Colorado Climate Project

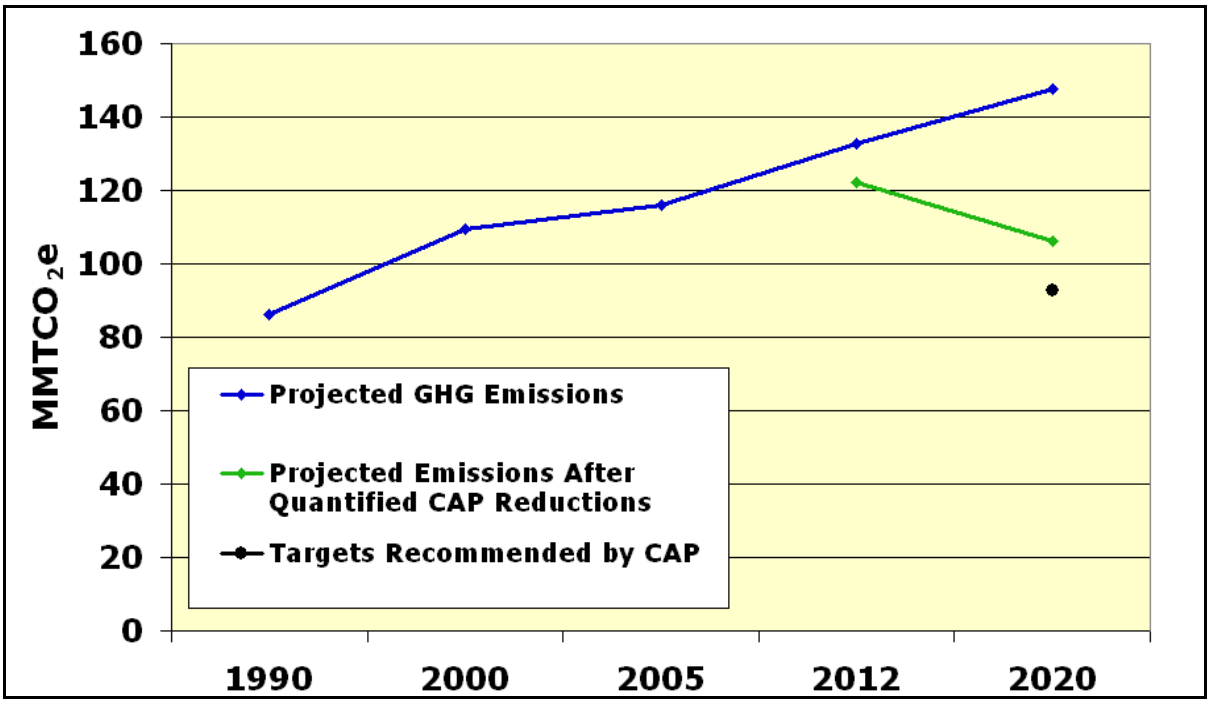
the ROCKY MOUNTAIN CLIMATE Organization

Summary of Climate Action Panel Recommendations

October 10, 2007

Greenhouse Gas (GHG) Emissions (millions metric tons of C02 equivalent)					
	1990	**2000**	**2005**	**2012**	**2020**
Actual/projected GHG emissions	86.1	109.6	116.1	132.8	147.6
Projected emissions compared to 2005				+14%	+32%
Total GHG reductions from 33 analyzed CAP recommendations				-10.7	-41.3
Projected emissions after above reductions				122.1	106.3
2020 target recommended by CAP					92.9
2020 target compared to actual/forecast			-20%	-30%	-37%

