rate structures, for customers of gas and electric utilities.</p> <p>(b) No action yet.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>Panel vote: Majority (7 objections)</p> <p>[This recommendation is an alternative to RCI-11 and is inconsistent with RCI-7's time-of-use rates.]</p>				
<p>RCI-6: Retrofits for Existing Commercial &amp; Industrial Buildings</p> <p>Establish in 2008 a state revolving loan fund for no- or low-interest loans for energy efficiency retrofits for existing commercial (nongovernmental) and industrial buildings, sufficient to achieve by 2017, retrofits in 5% of existing buildings in those categories, with each achieving within 5 years a 25% reduction in current energy use.</p> <p>Panel vote: Unanimous (with 2 statements of qualified approval).</p>	1.8	-\$ 28/ton	No comparable provision.	The passage of <a href="#">House Bill 2008-1350</a> enabled the state Clean Energy Development Authority to issue renewable energy bonds to create a statewide financing program for efficiency improvements for commercial, as well as residential, buildings. CEDA has not yet started this program and currently has no funding. House Bill 2008-1350 gave local governments the ability to issue such bonds, and Boulder County has such a proposal on the 2008 ballot.
<p>RCI-7: Smart Metering &amp; Time-of-Use Rates</p> <p>Install electricity smart metering and in-home or in-office read-out displays for all residential, commercial, and industrial consumers and institute time-of-use rates. Start with 10% of state's customers in 2009, achieving full coverage by 2013.</p> <p>Implementation: A legislatively-prescribed PUC study to determine the most cost-effective technologies and programs, performed prior to systems installation.</p> <p>Panel vote: Unanimous.</p>	2.6	-\$ 33/ton	No comparable provision.	Pilot programs: Xcel Energy established in 2008 a pilot smart grid program with the City of Boulder, and the Colorado Department of Public Health and Environment is participating with a plug-in hybrid electric vehicle component. Colorado Springs Utilities is also starting a smart metering pilot program in 2008.
<p>RCI-8: Renewable Energy Tax Credits</p> <p>Create a 30% state tax credit for installation costs of renewable energy systems in new and existing residential, commercial, and industrial buildings. Eligibility for the credit would be contingent on reducing energy use at least 20% after installing the renewable energy systems. Only systems not credited to utilities for meeting the current renewable-portfolio standards would be eligible. Tax credit to be effective in 2008.</p>	Not Analyzed		No comparable provision.	<p><a href="#">House Bill 2008-1368</a>, enacted in 2008, exempts renewable energy systems from state sales tax.</p> <p>No action yet on a broader tax credit.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
Panel vote: Unanimous.				
<p>RCI-9: Combined Heat &amp; Power</p> <p>Follow the <a href="#">Western Governors Association recommendations</a> for promoting installation of combined heat and power (CHP) systems by large institutional and commercial facilities. Achieve avoided use of electricity and thermal energy equivalent to 15 megawatts of electricity by 2008, ramped up to 350 megawatts (half of what is now believed to be the economic potential) by 2020.</p> <p>Panel vote: Unanimous.</p>	1.4	-\$ 3/ton	No comparable provision.	No action yet.
<p>RCI-10: Voluntary Business Programs</p> <p>Replicate statewide Fort Collins' Climate Wise program to bring about voluntary business reductions in GHGs. Begin in 2008 and by 2015 reduce CO<sub>2</sub> emissions by 1 million tons annually.</p> <p>Panel vote: Unanimous.</p>	1.0	Not analyzed	Says the Governor will direct GEO to launch an Industrial Energy Efficiency Program to encourage large industrial sources to implement all available efficiency measures that can pay for themselves within five years.	Xcel has announced an industrial efficiency program as a part of its DSM plan approved in a 6/5/08 <a href="#">PUC decision</a> .
<p>RCI-11: Cost-of-Service Inverted Block Rates for Electricity</p> <p>Consider establishing by 2010 statewide requirements for inverted block rates for electricity, at levels that would recover (only) the cost of electric service (as current rates do). For lower tier(s) of consumption, the rate(s) per kilowatt-hour would be lower than current rates, for higher tier(s) of consumption the rates would be higher.</p> <p>Panel vote: Unanimous.</p> <p>[This recommendation is an alternative to RCI-5 and is inconsistent with RCI-7's time-of-use rates.]</p>	Not analyzed	Not analyzed	No comparable provision.	In September 2008 the PUC opened an <a href="#">investigatory docket</a> on regulatory and rate incentives, including inverted block rate structures, for customers of gas and electric utilities.
Sector GHG reduction total of <b>9 analyzed policies</b> after adjusting for overlaps among policies	15	N/A	N/A	N/A

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
Sector cost-effectiveness total of <b>7 analyzed policies with cost analysis</b> after adjusting for overlaps among policies		-\$ 2 /ton	N/A	N/A

# Energy-Supply Sector

Updated November 3, 2008

For full details of these Climate Action Panel recommendations, see [Appendix F](#) of the panel's report. For full details on these elements of the Governor's plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p style="text-align: center;">ES-1: Renewable Energy Assistance</p> <p>The state government to provide starting in 2009 financial assistance or tax credits to assist utilities in providing up to 2,000 megawatts of production from renewable sources used to meet the additional requirements of ES-2. Eligible projects to include renewable energy production facilities and research and development at universities and the National Renewable Energy Laboratory.</p> <p>Panel vote: Unanimous.</p>	Not analyzed		No comparable provision.	No action yet.
<p style="text-align: center;">ES-2: Mandated Portfolio Standards</p> <p>The state government to increase renewable portfolio standards to 30% for investor-owned electric utilities and 15% for municipal utilities and rural electric co-ops by 2020, with no more than 85% of the renewable energy from centralized wind power. The state government to allow purchase of renewable energy credits to count toward compliance, with equal weight given to in-state and out-of-state sources instead of additional weight for in-state sources under current law.</p> <p>Panel vote: Super majority (3 objections) (with 1 statement of qualified approval)</p> <p>[This is an alternative to ES-3.]</p>	4.9	\$ 16/ton	<p>No comparable provision.</p> <p>[See the item at the bottom of this section about the emission reduction goals for utilities]</p>	No action yet.
<p style="text-align: center;">ES-3: Clean Energy Portfolio Standard</p> <p>Consider adoption of Xcel Energy's proposed clean energy portfolio standard (a variant on a renewable portfolio standard that includes efficiency, clean</p>	Not analyzed		No comparable provision.	No action yet.

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>coal, and nuclear) on a state, regional, or national basis.</p> <p>Panel vote: Majority (9 objections)</p> <p>[This is an alternative to ES-2.]</p>				
<p>ES-4: Transmission Infrastructure for Renewables</p> <p>The state government in 2008 to expand to all electric utilities the current requirement (<a href="#">Senate Bill 2007-100</a>) for investor-owned utilities to map and plan for electricity transmission infrastructure investments that support renewable energy generation zones. Require cooperative transmission planning among all of the utilities.</p> <p>Panel vote: Unanimous.</p>	Not analyzed		No comparable provision.	No action yet.
<p>ES-5: Costs for CO<sub>2</sub> Emissions</p> <p>Consider applying a price to CO<sub>2</sub> emissions (such as cap and trade or tax) on a state, regional, or national basis.</p> <p>Panel vote: Super majority (1 objection) (with 1 statement of qualified approval)</p>	Not analyzed		Calls for national legislation to establish a cap-and-trade program, and says that if there is no demonstrable progress on national legislation and the <a href="#">Western Climate Initiative</a> cap-and-trade program is compatible with Colorado resources, then the state will join the Western Climate Initiative.	No action yet.
<p>ES-6: Public Benefit Charge Funds</p> <p>Assess a public benefit charge on all retail electric utility bills to fund renewable energy programs. Apply either a 2 mill (\$0.002)/kilowatt-hour charge (would yield about \$96 million/year) or a 4 mill/kWh charge (about \$192 million/year yield).</p> <p>Panel vote: Super majority (3 objections) (with 1 statement of qualified approval)</p> <p>[This is an alternative to the RCI-5 recommendation.]</p>	Not analyzed		No comparable provision.	No action yet.
<p>ES-7: Incentives for Combined Heat &amp; Power and Distributed Generation</p> <p>Goal: Expand combined heat and power (CHP) and distributed generation (DG) to each equal 1% of</p>	1.1	\$ 15/ton	No comparable provision.	

