



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

Updated June 15, 2011

This scorecard summarizes the implementation status of the Colorado Climate Action Plan announced by Governor Bill Ritter, Jr., 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 state plan and the blue-ribbon panel's recommendations, on which the state 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, the Colorado Climate Action 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.) The Colorado Climate Action 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 the State Climate Action 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 the Colorado Climate Action 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.¹ 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 the Colorado Climate Action 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 or 303-861-6481.

Residential, Commercial, and Industrial Sectors

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 State plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action 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"> • those new programs, • House Bill 2007-1037, and • a 2007 DSM commitment by Xcel Energy <p>will 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 reductions to be phased in until full implementation beginning in 2013.</p> <p>Implementation: (a) Investor-owned utilities (IOUs⁵): Public Utility Commission (PUC) requirements.</p> <p>(b) Municipal utilities and rural electric co-ops (public utilities⁶): 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 GHGs² (see the item at the end of the Energy Supply section).</p> <p>Implementation: (a) IOUs⁵ – 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 GHGs² 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 GHGs².</p> <p>(b) Public utilities⁶: 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 style="text-align: center;">Substantial Progress</p> <p>(a) IOUs⁵: Executive Order D004 08 (04/22/08) does as the Plan says it would. With respect to Xcel Energy, the PUC's 6/5/08 PUC decision on the utility's DSM program for electricity, an element in its electric resource plan, requires greater and quicker reductions in electricity use than recommended by the Panel. A 3/31/11 PUC decision in Docket 10A-554EG raised the reduction targets by another 30%. With respect to Black Hills Energy, the PUC approved a DSM plan stemming from Black Hills' August 2008 electric resource plan 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 GHG² actions, as provided in the Plan. A report to the Governor is due by April 2009. The PUC did so in Energy Efficiency and Colorado Utilities in October 2009.</p> <p>(b) In July 2008 GEO began seeking voluntary goals and action plans from public utilities⁶ about GHG² emission reductions. The PUC 2009 report Energy Efficiency and Colorado Utilities noted the lack of incentives and resources rural electric co-ops have to implement such programs, but says that ten utilities and two wholesale power producers signed a resolution indicating their support for the Climate Action Plan goals. Extent of further action is unknown.</p>

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				<p>In 2010, Tri-State Transmission and Generation Co., supplier of most Colorado REAs, completed a Systemwide Energy Efficiency Potential Study on potential savings for customers in all states it supplies and implementation strategies.</p> <p>(c) Wholesale natural gas: Pursuant to House Bill (HB) 07-1037, the PUC set rules for natural gas utilities to adopt DSM programs on which they expend at least 2% of prior year revenues, with bonus incentives for programs that achieve certain levels of usage reductions. All investor-owned gas utilities have adopted such programs and are required to report to the PUC on implementation annually.</p>
<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.	<p style="text-align: center;">No Progress</p> <p>No action yet.</p>
<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</p>	2.7	Not analyzed	(1) Says GEO will continually update the state's minimum building codes.	<p style="text-align: center;">Some Progress</p> <p>(1) HB 07-1146 set IECC 2003 codes as the minimum for local governments who have adopted building codes, but without guidance says GEO may increase it. GEO has not done so.</p>

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<p>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>				<p>(2) GEO held workshops in 2008 and 2009 to assist local governments in adopting and enforcing building codes. In 2009 GEO teamed with the Department of Local Affairs and others to start the Energy Codes Support Partnership to offer free consulting services (funded by federal ARRA stimulus funds) to local jurisdictions around adoption and implementation of the IECC 2009 codes. In December 2010 the non-profit Building Codes Assistance Program published a Colorado Gaps Analysis summarizing actions to date, potential energy savings using IECC 2009, barriers to adoption, and recommendations to fill the gaps.</p> <p>The Department of Local Affairs (DOLA) in 2008 used Energy and Mineral Impact funds to finance a New Energy Communities initiative, which funded 14 projects totaling \$10 million that included technical assistance on building code upgrades.</p>
<p>RCI-4: Beyond Code Building Planning & 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> <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>	2.4	\$ 76/ton	No comparable provision.	<p>State Government: Substantial Progress</p> <p>(1) Pursuant to Senate Bill (SB) 07-51 the Office of the State Architect established LEED gold as the minimum standard for all new facilities and major renovation projects over 5,000 square feet which receive at least 25% of their funding from the state, unless costs to meet those standards cannot be recouped in 15 years. Extent of action by local governments is not readily quantifiable.</p> <p>(2) GEO has set up an Energy Star New Homes Program and an Energy Star Mortgages programs to support the construction and testing of Energy Star-certified new homes. Since 2007, Energy Star housing starts increased from 7% in 2007 to 47% in 2010 of total new home starts in Colorado.</p>

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<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>Built Green Colorado (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>Local Government: Some Progress</p> <p>Extent of action on items 1-4 is not readily quantifiable. Some jurisdictions have adopted model beyond-code programs.</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%</p>	6.7	-\$ 30/ton	No comparable provision.	<p>Some Progress</p> <p>a) In September 2008 the PUC opened an investigatory docket on regulatory and rate incentives, including inverted block rate structures, for customers of gas and electric utilities. In March 2010, the PUC announced in a press release that it made a decision in an Xcel Energy rate case that beginning in June 2010 a June-September inverted rate</p>

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<p>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 IOUs⁵, regulations by the PUC.</p> <p>(b) Public utilities⁶ could either impose block-rate surcharges or comparable system benefit charges.</p> <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>structure would be implemented.</p> <p>(b) SB 09-39 authorizes rural electric co-ops to change their electric rate structure for residential customers to include increasing block rate structures. Extent of action by public utilities⁶ on block rates not inventoried.</p>
<p>RCI-6: Retrofits for Existing Commercial & 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.	<p>Some Progress</p> <p>The passage of HB 08-1350 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.</p> <p>GEO's Industrial Energy Challenge program offers low-interest loans for industrial energy efficiency improvements through the Colorado Housing and Finance Authority (CHFA).</p> <p>GEO used ARRA federal stimulus funds to launch a Main Street Efficiency Initiative, which works directly with local communities to encourage energy efficiency</p>