Colorado Emissions



Residential, Commercial & Industrial Policy Recommendations

	Policy Recommendation	GHG Reductions ($MMtCO_2e$)			Costs (Savings) 2007-2020 (Million $)	Cost-Effective-ness ($/tCO₂e)	Climate Action Panel Action
		2012	2020	Total 2007-2020			
RCI-1	Expand demand side management programs of all electric and gas utilities, ramped up to reduce energy use by 1% per year by 2013.	0.6	5.2	24	-$ 853	-$ 32/ton	Unanimous Consent
RCI-2	Revolving loans to reduce energy use in state and local government buildings.	0.2	0.5	3.7	-$ 67	-$ 18/ton	Super Majority (1 objection)
RCI-3	Upgrade the state's energy requirements for local building codes every 3 years, and improve enforcement of building codes.	0.3	2.7	13.0	N/A	N/A	Unanimous Consent
RCI-4 (total)	Targets and programs for beyond-code reductions in energy use in new government, residential, and commercial buildings.	1.0	2.4	20.4	$ 1,550	$ 76/ton	Unanimous Consent
	Government subtotal:	*0.4*	*0.6*	*6.0*	*$ 348*	*$ 58/ton*	
	Commercial subtotal:	*0.5*	*1.4*	*11.2*	*$ 1,219*	*$ 109/ton*	
	Residential subtotal:	*0.2*	*0.4*	*3.2*	*-$ 17*	*-$ 5/ton*	
RCI-5	Inverted electricity block rates for all residential and commercial consumers to fund utility energy efficiency programs.	1.6	6.7	38.2	-$ 1,135	-$ 30/ton	Majority (6 objections)
RCI-6	Low interest loans to fund energy efficiency retrofits for commercial and industrial buildings.	0.5	1.8	11.7	-$ 334	-$ 28/ton	Unanimous Consent
RCI-7	Electricity smart metering with time-of-use rates and in-home or in-office displays for all residential, commercial, and industrial consumers.	2.0	2.6	25.4	-$ 844	-$ 33/ton	Unanimous Consent
RCI-8	Tax credits for renewable energy systems in new and existing residential, commercial, and industrial buildings.	N/A	N/A	N/A	N/A	N/A	Unanimous Consent
RCI-9	Promote commercial and industrial combined heat and power (CHP) systems.	0.3	1.4	8.3	-$ 25	-$ 3/ton	Unanimous Consent
RCI-10	Statewide program for voluntary GHG reductions by businesses.	0.6	1.0	4.5	N/A	N/A	Unanimous Consent
RCI-11	Inverted electricity block rates for all residential and commercial consumers, recovering only cost of service.	N/A	N/A	N/A	N/A	N/A	Unanimous Consent
	Sector GHG reduction total of **9 analyzed policies** after adjusting for overlaps among policies	3.7	15	86	N/A	N/A	
	Sector cost-effectiveness total of **7 analyzed policies with cost analysis** after adjusting for overlaps among policies				-$ 153	-$ 2 /ton	

Note: Negative numbers indicate cost savings.

Energy Supply Policy Recommendations

	Policy Recommendation	GHG Reductions ($MMtCO_2e$)			Costs (Savings) 2007-2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Climate Action Panel Action
		2012	2020	Total 2007-2020			
ES-1	Tax credits and incentives to finance renewable energy generation facilities.	Benefits are quantified in policy ES-2.					Unanimous Consent
ES-2	Increase renewable portfolio standards to 30% for investor-owned electric utilities and 15% for municipal and co-op utilities, with no more than 85% of renewable energy from centralized wind power.	1.9	4.9	34	$ 524	$ 16/ton	Super Majority (3 objections)
ES-3	Consider adoption of Xcel's clean energy portfolio standard on a state, regional, or national basis.	Non-specific policy was not quantified					Majority (9 objections)
ES-4	Require all electric utilities to plan cooperatively for electricity transmission infrastructure investments that support renewable resources.	Non-quantitative policy proposal analyzed					Unanimous Consent
ES-5	Consider applying a price to CO_2 emissions (such as cap and trade or tax) on a state, regional, or national basis.	Non-specific policy not quantified					Super Majority (1 objection)
ES-6	Assess a public benefit charge on all electric utility bills to fund renewable energy programs.	Policy not quantified					Super Majority (3 objections)
ES-7	Adopt structural changes to facilitate large businesses and universities to invest in combined heat and power (CHP) and distributed generation (DG) systems.	0.4	1.1	7.3	$ 110	$ 15/ton	Unanimous Consent
ES-8	Work with neighboring states to form a regional CO_2 transportation and sequestration collaborative.	Non-quantitative proposal not quantified					Unanimous Consent
ES-9	Low interest loans to Colorado companies and universities for research and development of carbon emissions reduction technology, funded at $100M/yr through surcharge on all electricity bills.	R&D benefits not quantified					Unanimous Consent
ES-10	Evaluate and, if appropriate, seek funding for advanced fossil fuel generation with carbon capture demonstration project.	Non-specific policy not quantified					Unanimous Consent
ES-11	Statewide mapping & development of small hydro-power, geothermal, and biomass renewable power sources.	0.0	0.8	3.1	$ 123	$ 40/ton	Unanimous Consent
ES-12	Review costs and emission reduction potential of nuclear power.	Non-specific policy not quantified					Unanimous Consent
ES-13	Adopt policies to promote a 2% increase in efficiency of existing power generators by 2020.	Costs not quantified – savings ca. 1 $MMtCO_2$/yr by 2020					Unanimous Consent
ES-14	Reduce GHG emissions from oil and gas operations 35% by 2020.	0.8	2.6	16	$ 12	$ 0.8/ton	Unanimous Consent
ES-15	Establish a CO_2 emissions performance standard of no more than 1,100 $lbsCO_2$/MWh for new non-peaking power plants and those older than 60 years.	0.5	2.3	13	-$ 14	-$ 1/ton	Super Majority (5 objections)