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>total fossil-fuel generation by 2020.</p> <p>Implementation:</p> <p>(a) Such measures as direct subsidies, tax credits or exemptions, and/or direct payments for system outputs.</p> <p>(b) Implementation of <a href="#">Western Governors Association recommendations for CHP</a>. [See RCI-7 recommendation].</p> <p>(c) Net metering for customers with CHP and DG.</p> <p>(d) Various actions to reduce utility policy barriers.</p> <p>Panel vote: Unanimous.</p>				(a) – (d) No action yet.
<p>ES-8: CO<sub>2</sub> Capture &amp; Transport Infrastructure</p> <p>(1) The state government to work with neighboring states to form a regional CO<sub>2</sub> transportation and sequestration collaborative.</p> <p>(2) The Oil and Gas Conservation Commission and the Department of Public Health and Environment (CDPHE) to investigate regulatory and environmental issues associated with carbon capture and storage and report recommendations to the governor.</p> <p>Panel vote: Unanimous.</p>	Not analyzed		<p>(1) No comparable provision.</p> <p>(2) Calls for the Department of Natural Resources (DNR) and CDPHE to identify potential sequestration sites and to develop an appropriate regulatory framework.</p>	<p>(1) No action yet.</p> <p>(2) No agency action reported yet.</p>
<p>ES-9: R&amp;D for Low-Carbon Technology</p> <p>The state government to set up a program for low-interest loans to Colorado companies and universities for research and development of carbon emissions reduction technology for electricity generation, funded at \$100 million/year through a 2 mill (\$0.002)/kilowatt-hour surcharge on all electricity bills. Not eligible would be generation technologies that depend on carbon capture and sequestration. Start program in 2008.</p> <p>Panel vote: Unanimous.</p>	Not analyzed		No comparable provision.	No action yet.

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>ES-10: Advanced Fossil-Fuel Generation with Carbon Capture and Sequestration</p> <p>(1) The Governor to consider supporting Xcel Energy's proposal for an integrated gasification combined cycle (IGCC) coal-fired power plant with carbon capture and sequestration.</p> <p>(2) Public officials in Colorado to seek federal funding for the above project.</p> <p>(3) Also evaluate advanced technologies other than IGCC.</p> <p>(4) PUC to re-evaluate rules for demonstration projects and technology commercialization.</p> <p>Panel vote: Unanimous.</p>	Not analyzed		<p>(1) No comparable provision.</p> <p>(2) &amp; (3) Calls on the federal government to make research and development of IGCC and similar technologies a high priority.</p> <p>(4) No comparable provision.</p>	<p>(1) Xcel has delayed its plans for the plant. The passage of <a href="#">House Bill 2008-1350</a> authorized the state Clean Energy Development Authority to assist with bonding if a utility is interested in building an IGCC plant with carbon capture and sequestration.</p> <p>(2) No action yet.</p> <p>(3) No action yet.</p> <p>(4) No action yet.</p>
<p>ES-11: Hydroelectric and Small Renewables</p> <p>(1) The state government to expand the scope of current statewide renewable resource zones mapping (i.e., <a href="#">Senate Bill 2007-91</a> requirements) to include more detail on small hydro-power, geothermal, and biomass renewable power sources.</p> <p>(2) Establish a work group to research barriers to small renewable energy facilities and propose solutions.</p> <p>(3) Seek to add 50 megawatts per year of new small hydro resources by 2014.</p> <p>(4) Consider transferring Federal Energy Regulatory Commission regulation of hydropower to the state.</p> <p>Panel vote: Unanimous.</p>	0.8	\$ 40/ton	<p>No comparable provisions.</p>	<p>(1) No action yet.</p> <p>(2) No action yet.</p> <p>(3) GEO has established a funding mechanism through the Colorado Water and Power Development Authority's <a href="#">Small Hydro power Loan Program</a>. The first set of loans and grants will be awarded in early 2009.</p> <p>(4) No action yet.</p>
<p>ES-12: Nuclear Power</p> <p>Review the costs and emission reduction potential of nuclear power.</p> <p>Panel vote: Unanimous.</p>	Not analyzed	Not analyzed	<p>No comparable provision.</p>	<p>No action yet.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>ES-13: Efficiency of Existing Power Plants</p> <p>Goal: Adopt policies to promote a 2% increase in the efficiency of existing power generation facilities by 2020.</p> <p>Implementation: Utilities to begin reporting total heat input per total megawatt hours of output in 2008, and to begin achieving reductions in 2011.</p> <p>Panel vote: Unanimous.</p>	1.0	Not analyzed	No comparable provision.	No action yet.
<p>ES-14: Oil and Gas Operations</p> <p>Goal: Reduce methane emissions from oil and natural gas operations 35% from 2004 levels by 2020.</p> <p>Implementation: Such measures as operator education, financial incentives, mandates or standards, and/or cost and investment recovery mechanisms.</p> <p>Panel vote: Unanimous.</p>	2.6	\$ 0.8/ton	Calls on DNR and CDPHE to work with the oil and gas sector to reduce methane leakage.	No agency action reported yet.
<p>ES-15: Power plant emission standard</p> <p>The state government to establish a CO<sub>2</sub> emissions performance standard of no more than 1,100 lbs. of CO<sub>2</sub>/MWh for new non-peaking power plants and those older than 60 years. (This level is roughly equal to that of a combined cycle natural gas-fueled plant). The standard includes plants that come on line in 2011 or after, and plants located outside Colorado supplying power to Colorado customers.</p> <p>Panel vote: Super majority (5 objections)</p>	2.3	-\$ 1/ton	Says that an executive order will direct CDPHE to develop recommendations for addressing GHG emissions from new power plants.	With different wording, <a href="#">Executive Order D004 08 (4/22/08)</a> directs CDPHE and GEO to evaluate policy options to address demand for new coal-fired power plants. This effort shall consider alternate sources of energy and reducing or mitigating GHGs from new plants. Recommendations are due to the Governor by April 2009. No agency action reported yet.
N/A	N/A	N/A	(1) Calls for reducing emissions from electric utilities 20% below their 2005 levels by 2020. Some of these reductions will be those resulting from 2007 laws and actions, and the remainder from new laws and actions. Some of these reductions will be from energy-supply actions (this policy area) and some from DSM (see RCI-1).	(1) (a) Investor-owned utilities – <a href="#">Executive Order D004 08 (04/22/08)</a> does as the Plan says it would. The PUC has <a href="#">approved Phase I</a> of Xcel Energy's 2007 Electric Resource Plan application, which expresses an intent to meet this goal in future plan filings but not this one. Black Hills, in its 2008 Electric Resource Plan now under PUC consideration, purports to meet this goal.

