MINNESOTA Climate Change Advisory Group

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Memo

To: Minnesota Climate Change Advisory Group

From: The Center for Climate Strategies

CC: Minnesota Department of Commerce
Minnesota Pollution Control Agency
Minnesota Technical Work Group Members

Subject: Preparation for the Sixth Meeting of the Minnesota Climate Change Advisory Group Meeting

Date: December 5, 2007

At the sixth meeting of the Minnesota Climate Change Advisory Group (MCCAG) on Wednesday, December 5, 2007 the MCCAG will begin review and final approval of draft pending policy options, with the goal of approving as many as possible in order to finish work by the end of January. We also will review and approve progress and recommended updates to the statewide inventory and forecast of emissions. Based on decisions made by the MCCAG, the Technical Work Groups (TWGs) will continue to update quantification and development of the remaining draft policy options that the MCCAG does not approve during this sixth meeting. Additional consideration and approval of the remaining draft options will continue at the next MCCAG meeting on January 10, 2008 and at the final MCCAG meeting on January 24, 2008.

As preparation for our sixth meeting, please review the draft policy options below and other background documents posted to the project website at: www.mnclimatechange.us.

In terms of overall progress, the MCCAG has completed key milestones since its launch, including:

- Identification of a full range of potential Minnesota options for mitigation of GHG emissions, over 300 possible state actions, including several specific new options approved by the MCCAG based on suggestions by the TWGs.
- MCCAG approval of 58 initial priorities for analysis of draft policy options.
- Completion of the initial statewide inventory and forecast of GHG emissions and start of the review process.

- MCCAG approval of TWG suggested "straw proposals" for the design of initial draft policy options.
- Completion of the first round of quantification of draft policy options by CCS at our fifth meeting.

The next stages of the MCCAG process will include completion of the following milestones:

- Final approval of remaining MCCAG policy option recommendations at our sixth, seventh and eighth meetings.
- Continued quantification and policy design assistance by TWGs if/as needed, based on MCCAG decisions.
- Final approval of the statewide inventory and forecast of GHG emissions by the final meeting.
- Production of the final MCCAG report.

Summary of MCCAG Progress and Next Steps:

Status of Draft Policy Options	
Original Number of Potential Options Presented to the MCCAG from the CCS Catalog of State Actions	251
Updated Number of Potential Options on the CCS Catalog of States Actions, Including MCCAG Additions	300+
Current Number of Draft Potential Priority Policy Options for Analysis	58
• Residential, Commercial, and Industrial	10
• Energy Supply	10
• Transportation and Land Use	13
• Agriculture, Forestry and Waste	8
• Cross Cutting Issues	10
• Cap and Trade	7
Next Steps	
Present Updated Draft Policy Options and Approve Consensus Recommendations	MCCAG Meeting #6
Present Updated Draft Policy Options and Approve Additional Consensus Recommendations	MCCAG Meeting #7
Approve Final MCCAG Policy Option Recommendations	MCCAG Meeting #8

Results of the cumulative (integrated) analysis of existing actions by the state of Minnesota and proposed options of the MCCAG show that the combined effects of the two result in potential

GHG emissions reductions very close to legislative GHG targets (see table and graphs below). Result of cumulative GHG emissions reductions are presented in four separate accounting frameworks corresponding to consumption, production, gross and net based calculations.

Consumption Basis - Net Emissions					
	1990	**2000**	**2005**	**2015**	**2025**
Projected GHG Emissions	115.7	141.4	152.4	172.9	187.5
Reductions from Existing Actions	0.0	0.4	0.4	11.0	13.3
Projected GHG Emissions After Existing Actions			152.0	161.9	174.3
Next Generation Energy Act Targets (NGEA)				129.6	106.7
Total GHG Reductions from MCCAG				33.0	67.1
Difference Between MCCAG Reductions & NGEA Targets				-0.7	0.4
Projected Emissions After Quantified MCCAG Reductions				128.9	107.1