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				<p>improvements on small and mid-size commercial buildings, and has provided rebates on some improvements.</p> <p>The Department of Local Affairs (DOLA) in 2008 used Energy and Mineral Impact funds to finance a New Energy Communities initiative, which funded 14 projects totaling \$10 million that included greening main streets and local business energy efficiency improvements.</p> <p>House Bill 08-1350 gave local governments the ability to issue such bonds. Boulder County voters passed a 2008 ballot proposal and started a ClimateSmart loan program for residential and commercial energy improvements ballot. In 2010 the Federal Housing Administration put up roadblocks and the residential portion of this program is now on hold, but commercial property-assessment financed loans are still available. Eagle and Gunnison Counties passed similar ballot proposals in 2009 but also have their programs on hold.</p>
<p>RCI-7: Smart Metering & 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.	<p>Some Progress</p> <p>Pilot programs: Xcel Energy established in 2008 a pilot smart grid program with the City of Boulder. Meters have been installed in a significant number of residences and businesses and the system became partially operational in early 2010. An Xcel cost-recovery rate case has highlighted the unexpectedly high costs of the system, and the PUC has done other smart grid investigations.</p> <p>Colorado Springs Utilities started a smart metering pilot program in 2008 and Fort Collins in 2010 received an \$18 million federal grant to install a smart grid. Extent of action by other public utilities⁶ not readily</p>

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				<p>quantifiable.</p> <p>The passage of SB 10-180 in 2010 established a Smart Grid Task Force to address key components of smart grid policy development. The task force delivered a report to the General Assembly and the PUC in January 2011.</p> <p>In 2010 the PUC opened an investigatory docket to explore issues related to smart grid and advanced metering technologies and in April 2011 issued its conclusions that rulemaking is warranted to guide filing of smart grid plans and smart meter plans by regulated utilities.</p>
<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> <p>Panel vote: Unanimous.</p>	Not Analyzed		No comparable provision.	<p style="text-align: center;">Some Progress</p> <p>HB 08-1368, enacted in 2008, exempts renewable energy systems from state sales tax.</p> <p>No action yet on a broader tax credit.</p>
<p>RCI-9: Combined Heat & Power</p> <p>Follow the Western Governors Association recommendations 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>	1.4	-\$ 3/ton	No comparable provision.	<p style="text-align: center;">Some Progress</p> <p>Xcel Energy offers a voluntary industrial Process Efficiency program, consisting of low cost technical assistance and rebates for evaluation and implementation of efficiency improvements. CHP systems may qualify. Results are not inventoried.</p> <p>Extent of action on CHP installation and adoption of WGA recommendations not readily quantifiable.</p>

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Panel vote: Unanimous.				
<p>RCI-10: Voluntary Business Programs</p> <p>Replicate statewide Fort Collins' Climate Wise program to bring about voluntary business reductions in GHGs². Begin in 2008 and by 2015 reduce CO₂ 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.	<p>Some Progress</p> <p>Xcel has announced an industrial efficiency program as a part of its DSM plan approved in a 6/5/08 PUC decision.</p> <p>GEO in 2010 started the Colorado Industrial Energy Challenge, a voluntary program for businesses with at least \$200,000 in annual energy cost, that includes setting targets for energy use reduction and technical assistance.</p>
<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		No comparable provision.	<p>Some Progress</p> <p>In September 2008 the PUC opened an investigatory docket on regulatory and rate incentives, including inverted block rate structures, for customers of gas and electric utilities.</p> <p>In March, 2010, the PUC announced in a press release that it made a decision in an Xcel Energy rate case that beginning in June 2010 a June-September inverted rate structure would be implemented.</p> <p>SB 09-39 authorizes rural electric co-ops to change their electric rate structure for residential customers to include increasing block rate structures. Extent of action by public utilities⁶ on block rates not readily quantifiable.</p>

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Sector GHG ² reduction total of 9 analyzed policies after adjusting for overlaps among policies	15	N/A	N/A	N/A
Sector cost-effectiveness total of 7 analyzed policies with cost analysis after adjusting for overlaps among policies		-\$ 2 /ton	N/A	N/A

Energy-Supply Sector

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 State plan, see the [Colorado Climate Action Plan](#).

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<p>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.	<p>No Progress</p> <p>No action yet.</p>
<p>ES-2: Renewable 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>	<p>Substantial Progress</p> <p>The General Assembly in its 2010 session passed HB 10-1001, increasing the renewable portfolio standards for IOUs⁵ only, from 20% to 30% by 2020. The standard for public utilities⁶ remains at 10% by 2020. A provision requiring distributed generation installations to comprise 3% of the utilities' energy portfolios by 2020 replaced previous law with carve-out for solar energy.</p>

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<p>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 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>	Not analyzed		No comparable provision.	<p>No Progress</p> <p>Xcel Energy is no longer proposing this standard.</p>
<p>ES-4: Transmission Infrastructure for Renewables</p> <p>The state government in 2008 to expand to all electric utilities the current requirement (Senate Bill 2007-100) for IOUs⁵ 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.	<p>Substantial Progress</p> <p>HB 09-1345 directed the PUC to investigate the status of integrated transmission planning among the state's utilities, but does not require utilities to do so. As a result, the PUC opened two dockets. In docket 09M-616E, the PUC conducted the investigation and reported to the General Assembly in July, 2010 that no new legislation was needed, and that it would set out new cooperative planning procedures. In docket 10R-526E, PUC proposed cooperative planning rules among most major utilities through the Colorado Coordinated Planning Group, including joint 10 year plans and 20 year conceptual plans, with stakeholder input. Planning for transmission of renewable energy generation is a major factor. Finalization is pending.</p>
<p>ES-5: Costs for CO₂ Emissions</p> <p>Consider applying a price to CO₂ 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 Western Climate Initiative cap-and-trade program is compatible with Colorado resources, then the state will join the Western Climate Initiative.	<p>Some Progress</p> <p>The Western Climate Initiative has developed a comprehensive framework for a regional cap-and-trade system with a goal of 15% reduction of heat-trapping gases below 2005 levels by 2020. In July 2010, WCI released its comprehensive strategy and design of the WCI program, covering 7 states (not including Colorado, which has been a recognized observer in the process) and 4 Canadian provinces. Start-up of the cap and trade program is planned for January 2012.</p>