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
			<p>Implementation: (a) Investor-owned utilities – Says an executive order will be issued requesting the PUC to seek from those 2 utilities an Electric Resource Plan showing how they could reduce GHGs 20% below 2005 levels by 2020. Also says that the executive order will direct the Governor's Energy Office (GEO) to identify policy changes to provide these utilities with incentives to invest in DSM and energy supply measures to reduce GHGs.</p> <p>(b) Municipal utilities and rural electric co-ops: Says that the Governor will request GEO and others to develop comparable goals for these utilities, with the Governor then to request them to develop plans to meet the goals.</p> <p>(2) Says that GEO will report to the Governor every 2 years on the status of renewable energy in the state and actions that can be taken to accelerate it.</p>	<p>The executive order also directs GEO and the Department of Regulatory Affairs to identify ways to provide these utilities with incentives for GHG actions, as provided in the Plan. A report to the Governor is due by April 2009. No action reported yet.</p> <p>(b) Municipal utilities and rural electric co-ops – In July 2008 GEO began seeking voluntary goals and action plans from these utilities to achieve those goals. March 2009 is the target date for a GEO report to the Governor on the plans those utilities will pursue.</p> <p>(2) No action yet.</p>
Sector totals of <b>6 analyzed policies</b> (including ES-13) after adjusting for overlaps among policies	9	N/A	N/A	N/A
Sector totals of <b>5 policies with cost estimates</b> (not including ES-13) after adjusting for overlaps		\$ 10/ton	N/A	N/A

# Transportation and Land-Use Sectors

Updated March 3, 2009

For full details of these Climate Action Panel recommendations, see [Appendix G](#) of the panel's report. For full details on these elements of the Governor's plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p style="text-align: center;">TLU-1: Smart Growth Policies</p> <p>(1) Support and promote public and private planning and development practices to reduce light-duty vehicle travel in Colorado, to reach a goal of a 2% reduction, compared to a current-policy baseline, in statewide light-duty vehicle miles traveled (VMT) by 2020, consistent with Denver Regional Council of Government growth scenarios for compact urban footprints.</p> <p>Implementation: Such practices and policies as developer incentives for density and mixed use, improved estimates of travel reductions resulting from mixed-use and infill development, sequencing new development with multi-modal transportation infrastructure, urban growth boundaries intergovernmental agreements, sharing tax proceeds among local governments, inter-jurisdictional land use and street grid planning, tax incentives for brownfields development.</p> <p>(2) Increase property owners' awareness of conservation easement tax incentives.</p> <p>(3) Increase funding for the private Conservation/Land Protection Fund to provide bridge loans to purchase targeted open lands when they become available.</p> <p>(4) The state government to require through executive order or legislation that by 2010 the Colorado Department of Transportation and</p>	0.47	Less than \$ 0/ton	No comparable provisions.	<p>(1) No action yet.</p> <p>(2) No action yet.</p> <p>(3) No action yet.</p> <p>(4) <a href="#">Senate Bill 09-108</a>, enacted 3/2/09, partially implements this recommendation by requiring CDOT to consider reduction of GHG emissions, multimodal choice, and support for urban and rural</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>metropolitan planning organizations quantify and report GHG emissions from long-range transportation plans, provided that financial aid and technical assistance is made available.</p> <p>Panel vote: Unanimous.</p>				<p>mass transit in a comprehensive statewide transportation plan (no date set).</p>
<p>TLU-2: Low-GHG Vehicle Incentives</p> <p>(1) As an alternative if the TLU-6 recommendation for clean-car standards is not implemented, the state government to participate in a multi-state study of the feasibility and effectiveness of a western regional "feebate" system that imposes a fee on purchase of high-GHG vehicles to fund credits for purchase of low-GHG vehicles. Implement before 2010.</p> <p>(2) Legislation to extend the state income-tax credit program for purchase of low-GHG vehicles beyond 2010. Implement prior to 2010.</p> <p>(3) Maintain current laws for access to HOV lanes for alternative-fuel vehicles (i.e., EPA-certified inherently low-emission vehicles, such as 100% electric vehicles).</p> <p>(4) Require state and local government agencies to purchase the lowest emitting vehicles suitable for their type of usage.</p> <p>Panel vote: Unanimous.</p>		<p>Not analyzed – alternative to TLU-6</p>	<p>No comparable provisions.</p>	<p>(1) No action yet.</p> <p>2) No action yet.</p> <p>(3) Related to this recommendation is the Colorado Department of Transportation 2008 start-up of a <a href="#">HOV lanes permit system</a> for qualifying hybrid vehicles, as provided for in the federal law that also allows alternative-fuel vehicles to access HOV lanes. The system will expire in September 2009 unless the federal law is extended.</p> <p>(4) No action yet.</p>
<p>TLU-3: Public Transit</p> <p>Goal: Expand and improve mass transit sufficiently to achieve by 2020, in combination with TLU-7, a 6% reduction in urban light-duty vehicle miles traveled (VMT) from a current-policy baseline. This is equal to a 22%, rather than a 28%, growth in</p>	<p>0.97</p>	<p>Not analyzed</p>	<p>No comparable provision.</p>	

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>urban light-duty VMT between 2007 and 2020.</p> <p>Implementation mechanisms include:</p> <p>(a) Create a reliable statewide funding source.</p> <p>(b) All new large residential developments to have a resident travel plan that will achieve a 20% transit mode share, with developments unable to reach that goal making a cash-in-lieu payment. The state government to require travel plans; if it does not have the authority to do so, incentivize local governments to require them.</p> <p>(c) Create a statewide mass transit plan.</p> <p>(d) Monitor and support the activities of the Rocky Mountain Rail Authority and the Colorado Rail Association.</p> <p>(e) Support the I-70 Collaborative Effort mediated by the Keystone Center to resolve stakeholder issues in the planning efforts to increase the capacity of I-70.</p> <p>(f) Improve intercity bus service</p> <p>(g) Improve frequency and service quality on existing transit routes.</p> <p>(h) Reduce travel times on existing transit routes (e.g., traffic signal prioritization, exclusive lanes).</p> <p>Panel vote: Unanimous.</p>				<p>(a) ) <a href="#">Senate Bill 09-108</a>, enacted 3/2/09, partially implements this recommendation by requiring \$15 million in annual expenditures from new fees established by the law for transit-related planning, construction, and operations.</p> <p>(b) No action yet.</p> <p>(c) - (d) No action yet.</p> <p>(e) I-70 corridor stakeholders in 2008 agreed on a <a href="#">consensus long-range preferred alternative</a>, including transit elements, to be analyzed in a Programmatic EIS now in process.</p> <p>(f) – (h) No action yet.</p>
<p>TLU-4: Heavy Duty Vehicle Idling Reduction</p> <p>Goal: Reduce fuel consumption from extended (overnight) heavy duty truck idling 50% by 2012 and 95% by 2020.</p>	0.11	-\$ 144/ton	No comparable provision.	