Consumption Basis - Gross Emissions					
	1990	**2000**	**2005**	**2015**	**2025**
Projected GHG Emissions	115.7	141.4	152.4	172.9	187.5
Reductions from Existing Actions	0.0	0.4	0.4	11.0	13.3
Projected GHG Emissions After Existing Actions			152.0	161.9	174.3
Next Generation Energy Act Targets (NGEA)				129.6	106.7
Total GHG Reductions from MCCAG				33.0	67.1
Difference Between MCCAG Reductions & NGEA Targets				-0.7	0.4
Projected Emissions After Quantified MCCAG Reductions				128.9	107.1

Production Basis Net					
	1990	**2000**	**2005**	**2015**	**2025**
Projected GHG Emissions	110.7	133.0	138.2	156.6	168.0
Reductions from Existing Actions	0.0	0.4	0.4	11.0	13.3
Projected GHG Emissions After Existing Actions			137.8	145.5	154.8
Next Generation Energy Act Targets (NGEA)				117.5	96.8
Total GHG Reductions from MCCAG				33.0	67.1
Difference Between MCCAG Reductions & NGEA Targets				-5.0	-9.1
Projected Emissions After Quantified MCCAG Reductions				112.5	87.6

Production Basis Gross					
	1990	**2000**	**2005**	**2015**	**2025**
Projected GHG Emissions	110.7	133.0	138.2	156.6	168.0
Reductions from Existing Actions	0.0	0.4	0.4	11.0	13.3
Projected GHG Emissions After Existing Actions			137.8	145.5	154.8
Next Generation Energy Act Targets (NGEA)				117.5	96.8
Total GHG Reductions from MCCAG				33.0	67.1
Difference Between MCCAG Reductions & NGEA Targets				-5.0	-9.1
Projected Emissions After Quantified MCCAG Reductions				112.5	87.6

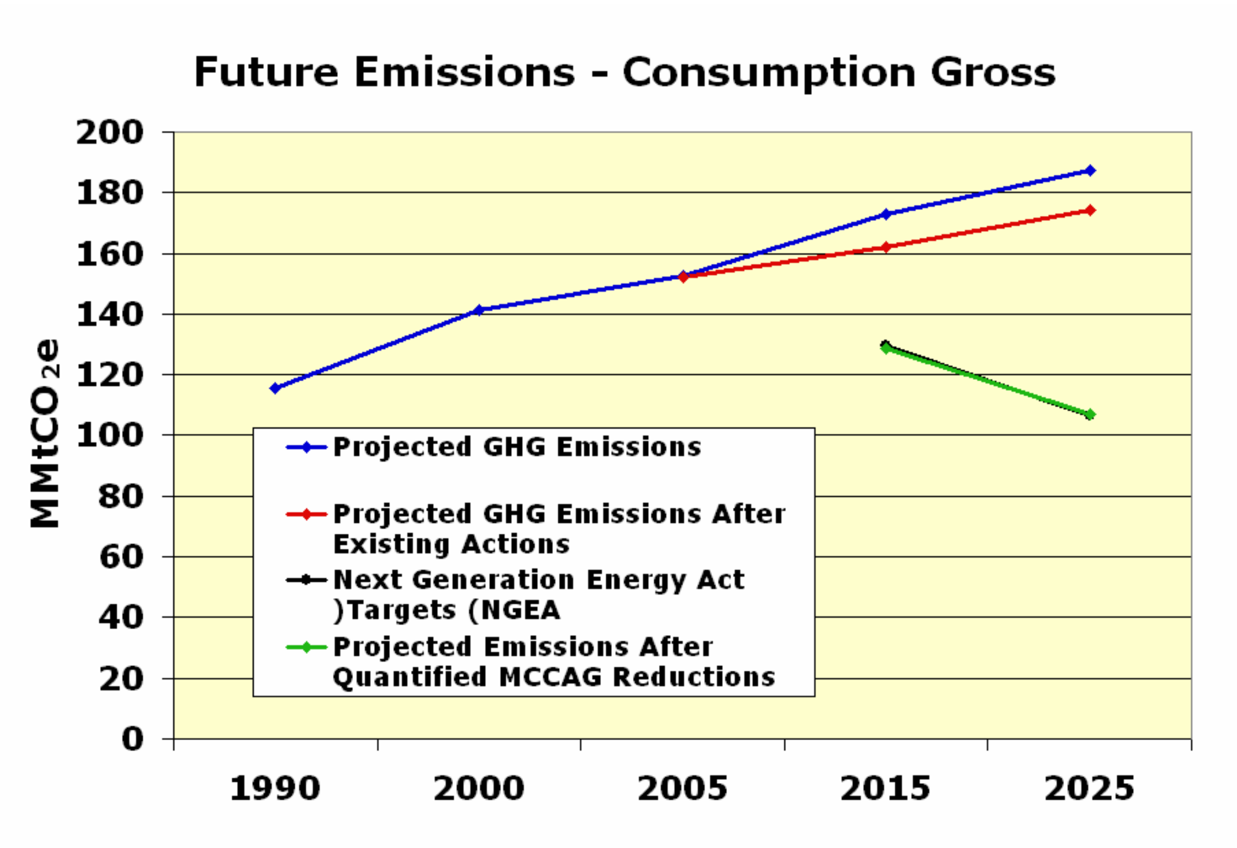
Future Emissions - Consumption Gross
MMtCO2e
200
180
160
140
120
100
80
60
40
20
0
1990
2000
2005
2015
2025
Projected GHG Emissions
Projected GHG Emissions After Existing Actions
Next Generation Energy Act)Targets (NGEA
Projected Emissions After Quantified MCCAG Reductions