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<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.	<p>No Progress</p> <p>No action yet.</p>
<p>ES-7: Incentives for Combined Heat & Power and Distributed Generation</p> <p>Goal: Expand combined heat and power (CHP) and distributed generation (DG) to each equal 1% of 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 Western Governors Association recommendations for CHP. [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>	1.1	\$ 15/ton	No comparable provision.	<p>Some Progress</p> <p>(a) (b) (d) Extent of action by utilities on CHP and DG incentives and policies not readily quantifiable.</p> <p>(c) IOUs⁷: SB 09-51 in 2009 modified net metering rules for standard range of DG technologies, specifying that up to 120% of a customer's normal usage can qualify for credits. HB 10-1342 in 2010 authorized offsite "solar gardens" up to 2 MW of capacity and in which at least 10 customers must share the output, with credits based on a pro-rata usage share.</p> <p>Public utilities⁶: HB 08-1160 in 2008 requires net metering, for systems up to 10 kW residential and 25 kW commercial for power generated in excess of consumption a rate deemed appropriate by the utility. Utilities may elect to exceed these minimums.</p>
<p>ES-8: CO₂ Capture & Transport Infrastructure</p> <p>(1) The state government to work with</p>	Not analyzed		(1) No comparable provision.	<p>Some Progress</p> <p>(1) No action yet.</p>

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<p>neighboring states to form a regional CO₂ 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>			<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>(2) In 2007 the Colorado Geologic Survey (CGS) published CO2 Sequestration Sites in Colorado, identifying potential sites. In 2009 CGS was part of a team awarded \$3.8 million from ARRA federal stimulus funds to study capabilities of carbon sequestration in deep saline aquifers in northwest Colorado. Status of further action is not known</p>
<p>ES-9: R&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.	<p>No Progress</p> <p>No action yet.</p>
<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>	Not analyzed		<p>(1) No comparable provision.</p> <p>(2) & (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>No Progress</p> <p>(1) Xcel no longer plans to build this plant. The passage of HB 2008-1350 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) Not implementable at this time.</p> <p>(3) Status of any action is not known.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>(4) PUC to re-evaluate rules for demonstration projects and technology commercialization.</p> <p>Panel vote: Unanimous.</p>				(4) Status of any action is not known.
<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., Senate Bill 2007-91 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	No comparable provisions.	<p>Some Progress</p> <p>(1) Status of action is not known.</p> <p>(2) Status of action is not known.</p> <p>(3) GEO has established a funding mechanism through the Colorado Water and Power Development Authority's Small Hydro power Loan Program, with the first set of loans and grants awarded in 2009. In 2011, the Authority plans to award up to \$150,000, with a \$15,000 maximum, in matching grants for feasibility studies, permitting activities, or final design on a potential hydropower project</p> <p>HB 11-1083 passed in 2011 adds hydroelectricity and pumped hydroelectricity to the list of technologies that the PUC may give the fullest possible consideration when considering generation acquisitions for electric utilities.</p> <p>(4) GEO has started a Small Hydro Federal Permitting Program, which has worked with FERC to streamline the permitting process and now offers technical assistance to small hydro operators to navigate the permitting process.</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	No comparable provision.	<p>No Progress</p> <p>Status of any action is not known.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>ES-13: Efficiency of Existing Power Plants</p> <p>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.	<p>No Progress</p> <p>No action yet.</p>
<p>ES-14: Oil and Gas Operations</p> <p>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.	<p>Some Progress</p> <p>The Air Quality Control Commission's adoption of stronger ozone control standards for producers in Regulation 7 (which it updated 1/7/11) has an unquantified effect on methane emission reductions.</p>
<p>ES-15: Power plant emission standard</p> <p>The state government to establish a CO₂ emissions performance standard of no more than 1,100 lbs. of CO₂/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 ² emissions from new power plants.	<p>Substantial Progress</p> <p>With different wording, Executive Order D004 08 (4/22/08) directs CDPHE and GEO to evaluate policy options to reduce GHGs² from fossil fuel and alternate sources at new power plants. Recommendations were due to the Governor by April 2009. Status of further action is not known.</p> <p>Passage of HB 10-1365 mandated retirement or replacement of a minimum of at least 900 MW of production from IOUs¹⁵ aging coal plants with new facilities at least as efficient as high-efficiency gas plants. In December 2010 the PUC approved plans for Xcel and Black Hills Energy to meet that target. In January 2011 the Air Quality Control</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
				<p>Commission (AQCC) approved the plans as part of amendments to its Visibility and Regional Haze State Implementation Plan (SIP) to comply with the federal Clean Air Act.</p> <p>With passage of HB 11-1291 in 2011, the Legislature exercised its option to approve the SIP and thereby the retirement/replacement plan approved by PUC and the AQCC.</p>
No provision comparable to state plan	8.5 (Not included in total below)	Not analyzed	<p>Targets emissions reductions from electric utilities 20% below their 2005 levels by 2020. Some of these reductions will be from energy-supply actions and some from demand side management policies (see RCI-1 above).</p> <p>Says an executive order will be issued requesting the PUC to seek from IOUs⁵ Electric Resource Plans incorporating the 20% reduction goal. Also says that the executive order will direct GEO to identify policy changes to provide IOUs⁵ with incentives to invest in DSM and energy supply measures to reduce GHGs².</p> <p>For public utilities⁴ says GEO will work with them to develop comparable goals.</p> <p>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>Substantial Progress</p> <p>IOUs⁵: Executive Order D004 08 (04/22/08) does as the Plan says it would. The PUC has approved Phase I 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 described a plan to meet this goal.</p> <p>The executive order also directs GEO and the PUC to identify ways to provide IOUs⁵ with incentives for GHG² reduction actions. A report to the Governor was due by April 2009. Status of further action unknown.</p> <p>Public utilities⁴ - In 2008 GEO began seeking voluntary goals and action plans from these utilities to achieve those goals. Ten utilities and two wholesale power producers signed a resolution indicating their support for the Climate Action Plan goals.</p> <p>In 2010 GEO released the 2010 Colorado Utilities Report on the status of renewable energy policies and actions by IOUs⁵ and public utilities⁴.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
Sector totals of 6 analyzed policies (including ES-13) after adjusting for overlaps among policies	9	N/A	N/A	N/A
Sector totals of 5 policies with cost estimates (not including ES-13) after adjusting for overlaps		\$ 10/ton	N/A	N/A