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>Implementation:</p> <p>(a) The state government to put in place an anti-idling regulation by 2009 and fund public education on the regulation.</p> <p>(b) Provide electrification at 2 major truck stops by 2012 and all major truck stops by 2020.</p> <p>(c) The state government to establish incentives for purchase of heavy-duty vehicle auxiliary power units.</p> <p>Panel vote: Unanimous.</p>				<p>(a) No action yet.</p> <p>(b) No action yet.</p> <p>(c) No action yet.</p>
<p>TLU-5: Low Carbon Fuel Standard</p> <p>The state government to adopt a low-carbon fuels standard that will reduce carbon intensity of passenger vehicle fuels by at least 10% by 2020.</p> <p>Panel vote: Unanimous.</p>	2.21	Not analyzed	No comparable provision.	No action yet.
<p>TLU-6: GHG Vehicle Emission Standard</p> <p>Adopt GHG emission standards for new light-duty cars and trucks equivalent to those established by the California Air Resources Board. Begin compliance with the 2011 model year.</p> <p>Panel vote: Unanimous.</p> <p>[Should this recommendation not be implemented, TLU-2 is an alternative.]</p>	3.40	-\$ 100/ton	Says an executive order will be issued directing the CDPHE to propose to the Air Quality Control Commission (AQCC) adoption of California's standards for new cars and trucks.	With more general wording and in an apparent change, <a href="#">Executive Order D004 08</a> (4/22/08) directs CDPHE to propose by April 2010 to AQCC a comprehensive proposal for reducing GHG emissions from the transportation sector, including measures to achieve the maximum feasible and cost-effective reductions in emission from passenger cars and light duty trucks. No agency action reported yet.
<p>TLU-7: Public Transit Promotion</p> <p>Goals: (1) Expand participation in employer-sponsored annual transit passes to achieve 10%</p>			No comparable provisions.	

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>of urban area employees having free transit passes by 2012 and 25% by 2020. Implement by 2009.</p> <p>Implementation: (a) Ensure all major transit systems in the state offer employer-provided transit passes</p> <p>(b) State legislation to require employers over a certain size threshold and all public agencies (including educational institutions) to give transit passes to employees (if located in a jurisdiction that offers them).</p> <p>(c) The state government to provide matching funds for employers initiating a program.</p> <p>(d) State legislation to establish a tax incentive for employer transit pass programs.</p> <p>(e) Local governments to require developers of large residential or commercial properties to adopt transportation demand management programs.</p> <p>(f) Local governments to provide matching funds to residential neighborhoods to start transit pass programs.</p> <p>(g) Transit agencies should offer special amenities (e.g., real time arrival info, Wi-Fi, and enhanced station and transit vehicle comfort).</p> <p>(2) Expand number of employers offering Commuter Checks (pre-tax transit fare program) to achieve 25% of transit riders using the program by 2012 and 50% by 2020.</p> <p>(3) Work with transit agencies to increase transit marketing programs.</p> <p>Panel vote: Unanimous.</p>				<p>(a) – (g) No action yet.</p> <p>(2) No action yet.</p> <p>(3) No action yet.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>TLU-8: Pay-As-You-Drive Auto Insurance</p> <p>(1) The state government to change insurance regulations to allow pay-as-you-drive (PAYD) insurance (i.e., auto insurance rates based on miles driven) and to initiate a pilot program to evaluate effectiveness in reducing VMT.</p> <p>(2) If pilot is successful, the state to establish a permanent program requiring all Colorado insurance providers to offer PAYD as an option for all car owners.</p> <p>Assumption: 50% of the state's drivers to have PAYD insurance by 2020, each reducing miles driven and emissions by 8%.</p> <p>Panel vote: Unanimous.</p>	0.94	Less than \$ 0/ton	No comparable provisions.	<p>(1) No action yet.</p> <p>(2) No action yet.</p>
<p>TLU-9: Parking Management</p> <p>(1) The state government to establish by 2010 a program to encourage local governments to voluntarily adopt parking-management programs that encourage alternative travel choices and transit-oriented development.</p> <p>Implementation: Such policies and practices as zoning code changes, unbundling parking from sale or lease of buildings, congestion parking price increases, parking space surcharges, improved enforcement, and preferential parking for vanpools/carpools.</p> <p>(2) The state government by 2010 to adopt for its facilities parking incentives that encourage transit-mode shifts.</p> <p>Panel vote: Unanimous.</p>	0.03	-\$ 110	No comparable provisions.	<p>(1) No action yet.</p> <p>(2) No action yet.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>TLU-10: Commuter Benefits Programs</p> <p>The state government to require employers with more than 100 employees in a location to offer by 2010 commuter-benefits programs to help employees reduce the miles they drive.</p> <p>Implementation: (a) An executive order to require state agencies to offer commuter benefits.</p> <p>(b) A state law to require large private employers to offer commuter benefits.</p> <p>(c) The state government to fund a \$10 million grants program for employers.</p> <p>(d) A commuter-benefits program could be a stand-alone voluntary business program or part of a broader voluntary business program.</p> <p>Panel vote: Unanimous.</p>	0.45	-\$ 240/ton	No comparable provision.	(a) – (d) No action yet.
<p>TLU-11: Driver and Consumer Education</p> <p>Goals: (1) The state government to develop and implement a driver- and consumer-education curriculum for reducing GHG emissions from vehicle use, for inclusion in driver-education and fleet-operator training classes.</p> <p>(2) Require private and commercial drivers-license tests to include a fuel- saving driving practices component by 2010.</p> <p>(3) The state government or an appropriate agency to launch a marketing program for fuel efficient replacement tires and energy efficient driving practices and devices (including tire pressure monitoring systems) in 2009.</p> <p>Panel vote: Unanimous.</p>	Not analyzed		No comparable provision.	<p>(1, 3) In August 2008 Gov. Ritter <a href="#">announced</a> that Colorado is joining the American Automobile Manufacturing Association's <a href="#">EcoDriving USA campaign</a>, which includes recommendations for incorporating fuel efficient driving in driver-education classes and for state agency employee training. No agency action reported yet</p> <p>2) No action yet.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
Sector GHG reduction total of <b>8 analyzed policies</b> after adjusting for overlaps among policies	7.84	N/A	N/A	N/A
Sector cost-effectiveness total of <b>4 analyzed policies with cost estimates</b> after adjusting for overlaps among policies		-\$ 141/ton	N/A	N/A

## Agriculture, Forestry, and Waste Sectors

Updated November 3, 2008

For full details of these Climate Action Panel recommendations, see [Appendix H](#) of the panel's report. For full details on these elements of the Governor's plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p style="text-align: center;">AFW-1: Agricultural Crop Management</p> <p>Goals: (1) Achieve no-till operation of 30% of total annual croplands by 2012 and 50% by 2020.</p> <p>(2) Increase nitrogen fertilizer efficiency by 10% by 2012 and 20% by 2020</p> <p>Implementation (for both (1) and (2)): (a) Increase Colorado State University Extension outreach to producers.</p> <p>(b) Consider state tax incentives for "high conservation management."</p> <p>(c) Support research and development for cropping systems research.</p> <p>(d) Consider incentives for water conservation and more flexible water allocation.</p> <p>Panel vote: Unanimous.</p>	0.78	-\$ 7/ton	<p>[See the item at the bottom of this section about the agricultural offset program in Gov. Ritter's <a href="#">Climate Action Plan</a>.]</p>	<p>(a) No action reported yet.</p> <p>(b) No action yet.</p> <p>(c) No action reported yet.</p> <p>(d) No action yet.</p>
<p style="text-align: center;">AFW-2: Manure Management &amp; Energy Programs</p> <p>Goals: Implement methane capture and energy recovery on manure management projects on 10 dairy and swine feeding operations (AFOs) by 2012 and on 80% of dairy and swine AFOs) by 2020.</p>	0.32	\$ 36/ton	<p>No comparable provision.</p>	