Table 1.
Residential, Commercial, and Industrial
Summary List of Draft Pending Policy Options

Option No.	GHG Reduction Policy Option Name	GHG Reductions ($MMtCO_2e$)			Net Present Value (Million $)	Cost-Effective-ness ($\$/tCO_2e$)	Level of Support
		2015	2025	Total (2008–2025)			
RCI-1	Maximize Savings From the Utility Conservation Improvement Program (CIP)	3.8	8.7	82.8	–$2,408	–$29.1	Pending
RCI-2	Improved Uniform Statewide Building Codes	0.0035	0.0037	0.060	–$11.2	–$189.7	Pending
RCI-3	Green Building Guidelines and Standards Based on Architecture 2030	0.276	0.421	5.0	–$1.29	–$0.26	Pending
RCI-4	Incentives & Resources to Promote Combined Heat and Power (CHP)	1.0	4.9	32.8	$1,803	$27.5	Pending
RCI-5	Program To Reduce Emissions of Non-Fuel, High-Global-Warming-Potential GHGs	*Quantification still underway*					Pending
RCI-6	Non-Utility Strategies and Incentives To Encourage Energy Efficiency and Reduce GHG Emissions	0.025	0.13	0.83	–$307	–$37.1	Pending
RCI-7	Conservation Improvement-Type Program for Propane and Fuel Oil Efficiency	*Quantification still underway*					Pending
RCI-8	Energy Performance Disclosure	*Not quantified*					Pending
RCI-9	Promote Technology-Specific Applications to Reduce GHG Emissions	*Not quantified*					Pending
RCI-10	Support Strong Federal Appliance Standards and Require High State Standards in the Absence of Federal Standards	*Not quantified*					Pending
	Sector Total After Adjusting for Overlaps	**5.1**	**14.2**	**121.5**	**TBD**	**TBD**	
	Reductions From Recent Actions	**3.0**	**5.1**	**16**	**TBD**	**TBD**	
	Sector Total Plus Recent Actions	**8.1**	**19.3**	**137.5**	**TBD**	**TBD**	

Note: Negative numbers represent cost savings.