	Policy Recommendation	GHG Reductions ($MMtCO_2e$)			Costs (Savings) 2007-2020 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Climate Action Panel Action
		2012	2020	Total 2007-2020			
	Sector totals of **6 analyzed policies** (including ES-13) after adjusting for overlaps among policies	3	9	59	N/A	N/A	
	Sector totals of **5 policies with cost estimates** (not including ES-13) after adjusting for overlaps				$ 526	$ 10/ton	

Note: Negative numbers indicate cost savings.

Transportation and Land Use Policy Recommendations

	Policy Recommendation	GHG Reductions ($MMtCO_2e$)			Costs (Savings) 2007–2020 (Million $)	Cost-Effective-ness ($/tCO_2e$)	Climate Action Panel Action
		2012	2020	Total 2007-2020			
TLU-1	Reduce light-duty vehicle miles traveled 2% by 2020 by promoting "smart growth" land use planning and development. Require that GHG emissions be considered in long-range transportation plans by 2010.	0.08	0.47	2.43	Less than $ 0	Less than $ 0/ton	Unanimous Consent
TLU-2	Incentives for the purchase of low-GHG vehicles. [An alternative if the TLU-6 clean car standards are not implemented.]	Quantified as part of TLU-6					Unanimous Consent
TLU-3	Reduce light-duty vehicle miles traveled 6% by 2020 by improving transit service quality and funding expansion of transit infrastructure.	0.17	0.97	5.09	N/A	N/A	Unanimous Consent
TLU-4	Reduce heavy-duty vehicle idling.	0.07	0.11	0.91	-$ 131	-$ 144/ton	Unanimous Consent
TLU-5	Adopt a low carbon fuels standard that will reduce carbon intensity of passenger vehicle fuels by 10% by 2020.	0.38	2.21	16.1	N/A	N/A	Unanimous Consent
TLU-6	Adopt California GHG emission standards for cars and trucks.	0.70	3.40	18.8	-$ 1,880	-$ 100/ton	Unanimous Consent
TLU-7	Expand transit use marketing and employer-sponsored transit fare programs.	Quantified as part of TLU-3					Unanimous Consent
TLU-8	Move toward basing motor vehicle insurance on the distances vehicles are driven.	0.32	0.94	7.19	Less than $ 0	Less than $ 0/ton	Unanimous Consent
TLU-9	Local parking management programs to encourage alternative travel choices and transit-oriented development.	0.03	0.03	0.34	-$ 37	-$ 110	Unanimous Consent

	Policy Recommendation	GHG Reductions ($MMtCO_2e$)			Costs (Savings) 2007–2020 (Million $)	Cost-Effective-ness ($/tCO_2e$)	Climate Action Panel Action
		2012	2020	Total 2007-2020			
TLU-10	Require employers with more than 100 employees to offer commuter benefits programs.	0.42	0.45	4.77	-$ 1,145	-$ 240/ton	Unanimous Consent
TLU-11	Incorporate vehicle maintenance, operation, and transportation choice GHG reduction information in driver training and education.	Not quantified					Unanimous Consent
	Sector GHG reduction total of **8 analyzed policies** after adjusting for overlaps among policies	2.14	7.84	46.7	N/A	N/A	
	Sector cost-effectiveness total of **4 analyzed policies with cost estimates** after adjusting for overlaps among policies				-$ 3,191	-$ 141/ton	

Note: Negative numbers indicate cost savings.