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>Implementation: (a) Governor's Energy Office (GEO) to develop pilot funding program for methane capture and energy recovery.</p> <p>(b) Develop net metering programs to provide a financial incentive.</p> <p>(c) Allow AFOs to sell and insert scrubbed methane directly into natural gas pipelines.</p> <p>Panel vote: Unanimous (with 1 statement of qualified approval).</p>				<p>(a) In 2007 the Colorado Department of Agriculture awarded 3 feasibility study grants from its On-Farm Renewable Energy program for methane capture and recovery biogas projects in Saguache, Larimer, and Crowley Counties.</p> <p>(b) No action yet.</p> <p>(c) No action yet.</p>
<p>AFW-3: On-farm Energy Use</p> <p>Goals: (1) Reduce on-farm petro-diesel use 5% by 2012 and 20% by 2020.</p> <p>2) Reduce on-farm electricity use from fossil fuels 10% by 2012 and 40% through energy efficiency and on-site renewable sources generation.</p> <p>Implementation: (a) The state government and others to develop programs or businesses for services and products to increase energy efficiency and conservation, and develop group purchasing options and coordinate installation of products to lower costs.</p> <p>(b) The state government to develop standards for rural electric co-op ownership of renewable energy credits (RECs) for use as rebates for on-farm renewable production; enable the RECs to qualify for renewable portfolio standards requirements required by the passage of <a href="#">House Bill 2007-1281</a>.</p> <p>(c) The state government to incentivize upgrades in rural electric co-op distribution systems to smart grid technologies.</p> <p>(d) Rural electric co-ops, Tri-State Transmission and Generation Assoc., and the state government to increase net metering standards above the</p>	0.64	-\$ 40/ton	No comparable provisions.	<p>(1) No action yet.</p> <p>(2) (a) The Governor's Energy Office (GEO) is seeking voluntary goals and action plans from each rural electric co-op to achieve a 20% reduction in its emissions (compared to 2005) by 2020, through supply and demand management options. GEO targets March 2009 for a report on plans those utilities will pursue. [See the description at the end of the Energy Supply recommendations.]</p> <p>In late 2007, the Colorado Department of Agriculture awarded a number of feasibility study, research, and project implementation grants from its <a href="#">On-Farm Renewable Energy program</a>.</p> <p>(b) No action yet.</p> <p>(c) No action yet.</p> <p>(d) No action yet.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>current 25 kW maximum standard.</p> <p>Panel vote: Unanimous.</p>				
<p>AFW-4: Biodiesel Production</p> <p>Goal: Produce enough in-state biodiesel using GHG-superior feedstocks (e.g., oilseed crops, waste vegetable oil) to offset 2% of the state's petro- diesel fuel use by 2012 and 20% by 2020.</p> <p>Implementation: (a) The state government to consider incentives for production of GHG-superior biodiesel sources.</p> <p>(b) The state government to consider a renewable fuels standard by volume of retail sales beginning at 2% and increasing to 5%.</p> <p>(c) The state government to consider a retail tax credit for sale of B20 fuel, increasing in value to proportion of retail volume sold.</p> <p>Panel vote: Unanimous (with 3 statements of qualified approval).</p>	0.22	\$ 12/ton	No comparable provision.	<p>(a) No action yet.</p> <p>(b) No action yet.</p> <p>(c) No action yet.</p>
<p>AFW-5: Ethanol Production</p> <p>Goal: Increase in-state ethanol production, using GHG-superior feedstocks and production methods, to 50 million gallons per year above business-as-usual (BAU) by 2012, and 400 million gallons per year above BAU by 2020.</p> <p>Implementation: Such measures as pilot projects, tax incentives, research and development, streamlined permitting, education programs, and recruitment of ethanol production facilities.</p> <p>Panel vote: Unanimous (with 3 statements of qualified approval).</p>	3.1	\$ 3/ton	No comparable provision.	<p>Research and development: <a href="#">House Bill 2008-1001</a> made biofuels eligible for a <a href="#">bioscience research matching-grant program</a> administered by the Colorado Office of Economic Development.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>AFW-6: Preservation of Lands with Carbon Storage Value</p> <p>Goal: Preserve forest lands and grasslands to reduce the rate of conversion to developed uses by 10% by 2012 and 25% by 2020.</p> <p>Implementation: such measures as additional funding for land protection, tax incentives for conservation easements based on avoided carbon emissions, a fund to supplement federal Conservation Reserve Program, and prioritizing land protection that is linked to growth management.</p> <p>Panel vote: Unanimous.</p>	<p>0.24 (forests) 0.14 (grasslands)</p>	<p>\$ 26/ton (forests) \$32/ton (grasslands)</p>	<p>No comparable provision.</p>	<p>No action yet.</p>
<p>AFW-7: Forest Health &amp; Biomass Feedstocks for Energy Production</p> <p>Goal: Increase the use of biomass from forest health and fire risk treatment for electricity production and for biomass heating systems, using 10% of harvested wood by 2012 and 20% by 2020.</p> <p>Implementation: such measures as tax incentives, subsidies, and education and outreach.</p> <p>Panel vote: Unanimous.</p>	<p>0.20</p>	<p>-\$ 75/ton</p>	<p>Says the Governor will direct GEO and the Departments of Natural Resources and Public Health and the Environment to identify and implement actions to reduce the risk of catastrophic wildfire and to promote the use of forest-based biomass fuels.</p>	<p><a href="#">Executive Order B 004 08</a> (2/12/08) established the Colorado Forest Health Advisory Council, charged in part with recommending ways to reduce fire risks and expand bioheating and renewable energy with forest-based biofuels.</p> <p>GEO and Boulder County in 2008 funded a feasibility study for woodchip-fired heating systems at five locations in Boulder County.</p>
<p>AFW-8: Waste Reduction, Reuse, &amp; Recycling</p> <p>Goal: Divert 25% of wastes from landfills by 2012 and 75% by 2020 through source reduction, enhanced recycling, and composting programs.</p> <p>Implementation: such measures as public education; public/private partnerships to finance construction and operation of recycling/composting</p>	<p>4.6</p>	<p>\$ 13/ton</p>	<p>Encourages local governments to examine their trash and recycling programs.</p> <p>Says an executive order will be issued to establish a goal for state agencies to divert 75% of their wastes from landfills by 2020.</p>	<p>No action reported yet.</p>

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
<p>facilities; landfill tipping fee surcharges to finance programs; state and local rules such as allowable landfill materials; and advanced collection requirements for urban areas.</p> <p>Panel vote: Unanimous.</p>				
<p>AFW-9: Landfill Methane Reduction</p> <p>Goal: Install new methane control or capture technologies at 12 landfills by 2012 and achieve 50% reduction from business-as-usual by 2020. Decrease biodegradable waste stream to landfills and control methane through public education; the state government to require landfill methane control plans by end of 2008, financed from new tipping fee surcharges; adopt state and local rules for collection of biodegradable waste to be diverted from landfills; establish a state grants program financed by increased tipping fee surcharges.</p> <p>Panel vote: Unanimous.</p>	1.2	-\$ 0.02/ton	No comparable provision.	The City of Denver and Waste Management, Inc., plan to complete in 2009 a new 3.2 megawatt methane-to-energy plant at the Denver Arapahoe Disposal Site.
<p>AFW-10: Urban Forestry</p> <p>Goal: Plant 3.4 million new trees statewide by 2025 through expanded urban forestry programs. Initiate statewide program in 2008 (in addition to Denver Tree Initiative that already is committed to 1 million new trees by 2025).</p> <p>Implementation: Local governments to consider incentives for developers to attain tree canopy requirements; adoption of tree preservation and protection ordinances; sales of carbon sequestration credits through carbon offset programs; working with non-profits on public education and participation in tree planting. State Forest Service to increase seedling availability to urban programs and collaboration with non-profits. The state government to install green roofs on state buildings in urban areas.</p>	0.08	\$ 79/ton	No comparable provision.	No action yet.