Table 2.
Energy Supply
Summary List of Draft Pending Policy Options

	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2008–2025 (Million $)	Cost-Effective-ness ($/$tCO_2e$)	Level of Support
		2015	2025	Total (2008–2025)			
ES-1	Generation Performance Standard						
	Reference Scenario #1	3.88	4.56	56.12	$671	$12.0	Pending
	Reference Scenario #2	3.88	4.56	56.12	$671	$12.0	Pending
	Reference Scenario #3	0.64	0.62	8.24	$114	$13.9	Pending
ES-3	Efficiency Improvements, Repowering and other Upgrades to Existing Plants						
	Reference Scenario #1	1.50	2.69	28.52	$159	$5.59	Pending
	Reference Scenario #2	1.23	1.87	21.84	$123	$5.65	Pending
	Reference Scenario #3	1.27	1.93	22.56	$122	$5.41	Pending
ES-4	Transmission System Upgrading, Including Reducing Transmission Line and Distribution System Loss	*Not quantified*					Pending
ES-5	Renewable and/or Environmental Portfolio Standard						
	With coal additions	6.20	12.47	109.28	$2,084	$19.1	Pending
	No coal additions	6.40	12.83	112.68	$2,270	$20.1	Pending
ES-6	Nuclear Power Support and Incentives	*Not quantified*					Pending
ES-7	Advanced Fossil Fuel Technology Incentives, Support or Requirements	0.8	0.8	10.2	$1,085	$106.2	Pending
ES-8	Carbon Capture and Storage and/or Reuse Policies	3.8	3.8	49.5	$3,767	$76.1	Pending
ES-10	Voluntary GHG targets	*Not quantified*					Pending
ES-12	Distributed Renewable Energy Incentives and/or Barrier Removal	*Still being quantified*					Pending
ES-13	Technology-Based Approaches, Including Research and Development, Fuel Cells, Energy Storage, Distributed Renewable Energy Technologies, etc.	*Not quantified*					Pending
	Sector Total After Adjusting for Overlaps	**14.6**	**22.3**	**231**	**TBD**	**TBD**	
	Reductions From Recent Actions	**6.9**	**6.9**	**123**	**TBD**	**TBD**	
	Sector Total Plus Recent Actions	**21.5**	**29.2**	**354**	**TBD**	**TBD**	

Note: Negative numbers represent cost savings.

Table 3.
Transportation and Land Use
Summary List of Draft Pending Policy Options

	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2008–2025 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Level of Support
		2015	2025	Total 2008–2025			
TLU Area 1: Reduce VMT		2.72	8.12	66.4			
TLU-1	Improved Land Use Planning and Development Strategies	0.3	1.0	7.7	Net savings	Net savings	Pending
TLU-2	Expand Transit, Bicycle, and Pedestrian Infrastructure	0.1	0.2	2.2	$0	$0	Pending
TLU-5	Climate-Friendly Transportation Pricing						Pending
TLU-7	“Fix-it-First” Transportation Investment Policy and Practice						Pending
TLU-9	Workplace Tools to Encourage Carpooling, Bicycling, and Transit Ridership	0.5	0.9	7.5			Pending
TLU-14	Freight Mode Shifts: Intermodal and Rail						Pending
TLU Area 2: Reduce carbon per unit of fuel							
TLU-3	Low GHG Fuel Standard (Potential Overlap With AFW-7)	2.0	4.4	24.3	NA	NA	Pending
TLU Area 3: Reduce carbon per mile / per hour							
TLU-4	Infrastructure Management						Pending
TLU-6	Adopt California Clean Car Standards	2.3	7.0	56.0	–$1,244	–$18	Pending
TLU-11	Truck Stop Electrification						Pending
TLU-12	Mobile Source Emissions Reduction						Pending
TLU-13	Reduce Maximum Speed Limits						Pending
	Sector Total After Adjusting for Overlaps						
	Reductions From Recent Actions	**1.6**	**1.8**	**22.6**			
	Sector Total Plus Recent Actions						

Note: Negative numbers represent cost savings.