Agriculture, Forestry, and Waste Management Policy Recommendations

	Policy Recommendation	GHG Reductions ($MMtCO_2e$)			Costs (Savings) 2007–2020 (Million $)	Cost-Effective-ness ($/tCO_2e$)	Climate Action Panel Action
		2012	2020	Total 2007 2020			
AFW-1	Achieve no-till operation of half of croplands by 2020 and increase nitrogen fertilizer efficiency by 20%.	0.57	0.78	7.7	-$ 57	-$ 7/ton	Unanimous Consent
AFW-2	Implement methane capture and energy recovery on manure management projects on 80% of animal feeding operations by 2020.	0.01	0.32	1.8	$ 66	$ 36/ton	Unanimous Consent
AFW-3	Reduce on-farm petro-diesel use 20% by 2020, and reduce electricity use from fossil fuels 40% through energy efficiency and on-site renewable sources generation.	0.14	0.64	3.8	-$ 150	-$ 40/ton	Unanimous Consent
AFW-4	Incentives for the production of biodiesel fuel from oilseed crops, waste vegetable oil, or other sources to offset 40% of fossil diesel fuel use by 2020.	0.02	0.22	1.1	$ 13	$ 12/ton	Unanimous Consent
AFW-5	Increase in-state ethanol production, using GHG-superior feedstocks and production methods, to 400 million gallons per year above BAU by 2020.	0.39	3.1	15	$ 58	$ 3/ton	Unanimous Consent
AFW-6	Preserve forest lands (line 1) and grasslands (line 2) to reduce the rate of conversion to developed uses by 25% by 2020.	0.10 0.05	0.24 0.14	1.7 1.0	$ 44 $31	$ 26/ton $32/ton	Unanimous Consent
AFW-7	Increase the use of biomass from forest health and fire risk treatment for energy production, using 20% of harvested wood by 2020.	0.08	0.20	1.4	-$ 104	-$ 75/ton	Unanimous Consent
AFW-8	Divert 75% of wastes from landfills by 2020 through source reduction, enhanced recycling, and composting programs.	0.48	4.6	24	$ 311	$ 13/ton	Unanimous Consent
AFW-9	Control or capture landfill methane to achieve 50% reduction from BAU by 2020.	0.33	1.2	7.5	-$ 0.1	-$ 0.02/ton	Unanimous Consent

	Policy Recommendation	GHG Reductions ($MMtCO_2e$)			Costs (Savings) 2007–2020 (Million $)	Cost-Effective-ness ($/tCO_2e$)	Climate Action Panel Action
		2012	2020	Total 2007 2020			
AFW-10	Plant 3.4 million new trees statewide by 2020 through expanded urban forestry programs.	0.03	0.08	0.59	$ 40	$ 79/ton	Unanimous Consent
	Sector Total of Analyzed Policies After Adjusting for Overlaps	2.2	11.5	66	$ 252	$4 /ton	

Note: Negative numbers indicate cost savings.

.Cross-Cutting Issues Policy Recommendations

	Policy Recommendation	Analysis	Climate Action Panel Action
CC-1	Periodically update GHG inventories and forecasts.	*Not Quantified*	Unanimous Consent
CC-2	State development of annual GHG reporting protocols for all sources, including mandatory reporting for significant sources.	*Not Quantified*	Unanimous Consent
CC-3	State development of capacity to participate in the national *Climate Registry* to measure, track, and record emissions reductions.	*Not Quantified*	Unanimous Consent
CC-4	The governor should set statewide GHG reduction goals and targets to achieve in the vicinity of a 20% reduction by 2020 and 80% by 2050, both compared to 2005 levels.	*Not Quantified*	Super Majority (1 objection)
CC-5	Set state and local government reduction targets for their own GHG emissions; the state target should be at least an amount consistent with CC-4 levels.	*Not Quantified*	Unanimous Consent
CC-6	Promote adoption of comprehensive local government climate action plans.	*Not Quantified*	Unanimous Consent
CC-7	State and local government public education and outreach efforts to support GHG reduction programs, policies, and goals.	*Not Quantified*	Unanimous Consent
CC-8*]*	A public-private partnership to seek funding for GHG reduction measures and development of a new energy economy in Colorado.	*Not Quantified*	Unanimous Consent
CC-9	State government assessment of vulnerabilities to climate change and development of adaptation plans.	*Not Quantified*	Unanimous Consent