Panel Recommendation	2020 GHG <sup>2</sup> Reduction (Million Tons <sup>3</sup> )	Cost Per Ton <sup>4</sup>	Governor's Plan	Implementation Status
Panel vote: Unanimous (with 1 statement of qualified approval).				
N/A	N/A	N/A	Says an executive order will be issued directing the Departments of Agriculture and Public Health and Environment (CDPHE) to establish an agricultural offset program with market and accounting mechanisms for transfers of GHG emission offsets.	<a href="#">Executive Order D.010.08</a> (4/22/08) does as the Plan says. The program is to be designed by April 2010 for implementation by April 2011.
Sector Total of Analyzed Policies After Adjusting for Overlaps	11.5	\$4 /ton	N/A	N/A

## Cross-Cutting Matters

Updated November 3, 2008

For full details of these Climate Action Panel recommendations, see [Appendix I](#) of the panel's report. For full details on these elements of the Governor's plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
<p style="text-align: center;">CC-1: Inventories &amp; Forecasts</p> <p>The state government should periodically inventory current and forecast future GHG emissions.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	Says Department of Public Health and Environment (CDPHE) will update the emissions inventory every 5 years.	<a href="#">Executive Order D 004 08</a> (4/22/08) directs CDPHE to complete a next inventory by 2012 and update it every 5 years.
<p style="text-align: center;">CC-2: Emissions Reporting</p> <p>(1) The state government should provide opportunities for all sources to report their GHG emissions.</p> <p>(2) The state government should require reporting of GHG emissions by all significant sources, as determined by the Department of Public Health and the Environment.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	<p>(1) Says CDPHE will work with emitters to encourage voluntary reporting of GHG emissions in the Climate Registry.</p> <p>(2) Says an executive order will be issued directing CDPHE to propose to the AQCC mandatory reporting requirements for major emitters of GHGs.</p>	<p>(1) CDPHE is encouraging voluntary sign-up. Among the 18 Colorado members joining since September 2007 are all state government departments (1 of 2 states to have done so), major energy suppliers (Xcel Energy, Tri-State Generation and Transmission, Platte River Power Authority, Colorado Springs Utilities, Colorado Interstate Gas, and El Paso Natural Gas), and Denver Water,</p> <p>(2) <a href="#">Executive Order D 004 08</a> does as the Plan says it would.</p>
<p style="text-align: center;">CC-3: Climate Registry</p> <p>The state government should consider additional or ancillary emissions reporting requirements to the extent that the <a href="#">national Climate Registry</a> does not meet Colorado needs.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	No comparable provision.	No action yet.
<p style="text-align: center;">CC-4: Statewide Emission Goals</p> <p>The governor should set statewide GHG reduction</p>	Not Quantified	Says an executive order will be issued setting statewide GJG goals of a 20% reduction by 2020	<a href="#">Executive Order D 004 08</a> (4/22/08) set those

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
<p>goals and targets to achieve in the vicinity of a 20% reduction by 2020 and 80% by 2050, both compared to 2005 levels.</p> <p>Panel vote: Super majority (1 objection) (with 5 statements of qualified approval)</p>		<p>and 80% by 2050, both compared to 2005 levels.</p>	<p>goals.</p>
<p>CC-5: Goals for State &amp; Local Government Emissions</p> <p>(1) The state government should set reduction targets for its own GHG emissions, for at least a reduction consistent with statewide goals (see CC-4).</p> <p>(2) Individual state government departments and agencies should have their own reduction targets, conduct their own inventories, and report on their progress.</p> <p>(3) Local governments should set reduction targets for their own GHG emissions.</p> <p>(4) Individual local government departments and agencies should have their own reduction targets, conduct their own inventories, and report on their progress.</p> <p>Panel vote: Unanimous.</p>	<p>Not Quantified</p>	<p>No comparable provisions.</p>	<p>(1) No action yet.</p> <p>(2) No action yet.</p> <p>(3) Local governments that have set such reduction targets include [list needed].</p> <p>(4) Local governments that have assigned to individual departments and agencies reduction targets, inventory responsibilities, and reporting requirements include [list needed].</p>
<p>CC-6:Local Government Climate Action Plans</p> <p>(1) All local governments should adopt comprehensive local climate-action plans.</p> <p>(2) The state government, local government associations, RMCO, and others should promote local government climate-action efforts.</p> <p>Panel vote: Unanimous.</p>	<p>Not Quantified</p>	<p>(1) No comparable provision.</p> <p>(2) GEO will distribute information on best community practices.</p> <p>GEO will host an annual conference to encourage local best practices.</p> <p>The Governor will award an annual Excellence in Climate Action award.</p>	<p>(1) Local governments with comprehensive local climate-action plans include [list needed].</p> <p>(2) GEO held such an annual conference in October 2008.</p> <p>RMCO held a workshop in October 2008 to begin creating a Colorado local climate-action network of local governments and associated organizations working on local climate-action programs.</p>

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
<p>CC-7: Public Education &amp; Outreach</p> <p>(1) The state government should establish public education and outreach programs on climate change and climate action.</p> <p>(2) Local governments should establish public education and outreach programs on climate change and climate action.</p> <p>(3) The state government and/or a nongovernmental organization should implement a statewide program to encourage and structure voluntary efforts by individuals to reduce GHG emissions.</p> <p>Panel vote: Unanimous.</p>	<p>Not Quantified</p>	<p>Says that the state will work through the Governor's P-20 Education Council and others to make sustainability (i.e., climate) curricula become standard fare in K-12 classes statewide and a "Best in Education" category will be highlighted in the Governor's Annual Excellence in Sustainability Awards program.</p>	<p>(1) No action reported yet.</p> <p>(2) No action yet.</p> <p>(3) Offsets: The Governor's Energy Office in September 2008 launched a statewide program to structure voluntary contributions by individuals to offset some of their emissions by arranging for others to reduce their emissions. Individuals may make tax-deductible contributions to the new <a href="#">Colorado Carbon Fund</a> for transfer to the Climate Trust, a 501(c)3 nonprofit organization, to arrange new emission-reduction activities in Colorado.</p>
<p>CC-8: Funding for Climate and New Energy Economy Programs</p> <p>The state government should start a clearinghouse to seek funding sources for climate and new energy economy programs and businesses.</p> <p>Panel vote: Unanimous.</p>	<p>Not Quantified</p>	<p>No comparable provision.</p>	<p>No action yet.</p>
<p>CC-9: Vulnerability &amp; Adaptation</p> <p>(1) The state government should perform a comprehensive assessment of the state's vulnerabilities to climate change.</p> <p>(2) The state government should develop adaptation plans addressing specific impacts of climate change. Among the impacts for which adaptation plans should be prepared are:</p> <p>(a) effects on water quantity and quality  (b) increases in heat-related deaths and illnesses  (c) increased air pollution  (d) increases in diseases  (e) increased wildfires  (f) increases in severe weather</p>	<p>Not Quantified</p>	<p>(1) No comparable provision.</p> <p>(2)(a) Provides that the Department of Natural Resources (DNR) and CDPHE will pursue a water adaptation plan that will include scientific investigation, analysis of water rights and compacts, comprehensive drought planning, and information exchange and education.</p> <p>(2)(b) – (i) No comparable provisions.</p> <p>(2)(j) Says that the Governor will direct DNR, CDPHE, and GEO to identify and implement actions to reduce the risk of catastrophic wildfire,</p>	<p>(1) No action yet.</p> <p>(2) (a) See items related to recommendations WA-3, WA-4, WA-5, and WA-6.</p> <p>(2)(b) – (i) No action yet.</p> <p>(2)(j) No action reported yet.</p>