Transportation and Land-Use Sectors

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 State plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action 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</p>	0.47	Less than \$ 0/ton	No comparable provisions.	<p style="text-align: center;">Some Progress</p> <p>(1) SB 09-108, enacted in 2009, 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>DRCOG, in its Metro Vision 2035 Plan adopted in February 2011, identifies smart growth goals regarding: increase in urban density, new building concentrated in growth centers, open space protection, decrease in Single Occupant Vehicle (SOV) trips to work to 65 percent by 2035, reduction of daily Vehicle Miles Traveled (VMT) per capita by 10% by 2035, and a cut in greenhouse gas emissions by 60% by 2035.</p> <p>The North Front Range Metropolitan Planning Organization in its draft 2035 Regional Transportation Plan update released in April 2011 emphasizes investments in mass transit, reduction of single occupancy vehicle trips, and bicycle/pedestrian use but sets no VMT reduction goals.</p> <p>Extent of other progress by all local governments is not readily quantifiable; many have adopted smart growth policies.</p> <p>(2) Controversy about the property</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>the Colorado Department of Transportation and metropolitan planning organizations quantify and report GHG² emissions from long-range transportation plans, provided that financial aid and technical assistance is made available.</p> <p>Panel vote: Unanimous.</p>				<p>assessments and other aspects of the program has had the effect of increasing awareness. HB 10-1197 enacted in 2010 protected the state conservation easement tax credits program from substantial budget cuts by placing a \$26 million cap on use of the credits for next three fiscal years.</p> <p>(3) No action yet.</p> <p>(4) SB 09-108 enacted in 2009 partially implements this recommendation by requiring CDOT to consider reduction of GHG² emissions, multimodal choice, and support for urban and rural mass transit in a comprehensive statewide transportation plan (no date set).</p>
<p>TLU-2: Low-GHG² 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-GHG² vehicles to fund credits for purchase of low-GHG² vehicles. Implement before 2010.</p> <p>(2) Legislation to extend the state income-tax credit program for purchase of low-GHG² 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</p>	<p>Not analyzed – alternative to TLU-6</p>		<p>No comparable provisions.</p>	<p>Some Progress</p> <p>(1) No longer implementable – federal adoption of clean car standards means that this alternative to TLU-6 should no longer be considered.</p> <p>2) HB 09-1331 passed in 2009 extended the credit to 2015, added natural gas and idle reduction equipment, changed the formula for calculating the credit and put a cap on the maximum amount of the credit.</p> <p>(3) Related to this recommendation is the Colorado Department of Transportation 2008 start-up of a HOV lanes permit system for qualifying hybrid vehicles, as provided for in the federal law that also allows alternative-fuel vehicles to access HOV lanes. Continuation of the system depends on extension of the federal authorizing laws.</p> <p>(4) Executive Order D 2010 006 (4/22/10) requires each state agency to adhere to</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>vehicles suitable for their type of usage.</p> <p>Panel vote: Unanimous.</p>				<p>annual vehicle replacement plans proposed by State Fleet Management that call for purchase of low fuel consumption (high miles-per-gallon ratings), hybrid, flex- and alternatively-fueled, all-electric, and emerging technology vehicles.</p> <p>Extent of action by local governments is not readily quantifiable.</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 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>	0.97	Not analyzed	No comparable provision.	<p>Some Progress</p> <p>(a) SB 09-108, 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) SB 09-94 passed in 2009 created the Transit and Rail Division within CDOT and made it responsible for the planning, development, and promotion of investments in transit and rail systems statewide, including preparation of a statewide transit plan to be integrated into the Statewide Transportation Plan.</p> <p>(d) No action yet.</p> <p>(e) CDOT in 2011 released the final</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<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>Programmatic EIS for the I-70 Mountain Corridor from Denver to Glenwood Springs. Stakeholders convened by CDOT in 2008 agreed on a consensus long-range preferred alternative, including a fixed guideway transit element from Denver to Eagle. This consensus alternative is the preferred alternative in the final PEIS, and is estimated to cost between \$16.1 and \$20.2 billion.</p> <p>(f) – (h) Extent of action by local and regional transit agencies is not readily quantifiable.</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> <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>	0.11	-\$ 144/ton	No comparable provision.	<p>Some Progress</p> <p>(a) Passage of HB 11-1275 in 2011 prohibits heavy diesel engine idling for no more than 5 minutes, but grants a wide range of exceptions.</p> <p>(b) No action yet.</p> <p>(c) No action yet.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<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.	<p>No Progress</p> <p>No action yet.</p>
<p>TLU-6: GHG² Vehicle Emission Standard</p> <p>Adopt GHG² 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.	<p>Completed</p> <p>In 2010, EPA and NHTSA issued a Final Rule establishing standards for 2012-2016 model year based on the California standards. The federal action rendered unnecessary Governor Ritter's Executive Order D004 08 provision directing CDPHE to propose clean car standards.</p>
<p>TLU-7: Public Transit Promotion</p> <p>Goals: (1) Expand participation in employer-sponsored annual transit passes to achieve 10% 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</p>			No comparable provisions.	<p>Some Progress</p> <p>(a) – (d) No action yet.</p> <p>(e) - (g) Extent of action by local governments and transit agencies not readily quantifiable.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>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>(2) Status of any action is not known.</p> <p>(3) Status of any action is not known.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action 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>No Progress</p> <p>(1) Legislation in 2009 establishing optional PAYD insurance failed to pass the General Assembly.</p> <p>(2) Not applicable without implementation of (1).</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</p>	0.03	-\$ 110	No comparable provisions.	<p>Some Progress</p> <p>(1) No action yet.</p> <p>(2) Status of any action is not known.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>encourage transit- mode shifts.</p> <p>Panel vote: Unanimous.</p>				
<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.	<p>Some Progress</p> <p>(a) Executive Order D 2010 006 (4/22/10) requires each state agency to develop a plan to improve the commuting options for its employees by December 31, 2010. The plans shall evaluate opportunities for: encouraging low fuel consumption or electric vehicles; making available electrical sources to recharge electric vehicles; encouraging use of mass transit or car pooling; and implementing or refining flexible work schedule or telecommuting policies. Status of further action is not known.</p> <p>(b)- (d) No action yet.</p>
<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 GHG² emissions from vehicle use, for inclusion in driver-education and fleet-operator training classes.</p> <p>(2) Require private and commercial drivers-</p>	Not analyzed		No comparable provision.	<p>Some Progress</p> <p>(1), (3) In August 2008 Gov. Ritter announced that Colorado is joining the American Automobile Manufacturing Association's EcoDriving USA campaign, which includes recommendations for incorporating fuel efficient driving in driver-education classes and for state agency employee training. No agency action</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>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>				<p>reported yet.</p> <p>2) Status of any action is not known.</p>
Sector GHG ² reduction total of 8 analyzed policies after adjusting for overlaps among policies	7.84	N/A	N/A	N/A
Sector cost-effectiveness total of 4 analyzed policies with cost estimates after adjusting for overlaps among policies		-\$ 141/ton	N/A	N/A