Water Adaptation Policy Recommendations

	Policy Recommendation	Analysis	Climate Action Panel Action
WA-1	Public officials exercise leadership in addressing climate change effects on water supplies.	*Not Quantified*	Unanimous Consent
WA-2	Water managers consider climate change in all water supply decisions.	*Not Quantified*	Unanimous Consent
WA-3	Climate change effects considered in the new Colorado Water Conservation Board study of Colorado River water availability.	*Not Quantified*	Unanimous Consent
WA-4	State government develop mechanisms for compact calls for each major river basin.	*Not Quantified*	Unanimous Consent
WA-5	Assessment of knowledge about climate change effects on Colorado's water resources. An assessment of data and data systems for understanding climate change.	*Not Quantified*	Unanimous Consent
WA-6	Cooperative development of information on climate change effects in each major river basin.	*Not Quantified*	Unanimous Consent
WA-7	Municipal water providers evaluate water conservation savings, best demand management practices, and the best uses of conserved water in their systems.	*Not Quantified*	Unanimous Consent
WA-8	Minimize effects of water-rights transfers on agricultural economies.	*Not Quantified*	Unanimous Consent
WA-9	Consider relationships between energy and water use.	*Not Quantified*	Unanimous Consent
WA-10	Information exchanges on effects of climate change on water resources.	*Not Quantified*	Unanimous Consent
WA-11	State government consider ways to reduce climate change effects on water-related recreation and tourism.	*Not Quantified*	Unanimous Consent
WA-12	State government consider ways to reduce climate change effects on the environment.	*Not Quantified*	Unanimous Consent
WA-13	Reduce use of groundwater for irrigation until recharges match discharges.	*Not Quantified*	Unanimous Consent
WA-14	Establish new Colorado Water Institute.	*Not Quantified*	Super Majority (1 objection)

Combined Effect of All Policy Recommendations

Cumulative Reductions and Costs/Savings	2012 GHG Reductions ($MMtCO_2e$)	2020 GHG Reductions ($MMtCO_2e$)	2007-2020 GHG Reductions ($MMtCO_2e$)	2007–2020 Costs (Savings) (Net Present Value Million $)	2007-2020 Cost-Effectiveness ($/tCO_2e$)
	From 33 recommendations analyzed for GHG reductions:			*From 27 recommendations analyzed for costs & cost savings:*	
Residential Commercial and Industrial (RCI) Sector Total Adjusted for Overlaps	3.7[1]	15.1[1]	86.0[1]	-$ 53[2]	-$ 2/ton[2]
Energy Supply (ES) Sector Total Adjusted for Overlaps	3.0[3]	9.1[3]	58.8[3]	$ 526[4]	$ 10/ton[4]
Adjustments for Overlaps Between RCI and ES Recommendations	*[-0.3]*	*[-2.0]*	*[-8.6]*	*[-$ 10.0]*	
Transportation and Land Use (TLU) Sector Total Adjusted for Overlaps	2.1[5]	7.8[5]	46.7[5]	-$ 3,191[6]	-$ 141/ton[6]
Agriculture, Forestry, and Waste Management (AFW) Sector Total Adjusted for Overlaps	2.2	11.5	66.0	$ 252	$ 4/ton
Adjustments for Overlaps Between AFW and ES Recommendations	*[-0.04]*	*[-0.21]*	*[-1.40]*	*[-$ 0]*	*[-$ 0/ton]*
Cross-Cutting (CC) Sector Total	N/A	N/A	N/A	N/A	N/A
TOTALS	*From 33 recommendations analyzed for GHG reduction:*			*From 27 recommendations analyzed For costs & cost savings:*	
	10.7	**41.3**	**247.5**	**-$ 2,576**	**Not estimated**

Notes:

Negative numbers indicate cost savings.

[1]Totals from all 9 RCI recommendations with estimated GHG reductions.

[2]Totals from only those 7 RCI recommendations with estimated costs/cost savings.

[3]Totals from all 6 ES recommendations with estimated GHG reductions.

[4]Totals from only those 5 ES recommendations with estimated costs/cost savings.

[5]Totals from all 8 TLU recommendations with estimated costs/cost savings.

[6]Totals from only those 4 TLU recommendations with estimated costs/cost savings.