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
(g) effects on agriculture (h) a reduction in skiing and other snow-dependent recreation and tourism (i) transportation and other impacts of increased hot-weather visitation and tourism in mountains (j) changes in ecosystems (k) impacts on fishing and hunting  Panel vote: Unanimous.		promote the use of forest-based biofuels, and otherwise anticipate and respond to the potential adverse effects of climate change on our forests  (2)(k) No comparable provision.	(2)(k) No action yet.
N/A	N/A	Says a Climate Advisory Panel will be established to advise the Governor.	<a href="#">Executive Order B 007 08</a> (4/22/08) authorized a Climate Advisory Panel to make recommendations on ways to achieve the state's GHG reduction goals and other matters. On June 22, 2009, the Governor's Office <a href="#">announced</a> the appointment and first meeting of the 30-member panel.

# Water Adaptation

Updated November 3, 2008

For full details of these Climate Action Panel recommendations, see [Chapter 8](#) of the panel's report. For full details on these elements of the Governor's plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
<p style="text-align: center;">WA-1: Need for Leadership</p> <p>Federal, state, and local officials in Colorado with general responsibilities or with particular water responsibilities to exercise leadership in addressing the causes of and adapting to the effects of climate change on the state's water resources.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	<p>Says the Departments of Natural Resources and Public Health and Environment will pursue a water adaptation plan that will include scientific investigation, analysis of water rights and compacts, comprehensive drought planning, and information exchange and education. [See recommendations WA-3, WA-4, WA-5, and WA-6.]</p>	Not generally subject to measurement.
<p style="text-align: center;">WA-2: Consideration of Climate Change in Water Decisions</p> <p>(1) All water managers to investigate the vulnerabilities to climate change of their systems and to determine how to meet future water needs in light of these vulnerabilities. Water providers to no longer assume the future will be like the past.</p> <p>Implementation: Water managers to assess vulnerability of systems; identify and preserve adaptation options; apply risk management and adaptive management; explore phased adaptation actions; consider increasing water supply system reliability, diversity, and flexibility; use "no-regrets" planning; participate in regional efforts.</p>	Not Quantified	<p>(1) No comparable provision.</p>	<p>(1) Full extent of action generally unknown. Known actions:</p> <p>Six water providers (Aurora, Boulder, Colorado Springs, Denver, Fort Collins, and the Northern Colorado Water Conservancy District) in cooperation with the Colorado Water Conservation Board (CWCB) are conducting a Joint Front Range Climate Change Vulnerability Study. [See also recommendation WA-6.]</p> <p>Denver Water, as part of an update to its Integrated Resource Plan, has employed climate change scenarios in order to evaluate safety factors in the plan's section on water supply risks.</p> <p>A study completed in 2008 of the sensitivity of the City of Boulder's water supply to climate change, funded by the National Ocean and Atmospheric Administration (NOAA), modeled climate and precipitation change scenarios through 2070.</p>

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<p>(2) Water suppliers to consider the appropriate roles of reuse, conservation, storage, and conjunctive use.</p> <p>(3) The state government to provide assistance to water providers that do not have the resources to consider the effects of climate change on their systems.</p> <p>Panel vote: Unanimous.</p>		<p>(2) No comparable provision.</p> <p>(3) Says that the state will assist water users to prepare for and adapt to large-scale drought.</p>	<p>(2) Extent of action generally unknown.</p> <p>(3) The state government held a Governor's Conference on Managing Drought &amp; Climate Risk in October 2008. No other agency action reported yet.</p>
<p>WA-3: Colorado River Water Availability Study</p> <p>The state government to ensure that the potential effects of climate change are considered in the Colorado River Water Availability Study authorized by <a href="#">Senate Bill 2007-122</a>.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	Says the state is studying the effects of climate change in the Colorado River Water Availability Study.	The contract for the study (awarded by CWCB in May 2008) provides for consideration of the effects of climate change.
<p>WA-4: Interstate Compacts</p> <p>(1) Colorado should not assume that interstate compacts defining the state's share of water in interstate river basins will be renegotiated.</p> <p>(2) The state government to develop for each major river basin a mechanism to deal with potential compact calls.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	<p>(1) No comparable provision.</p> <p>(2) Says that the state will develop for each major river basin a mechanism to deal with potential compact calls.</p>	<p>(1) Not subject to measurement.</p> <p>(2) <a href="#">House Bill 2008-1346</a> provided 2008 funding for the Colorado Water Conservation Board (CWCB) to evaluate options for implementing a compact call on the Colorado River. No agency action reported yet.</p>
<p>WA-5: Assessment &amp; Data</p> <p>(1) The state government, a university, RMCO, or another entity to arrange for a report on the state of scientific knowledge about climate change and</p>	Not Quantified	No comparable provisions.	(1) CWCB released in October 2008 an assessment report, <a href="#">Climate Change and Colorado</a> , prepared by the Western Water Assessment at the

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
<p>its effects on Colorado water resources.</p> <p>(2) The state government to appoint a task force to assess and identify gaps in the data and data systems needed to understand and adapt to climate change effects on water resources in Colorado.</p> <p>(3) The state government and others to support additional data collection.</p> <p>(4) Colorado's congressional representatives, the state and local governments, and water providers to support agency efforts and funding for data collection and assessment.</p> <p>Panel vote: Unanimous.</p>			<p>University of Colorado. One or more additional reports may follow.</p> <p>(2) No action yet.</p> <p>(3) No action yet.</p> <p>(4) No action yet.</p>
<p>WA-6: Regional Modeling</p> <p>The state government, water providers, and others to cooperate in:</p> <p>(1) Developing information from climate models on the effects of climate change on water supplies in each major river basin.</p> <p>(2) Developing tools and databases on climate model outputs for use by water providers.</p> <p>(3) A clearinghouse of climate projection data.</p> <p>(4) Demonstration projects on basin-wide assessments of water rights yields and call patterns to be used in water providers' modeling.</p>	<p>Not Quantified</p>	<p>(1) – (2) No comparable provisions.</p> <p>(3) Says that the state government will work with federal and state agencies and water users to set up and maintain a clearinghouse of up-to-date climate projection data.</p> <p>(4) Says that the state will examine climate-induced changes in streamflows and the effects on the yield of individual water rights and the pattern of calls.</p>	<p>(1) The Colorado River Water Availability Study will include an assessment of the effects of climate change on Colorado River water. [See WA-3.] Portions of the river basins (segments of the upper Colorado, Arkansas, and So. Platte basins) that are sources for six water providers (Aurora, Boulder, Colorado Springs, Denver, Fort Collins, and the Northern Colorado Water Conservancy District) are included in a Joint Front Range Climate Change Vulnerability Study being conducted in cooperation with CWCB.</p> <p>(2) The Joint Front Range Climate Change Vulnerability Study (see above) will produce datasets that the participating water providers can apply to their water supply planning models.</p> <p>(3) No agency action reported yet.</p> <p>(4) No agency action reported yet. The NOAA-funded study of the sensitivity of the City of Boulder's water supply to climate change included a water rights yield assessment for the Boulder Creek basin. [See WA-2.]</p>