Agriculture, Forestry, and Waste Sectors

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 State plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>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 Climate Action Plan.]</p>	<p style="text-align: center;">Some Progress</p> <p>(a) CSU Extension in 2008 produced a Sustaining Colorado Agriculture brochure that promotes no- or reduced-till operation. CSU Extension agents do participate in workshops that include no-till operations. Status of further action is not known.</p> <p>(b) No action yet.</p> <p>(c) Status of any action is not known.</p> <p>(d) Status of any action is not known.</p>
<p>AFW-2: Manure Management & Energy Programs</p> <p>Goals: Implement methane capture and</p>	0.32	36/ton	No comparable provision.	<p style="text-align: center;">Some Progress</p> <p>(a) In 2008-2010 the Colorado Department of Agriculture awarded 5 feasibility study</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>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> <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>grants from its On-Farm Renewable Energy program for methane capture and recovery biogas projects in Saguache, Larimer, Morgan, and Crowley Counties.</p> <p>GEO has an Anaerobic Digestion Program and in 2009 funded a report on the economic feasibility and analysis of the policies germane to anaerobic digestion (AD) practices related to agricultural projects in the state. The status of further action is not known.</p> <p>In 2011 the Heartland Anaerobic Digestion Plant is in the permitting process in Weld County. One of the largest waste to energy plants in the U.S., it will turn agricultural and other organic waste into energy.</p> <p>(b) The status of any action is not known.</p> <p>(c) The status of any action is not known.</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>	0.64	-\$ 40/ton	No comparable provisions.	<p>Some Progress</p> <p>(1) Extent of voluntary reductions not readily quantifiable.</p> <p>In 2007-2010, the Colorado Department of Agriculture awarded a number of biodiesel feasibility study, research, and project implementation grants from its On-Farm Renewable Energy program.</p> <p>(2)(a) In July 2008 GEO began seeking voluntary goals and action plans from public utilities⁶ about GHG² emission reductions. The PUC 2009 report Energy Efficiency and Colorado Utilities noted the lack of incentives and resources rural electric co-ops have to implement such programs, but says that ten</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<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 House Bill 2007-1281.</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 current 25 kW maximum standard.</p> <p>Panel vote: Unanimous.</p>				<p>utilities and two wholesale power producers signed a resolution indicating their support for the Climate Action Plan goals. Extent of further action is unknown.</p> <p>(b) The status of any action is not known.</p> <p>(c) The status of any action is not known.</p> <p>(d) The status of any action is not known.</p>
<p>AFW-4: Biodiesel Production</p> <p>Goal: Produce enough in-state biodiesel using low-GHG² 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 low-GHG² 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>	0.22	\$ 12/ton	No comparable provision.	<p>No Progress</p> <p>(a) No action yet.</p> <p>(b) No action yet.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<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>				(c) No action yet.
<p>AFW-5: Ethanol Production</p> <p>Goal: Increase in-state ethanol production, using low-GHG² 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>Some Progress</p> <p>Research and development: HB 08-1001 made biofuels eligible for a bioscience research matching-grant program administered by the Colorado Office of Economic Development.</p> <p>The Colorado Department of Agriculture administers the Advancing Colorado Renewable Energy (ACRE) grant program. A number of biofuels grant awards have been awarded to study the feasibility of cellulosic biofuels production, but no commercial cellulosic plants are in operation yet in Colorado.</p>
<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</p>	0.24 (forests) 0.14 (grasslands)	\$ 26/ton (forests) \$32/ton (grasslands)	No comparable provision.	<p>Some Progress</p> <p>Extent of action by local open space programs related to growth management strategies not readily quantifiable. No action on other implementation measures yet.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<p>is linked to growth management.</p> <p>Panel vote: Unanimous.</p>				
<p>AFW-7: Forest Health & 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>	0.20	-\$ 75/ton	<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>Some Progress</p> <p>Executive Order B 004 08 (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. Status of further action is not known.</p> <p>HB 09-1199 passed in 2009 established a State Forest Service \$400,000 revolving loan fund for businesses to harvest, use, and market forest treatment by-products (including biofuel production).</p> <p>SB 10-177 passed in 2010 exempts forestry equipment that is used in the production of woody biomass from property taxes, effective July 1, 2013.</p> <p>GEO has a Woody Biomass Program. GEO and others in 2007 published Where Wood Works – Strategies for heating with Woody Biomass. GEO and Boulder County in 2008 funded a feasibility study for woodchip-fired heating systems at five locations in Boulder County. In 2010 GEO offered Biomass Feasibility Analysis grants which can be used for equipment purchases, feasibility studies, permitting processes, and technology and economic reviews and analysis</p> <p>The Colorado State Forest Service publicizes</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
				woody biomass utilization and grant programs.
<p>AFW-8: Waste Reduction, Reuse, & 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 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>	4.6	\$ 13/ton	<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>Some Progress</p> <p>Extent of progress by local governments operating landfills not readily quantifiable. Some have set goals as high as 75% diversion.</p> <p>Governor Ritter's Executive Order D2010-006 directs state agencies to attain 75% diversion by 2020.</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.	<p>Some Progress</p> <p>The City of Denver and Waste Management, Inc. completed in late 2008 a new 3.2 megawatt methane-to-energy plant at the Denver Arapahoe Disposal Site.</p> <p>Additional actions by landfill operators not readily quantifiable.</p>

Panel Recommendation	2020 GHG ² Reduction (Million Tons ³)	Cost Per Ton ⁴	State Climate Action Plan	Implementation Status
<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> <p>Panel vote: Unanimous (with 1 statement of qualified approval).</p>	0.08	\$ 79/ton	No comparable provision.	<p>Some Progress</p> <p>A statewide program, Trees Across Colorado, run by the non-profit Colorado Tree Coalition promotes community tree planting programs on a limited scale.</p> <p>Additional actions by local governments are not readily quantifiable; many local governments do promote tree planting, often within the context of land use permitting processes.</p>
No provision comparable to state plan	Not analyzed	Not analyzed	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 ² emission offsets.	<p>Some Progress</p> <p>Executive Order D 010 08 (4/22/08) does as the Plan says and provides for program design to be completed by April 2010 for implementation by April 2011. Status of further action is not known.</p>
Sector Total of Analyzed Policies After Adjusting for Overlaps	11.5	\$4 /ton	N/A	N/A