Table 4.
Agriculture, Forestry, and Waste Management Summary List of Draft Pending Policy Options

	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2008–2025 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Level of Support
		2015	2025	Total 2008 2025			
AFW-1	Agricultural Crop Management						Pending
	A. No Till	0.72	1.30	15	–$3.67	–$0.25	
	B. Nutrient Management	0.79	1.35	15	–$543	–$37	
AFW-2	Land Use Management Approaches for Protection and Enrichment of Soil Carbon						Pending
	A. Preserve Land	0.15	0.45	3.8	$120	$31	Pending
	B. Reinvest in Minnesota–Clean Energy (RIM-CE)	0.09	0.19	1.8	$193	$110	
AFW-3	In-State Liquid Biofuels Production						Pending
	A. Ethanol carbon content	2.13	3.00	35	$23	$1	Pending
	B. Fossil diesel displacement	0.03	0.19	1.4	$85	$62	
	C. Gasoline Displacement	4.63	13.60	114	$563	$5	
AFW-4	Expanded Use of Biomass Feedstocks for Electricity, Heat, or Steam Production	1.3	3.8	32	$392	$12	Pending
AFW-5	Forestry Management Programs to Enhance GHG Benefits						Pending
	A. Forestation	0.55	2.19	17	$218	$13	
	B. Urban forestry	1.2	2.7	26	–$295	–$12	
	C. Wildfire reduction	*Not Quantified*					
	D. Restocking	2.1	8.4	65	$2,187	$33	
	E. Forest health and enhanced sequestration	*Not Quantified*					
AFW-6	Forest Protection—Reduced Clearing and Conversion to Non-Forest Cover	2.2	2.7	34	$74	$3	Pending
AFW-7	Integrated Waste Management						Pending
	A. Source Reduction	0	3.7	9.2	TBD	TBD	
	B. Recycling	3.1	4.1	46	TBD	TBD	
	C. Composting	0.23	0.24	4.1	TBD	TBD	
AFW-8	End of Use Waste Management Practices						Pending
	A. Landfilled Waste Methane	0.03	0.34	2.1	$2.1	$1	
	B. Organics Recovery & WTE	0.11	0.07	1.8	TBD	TBD	
	C. WTE Preprocessing	0.002	0.005	0.04	*Not Quantified*		
	Sector Total After Adjusting for Overlaps*	**13.3**	**30.7**	**283.6**	**TBD**	**TBD**	
	Reductions From Recent Actions	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	
	Sector Total Plus Recent Actions	**13.3**	**30.7**	**283.6**	**TBD**	**TBD**	

Note: Negative numbers represent cost savings.

Table 5.
Cross-Cutting Issues
Summary List of Draft Pending Policy Options

Option No.	Policy Option	GHG Reductions ($MMtCO_2e$)			Net Present Value 2008–2025 (Million $)	Cost-Effectiveness ($/tCO_2e$)	Status of Option
		2015	2025	Total 2008-2025			
CC-1	GHG Inventories, Forecasting, Reporting, and Registry	*Not Quantified*					Pending
CC-2	Statewide GHG Reduction Goals and Targets	*Not Quantified*					Pending
CC-3	State and Local Government GHG Emissions (Lead-by-Example)	*Not Quantified*					Pending
CC-4	Public Education and Outreach	*Not Quantified*					Pending
CC-5	Tax and Cap Policies	*Not Quantified*					Transferred to new Cap and Trade TWG
CC-7	Participate in Regional and Multi-State GHG Reduction Efforts	*Not Quantified*					Pending
CC-8	Encourage the Creation of a Business-Oriented Organization to Share Information and Strategies, Recognize successes, and Support Aggressive GHG Reduction Goals	*Not Quantified*					Pending
CC-9	Dedicate Greater Public Investment to Climate Data and Analysis	*Not Quantified*					Pending
CC-10	Facilitate the Development of an Effective Carbon Credit System for MN	*Not Quantified*					Coordinate w/ Cap and Trade TWG
CC-11	Create a Market Advisory Group	*Not Quantified*					Transferred to new Cap and Trade TWG
	Sector Total After Adjusting for Overlaps	*Not Quantified*					
	Reductions From Recent Actions	*Not Quantified*					
	Sector Total Plus Recent Actions	*Not Quantified*					

Note: Negative numbers represent cost savings.