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
Panel vote: Unanimous.			
<p>WA-7: Water Conservation</p> <p>(1) Municipal water providers to determine the potential for water conservation savings.</p> <p>(2) Municipal water providers to determine the best use of conservation savings, such as reserving savings for adaptation to climate change, supplying new growth, or meeting environmental needs.</p> <p>(3) Municipal water providers to consider and implement where appropriate specific, listed demand management measures and outdoor water conservation measures.</p> <p>(4) State and local governments to consider requiring or providing incentives for state-of-the-art conservation measures. .</p> <p>(5) Water providers to evaluate, monitor, and report to the state government on the impacts of conservation on systems yields and reliability.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	No comparable provisions.	<p>(1) Extent of action generally unknown.</p> <p>(2) Extent of action generally unknown.</p> <p>(3) Extent of action generally unknown.</p> <p>(4) No action yet.</p> <p>(5) No action yet.</p>
<p>WA-8: Agriculture</p> <p>The state government, agricultural water users, and municipal water users to:</p> <p>(1) Develop operating arrangements to minimize disruption of agriculture as water is transferred from agricultural to municipal uses.</p> <p>(2) Develop operating agreements, funding, and if needed legislation to allow improvements in agricultural water efficiency to benefit non-consumptive uses.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	No comparable provisions.	<p>(1) The Water Transfers Subcommittee of the <a href="#">Arkansas Basin Roundtable</a> has drafted a template to evaluate how water can be reallocated from agriculture uses in a way that supports the economy and environment of rural communities.</p> <p>(2) No action yet.</p>

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
<p>WA-9: Energy &amp; Water</p> <p>(1) The state government and others to evaluate water use of cooling technologies on all new electricity generating facilities.</p> <p>(2) Public education efforts about climate change in Colorado to address links among water conservation, energy conservation, and GHGs (greenhouse gases) and to encourage both energy and water conservation.</p> <p>(3) Water providers and others to consider GHG emissions from new water projects and activities.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	No comparable provisions.	<p>(1) No action yet.</p> <p>(2) No action yet.</p> <p>(3) No action yet.</p>
<p>WA-10: Information Exchanges</p> <p>(1) The state government or other entities to establish one or more peer-reviewed publications for water resource professionals, managers, and public officials translating climate change and water research products into useful, practical information.</p> <p>(2) The state government and/or others to provide practice-oriented information about climate change, host information exchanges, conduct research oriented toward practical needs of water management, and provide training and education in relevant topics.</p> <p>(3) The state government and/or others to encourage and facilitate cooperative working relationships among water provider organizations to facilitate joint water adaptation actions.</p> <p>(4) The state government and/or others to develop training and education opportunities for elected officials on climate change and reducing Colorado's contributions and vulnerabilities to it (including with respect to water).</p>	Not Quantified	No comparable provisions.	<p>(1) No action yet.</p> <p>(2) No action yet.</p> <p>(3) No action yet.</p> <p>(4) No action yet.</p>

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
Panel vote: Unanimous.			
<p>WA-11: Recreation &amp; Tourism</p> <p>(1) The state government to evaluate the impacts of climate change on recreation and tourism in Colorado.</p> <p>(2) Natural resource management agencies to set visible examples by decreasing GHGs and taking adaptation actions, and educate the public on climate change and climate action.</p> <p>(3) CWCB to evaluate its instream flow program for any changes needed to reflect the effects of climate change.</p> <p>(4) The state government to investigate habitat needs for species vulnerable to climate change.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	No comparable provisions.	<p>(1) No action yet.</p> <p>(2) No action yet.</p> <p>(3) No action yet.</p> <p>(4) No action reported yet.</p>
<p>WA-12: Water Quality &amp; Environment</p> <p>(1) The state government and others to gather data and conduct research on water quality impacts related to climate change.</p> <p>(2) The state government to consider ways to enhance protection of aquatic and riparian ecosystems.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	No comparable provisions.	<p>(1) No action reported yet.</p> <p>(2) No action reported yet.</p>
<p>WA-13: Groundwater</p> <p>The state should reduce the use of groundwater for irrigation until recharges match discharges.</p> <p>Panel vote: Unanimous.</p>	Not Quantified	No comparable provision.	No action yet.
WA-14: Colorado Water Institute			

Panel Recommendation	Analysis	Governor's Plan	Implementation Status
<p>The state government and others to form a Colorado Water Institute, a consortium and partnership of state research universities, state agencies, federal agencies, other relevant agencies, and the governor's office. The CWI, which should not be a state agency, should facilitate a more visible, integrated, and collaborative approach to planning, adaptation, and management of water resources in the state, including with respect to climate change and water.</p> <p>Panel vote: Super majority (1 objection)</p>	Not Quantified	No comparable provision.	<p><a href="#">House Bill 2008-1026</a> changed the name of Colorado State University's existing Colorado Water Resources Research Institute to the Colorado Water Institute, added climate change research to its responsibilities, called for it to cooperate with other Colorado higher education institutions, and made it eligible for General Fund appropriations. <a href="#">House Bill 2008-1045</a> provided up to \$500,000 from severance taxes to fund the Colorado Water Institute for FY 2008-09.</p>

<sup>1</sup> The Panel's report says that new actions leading to emission reductions of 54.6 million tons by 2020 will be needed to bring that year's emissions to 20% below 2005 levels. Gov. Ritter's Plan says that emission reductions of 64 million tons will be needed. The difference results from a difference in the baseline forecasts used by the Panel and the Plan. The Panel's recommendations were analyzed in comparison to a forecast that assumed continuation of policies adopted through September 2007. Gov. Ritter's Plan used an earlier version of the baseline forecast that assumed continuation of policies adopted through December 2006. As a result, the effects of state laws enacted in 2007, such as the strengthening of the renewable portfolio standard for Colorado's utilities, are included in the baseline forecast for 2020 emission levels used by the Panel, leaving 54.6 million tons of additional reductions needed. In Gov. Ritter's Plan, the emission reductions resulting from actions taken from January through September 2007 are instead counted as part of the 64 million tons of emission reductions the Plan calls for. Other differences in the baseline forecasts are minimal, and the end results are essentially the same, as the Climate Action Panel's report calls for an actual emissions level of 94.7 million tons in 2020 and Gov. Ritter's Climate Action Panel calls for 94 million tons.

<sup>2</sup> GHG = greenhouse gases.

<sup>3</sup> Reductions in all greenhouse gases (carbon dioxide, methane, etc.) in 2020, compared to the forecast in the September 2007 [final emissions inventory and forecast](#), which assumes continuation of the laws then in effect. Expressed in millions of metric tons of carbon dioxide equivalent, i.e., adjusted to reflect the relative potency of different GHGs.

<sup>4</sup> Overall costs (or savings) per reduction of a metric ton of emissions of greenhouse gases, expressed in carbon dioxide equivalent, measured in terms of the potency of the effects of different greenhouse gases on the climate. Overall savings are shown by negative numbers.