Cross-Cutting Matters

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 State plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	Analysis	State Climate Action Plan	Implementation Status
<p>CC-1: Inventories & Forecasts</p> <p>The state government should periodically inventory current and forecast future GHG² emissions.</p> <p>Panel vote: Unanimous.</p>	<p>Not analyzed</p>	<p>Says Department of Public Health and Environment (CDPHE) will update the emissions inventory every 5 years.</p>	<p style="text-align: center;">Some Progress</p> <p>Governor Ritter’s Executive Order D 004 08 directed CDPHE to complete an update by 2012. Status of further action is not known.</p>

Panel Recommendation	Analysis	State Climate Action Plan	Implementation Status
<p>CC-2: Emissions Reporting</p> <p>(1) The state government should provide opportunities for all sources to report their GHG² emissions.</p> <p>(2) The state government should require reporting of GHG² emissions by all significant sources, as determined by the Department of Public Health and the Environment.</p> <p>Panel vote: Unanimous.</p>	<p>Not analyzed</p>	<p>(1) Says CDPHE will work with emitters to encourage voluntary reporting of GHG² 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 GHGs².</p>	<p>Substantial Progress</p> <p>(1) CDPHE is encouraging voluntary sign-up with the Climate Registry. At least 18 Colorado members have joined since September 2007, including all state government departments, 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) Executive Order D 004 08 does as the Plan says it would. Status of further action is not known.</p> <p>NOTE: Federally mandated nationwide reporting of GHGs² from major sources (at least 25,000 metric tons CO₂e) was established by EPA in 2009 through a rule establishing a Greenhouse Gas Reporting Program. First reports were due to have been filed by reporting sources by March 31, 2011.</p> <p>In 2010 EPA also adopted the Greenhouse Gas Tailoring Rule, which tailors the applicability criteria that determine which stationary sources and modification projects become subject to permitting requirements for GHG² emissions under the Prevention of Significant Deterioration (PSD) and title V programs of the Clean Air Act. Sources with at least 100,000 tons CO₂ per year are targeted. CDPHE's Air Pollution Control Division administers the program.</p>
<p>CC-3: Climate Registry</p> <p>The state government should consider additional or ancillary emissions reporting mechanisms to the extent that the national Climate Registry does not meet Colorado needs.</p> <p>Panel vote: Unanimous.</p>	<p>Not analyzed</p>	<p>No comparable provision.</p>	<p>No Progress</p> <p>Status of any action is not known.</p>
<p>CC-4: Statewide Emission Goals</p> <p>The governor should set statewide GHG² reduction goals and targets to achieve in the vicinity of a 20% reduction by 2020 and</p>	<p>Not analyzed</p>	<p>Says an executive order will be issued setting statewide GHG² goals of a 20% reduction by 2020 and 80% by 2050, both compared to</p>	<p>Completed</p> <p>Executive Order D 004 08 (4/22/08) set those goals.</p>

Panel Recommendation	Analysis	State Climate Action Plan	Implementation Status
<p>80% by 2050, both compared to 2005 levels.</p> <p>Panel vote: Super majority (1 objection) (with 5 statements of qualified approval)</p>		2005 levels.	
<p>CC-5: Goals for State & Local Government Emissions</p> <p>(1) The state government should set reduction targets for its own GHG² 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 GHG² 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>	Not analyzed	No comparable provisions.	<p>State Government: Completed</p> <p>(1) – (2) In Executive Order D2010-006 (4/22/10), state agencies are directed to achieve the same emission reductions as the state 2020 and 2050 targets and to do annual reporting to the state Greening Government council.</p> <p>Local Governments: Some Progress</p> <p>(3) Not readily subject to quantification. Among the limited number of local climate action plans that have been adopted, most do set targets.</p> <p>(4) Not readily subject to quantification.</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>	Not analyzed	<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>Some Progress</p> <p>(1) Not readily quantifiable. Among local governments with comprehensive local climate-action plans are: Aspen, City of Boulder, Boulder County, Denver, Fort Collins, Frisco, and Vail.</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. In May, 2009, the formation of the Colorado Climate Network was officially announced. In December, 2010, RMCO</p>

Panel Recommendation	Analysis	State Climate Action Plan	Implementation Status
			<p>hosted the inaugural conference of the Network.</p> <p>RMCO held a workshop in December, 2009, to assist local government recipients of federal Energy Efficiency and Conservation Block Grants (EECBG) in complying with the requirements of the federal stimulus funds from which the grants were awarded.</p> <p>GEO assists communities with federal direct EECBG grants to comply with federal requirements. GEO has also used state EECBG funds to hire about 20 community energy coordinators to provide assistance to local governments without direct grants. GEO also maintains a network of Front Range Sustainability Coordinators.</p>
<p>CC-7: Public Education & 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 GHG² emissions.</p> <p>Panel vote: Unanimous.</p>	<p>Not analyzed</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>Some Progress</p> <p>(1) Extent of any action is not known.</p> <p>(2) Extent of action by local governments is not readily quantifiable. The limited number of local governments with climate action plans use a variety of outreach efforts.</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 Colorado Carbon Fund 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 analyzed</p>	<p>No comparable provision.</p>	<p>Some Progress</p> <p>In 2011 GEO formed a Renewable Energy Development Team to assist local governments, non-profits, utilities, and land owners that do not have the financial capabilities to move forward to an investor and/or project developer review stage without additional assistance. Projects that reach the final REDT stage will be presented to a group of renewable energy project developers and potential investors.</p>