Table 6.
Cap and Trade
Summary List of Draft Pending Policy Options

Option No.	Policy Option	GHG Reductions ($MMtCO_2e$)				Net Present Value (Million $)	Cost-Effective-ness* ($\$/tCO_2e$) 2020	Permit Price† ($\$/tCO_2e$) 2020	Level of Support
		2015	2020	2025	Total (2008–2025)				
C&T-1 Cap and Trade Program	Midwestern Partners C&T (All Sectors)		54.11				–$5.30	$11.97	
	Midwestern Partners+Observers C&T (All Sectors)		55.93				–$4.72	$13.29	
	Midwestern Partners plus WCI Partners C&T (All Sectors)		52.87				–$5.70	$11.08	
	Midwestern Partners plus WCI Partners+Observers C&T (All Sectors)		56.47				–$4.54	$13.70	
	Midwestern Partners+Observers plus WCI Partners+Observers C&T (All Sectors)		57.04				–$4.36	$14.11	
	Midwestern Partners C&T (Power Sector)		16.40				$1.82	$10.68	
	Midwestern Partners+Observers C&T (Power Sector)		17.02				$2.16	$11.42	
	Midwestern Partners plus WCI Partners C&T (Power Sector)		15.25				$1.20	$9.32	
	Midwestern Partners plus WCI Partners+Observers C&T (Power Sector)		16.59				$1.92	$10.90	
	Midwestern Partners+Observers plus WCI Partners+Observers C&T (Power Sector)		16.92				$2.10	$11.30	

Option No.	Policy Option	GHG Reductions ($MMtCO_2e$)				Net Present Value (Million $)	Cost-Effective-ness* ($/tCO_2e$) 2020	Permit Price† ($/tCO_2e$) 2020	Level of Support
		2015	2020	2025	Total (2008–2025)				
C&T-2	MN-Only C&T (merged into C&T-1)								
C&T-3	National C&T (merged into C&T-1)								
C&T-4	Carbon Tax								
C&T-5	Market Advisory Group (Formerly CC-11)								
C&T-6	Regional and Multi-State GHG Reduction Efforts (Formerly CC-7)								
C&T-7	Carbon Credit System for Minnesota (Formerly CC-10)								

Note: Negative numbers represent cost savings.

Midwestern C&T partners include Iowa, Illinois, Kansas, Michigan, Minnesota, Wisconsin, and Manitoba; Midwestern C&T observers include Indiana, Ohio, and South Dakota; WCI partners include Arizona, California, New Mexico, Oregon, Utah, Washington, British Columbia, and Manitoba; WCI observers include Colorado, Idaho, Montana, Nevada, and Wyoming. The emission cap for WCI is 15% below the 2005 level in Year 2020. The emission cap for Midwestern states is 22.5% below the 2005 level in Year 2020 (as an average of Minnesota's 2015 and 2025 emission caps).

* This represents the average cost per tCO_2e mitigated/sequestered for Minnesota.

† This represents the marginal cost of the last tCO_2e mitigated/sequestered, and applies to all states involved in a trading arrangement.

Results thus far are only preliminary. All simulations undertaken so far are preliminary and are intended to illustrate the workings of the model. Currently, we have very limited data on mitigation/sequestration options for Midwestern States. Preliminary results given here may change significantly when better data is available.

It is anticipated that future model runs will include the following:

- All western states
- All RGGI states of the Northeast
- MN specific cost curves from the MCCAG process, and new cost curves for other states in the Midwest
- Cost curve modifications to address sensitivity analysis and alternate assumptions
- Other design assumption modifications based on MCCAG feedback