Panel Recommendation	Analysis	State Climate Action Plan	Implementation Status
<p>CC-9: Vulnerability & 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> <ul style="list-style-type: none"> (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 (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 <p>Panel vote: Unanimous.</p>	<p>Not analyzed</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, promote the use of forest-based biofuels, and otherwise anticipate and respond to the potential adverse effects of climate change on our forests.</p> <p>(2)(k) No comparable provision.</p>	<p style="text-align: center;">Some Progress</p> <p>(1) The 2011 Colorado Climate Preparedness Project Final Report commissioned by the Ritter Administration identifies options for state actions in five sectors, as well as overarching options, including a comprehensive vulnerability assessment(s).</p> <p>(2)(a) See items related to CAP recommendations WA-3, WA-4, WA-5, and WA-6 below. CWCB’s state Drought Mitigation and Response Plan (2010) is the most extensive agency adaptation planning effort to date. Some other state agencies have done informal limited assessments.</p> <p>(2)(b)-(d) Extent of any action is not known.</p> <p>(2)(e) Governor Ritter’s Executive Order B004 08 established a Forest Health Advisory Council to develop short and long term strategies to sustain forest health and resiliency. The Council adopted a Visions and Guiding Principles statement in 2009. Status of further action is not known.</p> <p>(2)(f)-(i) Extent of any action is not known.</p> <p>(2)(k) The Division of Wildlife convened in 2009 a multi-interest task force to make recommendations to the division on adaptation actions and policies. The group is currently inactive.</p>
<p>No provision comparable to state plan</p>	<p>Not analyzed</p>	<p>Says a Climate Advisory Panel will be established to advise the Governor.</p>	<p style="text-align: center;">Completed</p> <p>Executive Order B 007 08 (4/22/08) authorized a Climate Advisory Panel to make recommendations on ways to achieve the state’s GHG² reduction goals and other matters. On June 22, 2009, the Governor’s Office announced the appointment and first meeting of the 30-member panel. Status of further action is not known.</p>

Water Adaptation

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 State plan, see the [Colorado Climate Action Plan](#).

Panel Recommendation	Analysis	State Climate Action 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>	<p>Not Analyzed</p>	<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>	<p style="text-align: center;">Some Progress</p> <p>Extent of actions is not readily quantifiable. Some agencies and large urban water providers are taking adaptation (preparedness) steps.</p>
<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> <p>(2) Water suppliers to consider the appropriate roles of reuse, conservation, storage, and conjunctive use.</p>	<p>Not Analyzed</p>	<p>(1) No comparable provision.</p> <p>(2) No comparable provision.</p>	<p style="text-align: center;">Some Progress</p> <p>(1) Full extent of actions is not readily quantifiable. Some known actions include:</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. The study is schedule for completion in 2011. [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>Denver Water employs a staff Climate Scientist, and is a member of the Water Utilities Climate Alliance (WUCA), a collaborative effort among 10 of the nation’s major urban water providers.</p> <p>A study completed in 2008 of the sensitivity of the City</p>

Panel Recommendation	Analysis	State Climate Action Plan	Implementation Status
<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>(3) Says that the state will assist water users to prepare for and adapt to large-scale drought.</p>	<p>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> <p>(2) Extent of actions is not readily quantifiable.</p> <p>(3) The state government held a Governor's Conference on Managing Drought & Climate Risk in October 2008.</p> <p>In 2009, CWCB held drought vulnerability and planning workshops in locations statewide as part of the process of updating the state Drought Mitigation and Response Plan. The plan was adopted by CWCB in 2010. CWCB continues to host local drought planning workshops.</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 Senate Bill 2007-122.</p> <p>Panel vote: Unanimous.</p>	<p>Not Analyzed</p>	<p>Says the state is studying the effects of climate change in the Colorado River Water Availability Study.</p>	<p style="text-align: center;">Substantial Progress</p> <p>The Phase I draft was released in 2010, and did incorporate climate change scenarios and effects on water flows. A new contract is underway to finalize Phase I.</p>
<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>	<p>Not Analyzed</p>	<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 style="text-align: center;">Some Progress</p> <p>(1) Not subject to measurement.</p> <p>(2) HB 08-1346 provided 2008 funding for the Colorado Water Conservation Board (CWCB) to evaluate options for implementing a compact call on the Colorado River. The study is underway.</p>

Panel Recommendation	Analysis	State Climate Action Plan	Implementation Status
<p>WA-5: Assessment & 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 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>Not Analyzed</p>	<p>No comparable provisions.</p>	<p>Substantial Progress</p> <p>(1) CWCB released in October 2008 an assessment report, Climate Change and Colorado, prepared by the Western Water Assessment at the University of Colorado. CWCB has secured funding to start a follow-up study on the potential impacts of climate disruption on a range of resources, but the study is on hold due to budget considerations.</p> <p>(2) No action yet.</p> <p>(3) RMCO's Water Adaptation steering committee during 2009 worked with the State Climatologist and federal agency staff to identify funding needs to enhance climate data monitoring systems. During 2010 RMCO submitted testimony on behalf of committee members to get the funding considered in congressional appropriations processes. There was no direct result due to protracted FY 2011 budget adoption negotiations, but the information collected has helped prioritize investments with the funds available. The committee is working on testimony for the FY 2012 budget for submission to congressional Appropriations Subcommittees.</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>Not Analyzed</p>	<p>(1) – (2) No comparable provisions.</p> <p>(3) Says that the state government will work with federal and state agencies and water</p>	<p>Substantial Progress</p> <p>(1) The Colorado River Water Availability Study (CRWAS) models generated 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. Phase I of the CRWAS and the Front Range Study are scheduled for completion in 2011.</p> <p>(2) The Joint Front Range Climate Change Vulnerability</p>

Panel Recommendation	Analysis	State Climate Action Plan	Implementation Status
<p>(4) Demonstration projects on basin-wide assessments of water rights yields and call patterns to be used in water providers' modeling.</p> <p>Panel vote: Unanimous.</p>		<p>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>Study (see above) will produce datasets that the participating water providers can apply to their water supply planning models.</p> <p>(3) Status of any action is not known.</p> <p>(4) 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> <p>HB 08-1346 provided 2008 funding for the Colorado Water Conservation Board (CWCB) to evaluate options for implementing a compact call on the Colorado River. The study is underway.</p>
<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>	<p>Not Analyzed</p>	<p>No comparable provisions.</p>	<p>Substantial Progress</p> <p>(1) – (4) Extent of action is not readily quantifiable. Most major urban providers have evaluated and implemented a range of water conservation practices. For example, Denver Water has adopted a goal to reduce customer water use 22% below 2002 levels by 2016, and has achieved a 19% reduction.</p> <p>(4) HB 10-1358 passed in 2010 requires homebuilders to offer buyers options for water-efficient fixtures and equipment, including landscape irrigation. HB 10-1204 passed in 2010 adds conservation (corresponding to national standards) for the first time to the standards that must be addressed in the state plumbing code.</p> <p>(5) In 2010 a proposed state law did not pass that would have required water providers to annually report water savings realized as a result of their water efficiency programs. Passage of HB 11-1274 in 2011 allocated funding for CWCB to create a comprehensive database of water conservation practices and technologies.</p>

Panel Recommendation	Analysis	State Climate Action Plan	Implementation Status
<p align="center">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 Analyzed	No comparable provisions.	<p align="center">Some Progress</p> <p>(1) – (2) Since 2007, the CWCB's Alternative Agricultural Water Transfer Methods Grant Program has awarded \$1.5 million to various water providers, ditch companies, and university groups for the funding of six projects. The grants are intended to fund investigations of such techniques as rotational fallowing, Interruptible Service Agreements (ISAs), water banks, purchase and leasebacks, deficit irrigation, and changing crop type. A 2011 draft technical memorandum done for CWCB describes the studies and the technical, legal and institutional, financial, and other issues associated with such transfers. CWCB is offering another \$1.5 million to fund grants in 2011.</p> <p>The Water Transfers Subcommittee of the Arkansas Basin Roundtable 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>In 2011 CSU's Colorado Water Institute published Agricultural/Urban/Environmental Water Sharing: Innovative Strategies for the Colorado River Basin and the West, consisting primarily of interviews with 50 experts that profile current efforts.</p>
<p align="center">WA-9: Energy & 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 GHGs² and to encourage both energy and water conservation.</p> <p>(3) Water providers and others to consider GHG² emissions from new water projects and activities.</p>	Not Analyzed	No comparable provisions.	<p align="center">Some Progress</p> <p>(1) In its 2011 report, Every Drop Counts – Valuing the Water Used to Generate Electricity, Western Resource Advocates examines cooling technologies among other factors.</p> <p>(2) In 2009 Western Resource Advocates completed a white paper for CWCB, Water Conservation = Energy Conservation, exploring the water intensity of four major instate water providers. Extent of further action is not known.</p> <p>(3) Extent of action by water providers not readily quantifiable.</p>

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Panel vote: Unanimous.			
<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> <p>Panel vote: Unanimous.</p>	Not Analyzed	No comparable provisions.	<p>Some Progress</p> <p>(1) No action yet.</p> <p>(2) In 2009, CWCB held drought vulnerability and planning workshops in locations statewide as part of the process of updating the state Drought Mitigation and Response Plan. The plan was adopted by CWCB in 2010. CWCB continues to host local drought planning workshops.</p> <p>NOAA's National Integrated Drought Information System (NIDIS) has developed the Upper Colorado River Basin Drought Early Warning website. Among NIDIS activities are weekly drought seminars and the analysis of gaps in water data monitoring systems operated by federal agencies and the state.</p> <p>(3) 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. The study is schedule for completion in 2011. Extent of further action is not known.</p> <p>(4) Extent of any action is not known.</p>
<p>WA-11: Recreation & 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</p>	Not Analyzed	No comparable provisions.	<p>Some Progress</p> <p>(1) CWCB in its 2010 update of the state Drought Mitigation and Response Plan included some analysis of the vulnerability of outdoor recreation to drought.</p> <p>The 2011 Colorado Climate Preparedness Project Final Report commissioned by the Ritter Administration</p>

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<p>decreasing GHGs² 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>			<p>includes a section on potential impacts on outdoor recreation.</p> <p>(2) The U.S. Department of the Interior in 2009 announced a Strategic Response to Climate Change that includes regional Climate Science Centers, including one in Fort Collins hosted by CSU, Landscape Conservation Cooperatives (3 of which involve Colorado), and GHG² agency reduction strategies. The National Park Service's Climate Friendly Parks program includes mitigation, adaptation, and visitor education components; Rocky Mountain National Park participates.</p> <p>The U.S. Forest Service has adopted several inter-related programs to help forests, grasslands, and humans mitigate and adapt to global climate change. It includes operational strategies to reduce emissions and education components.</p> <p>(3) Status of any action is not known.</p> <p>(4) The Division of Wildlife convened in 2009 a multi-interest task force to make recommendations to the division on adaptation actions and policies, including identification of at-risk species. The group is currently inactive.</p> <p>CWCB in its 2010 update of the state Drought Mitigation and Response Plan included some analysis of the vulnerability of wildlife to drought.</p> <p>The 2011 Colorado Climate Preparedness Project Final Report commissioned by the Ritter Administration includes a section on potential impacts on wildlife.</p>
<p>WA-12: Water Quality & 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</p>	Not Analyzed	No comparable provisions.	<p style="text-align: center;">Some Progress</p> <p>(1) CWCB in its 2010 update of the state Drought Mitigation and Response Plan included some analysis of the vulnerability of the natural environment to drought, including references to wildfire and stream temperature impacts to drought.</p>

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<p>riparian ecosystems.</p> <p>Panel vote: Unanimous.</p>			<p>The 2011 Colorado Climate Preparedness Project Final Report commissioned by the Ritter Administration includes a section on potential impacts on water resources, with very limited coverage on water quality impacts.</p> <p>Status of other further actions is not known.</p> <p>(2) The DOW is investigating ways to incorporate actions to protect habitat vulnerable to climate change into its State Wildlife Action Plan by 2015, according to the 2011 Colorado Climate Preparedness Project Final Report.</p> <p>Status of other further actions is not known.</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 Analyzed	No comparable provision.	<p>No Progress</p> <p>No action is known to have occurred.</p>
<p>WA-14: Colorado Water Institute</p> <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 Analyzed	No comparable provision.	<p>Some Progress</p> <p>House Bill 2008-1026 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. HB 08-1045 provided up to \$500,000 from severance taxes to fund the Colorado Water Institute for FY 2008-09. Status of further appropriations is not known.</p> <p>The Institute's monthly newsletter contains climate information, and climate-change related research is funded by the Institute through Colorado State University, where it is housed. The Institute does not function as the broad consortium with integrated collaborative planning goals as described in the CAP</p>

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			recommendation.

¹ 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. The Colorado Climate 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. The Colorado Climate 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 the Colorado Climate 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 the Colorado Climate Action Plan calls for 94 million tons.

² "GHG" means greenhouse gas.

³ 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.

⁴ 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.

⁵ "IOUs" means investor-owned utilities. Xcel Energy and Black Hills Energy are the two IOUs that sell electricity in Colorado.

⁶ "Public utilities" includes both rural electric cooperatives and municipal utilities.