



Governor's Action Team on Energy and Climate Change  
*State of Florida*

Governor's Action Team for Energy and  
Climate Change  
Phase II Process

*Cap and Trade  
Technical Working Group (TWG)  
Meeting #2  
March 7, 2008*

# Welcome and Introductions

- Action Team TWG Members
- Florida Department of Environmental Protection
- Members of the Public
- Center for Climate Strategies

# Agenda

- Introductions
- Purpose and Goals
- Review and Approval of Call #1 Summary
- Overview of U.S. Regional C&T Initiatives
- Briefing on C&T Modeling
- Briefing on Regional Greenhouse Gas Initiative (RGGI)
- Development of the FL C&T Catalog of States' Actions
- Discussion – Expectations for C&T Recommendations
- Review of Next Steps
- Agenda, Date and Time for Next Meetings
- Public Comments
- Announcements

# Purpose and Goals

- To develop a comprehensive Energy and Climate Change Action Plan that will fully achieve or surpass Executive Order targets for statewide greenhouse gas reductions specified in Executive Order 07-127, including:
  - guidance on the design of a market-based emissions allowance trading program,
  - design of programs to further enable energy conservation
  - closer examination of emissions reduction opportunities offered by new technologies
  - an examination of revenue impacts of emissions reduction policies within the transportation sector
  - consideration of a low-carbon fuel standard
  - further consideration of the organization of Florida's state government to foster the development of a low-carbon energy market in Florida, and
  - other emissions reductions actions

# Approval of Call #1 Summary

- Review draft meeting summary for Cap and Trade TWG meeting #1
- Consider any corrections or additions to meeting summary
- Accept meeting summary with agreed upon changes

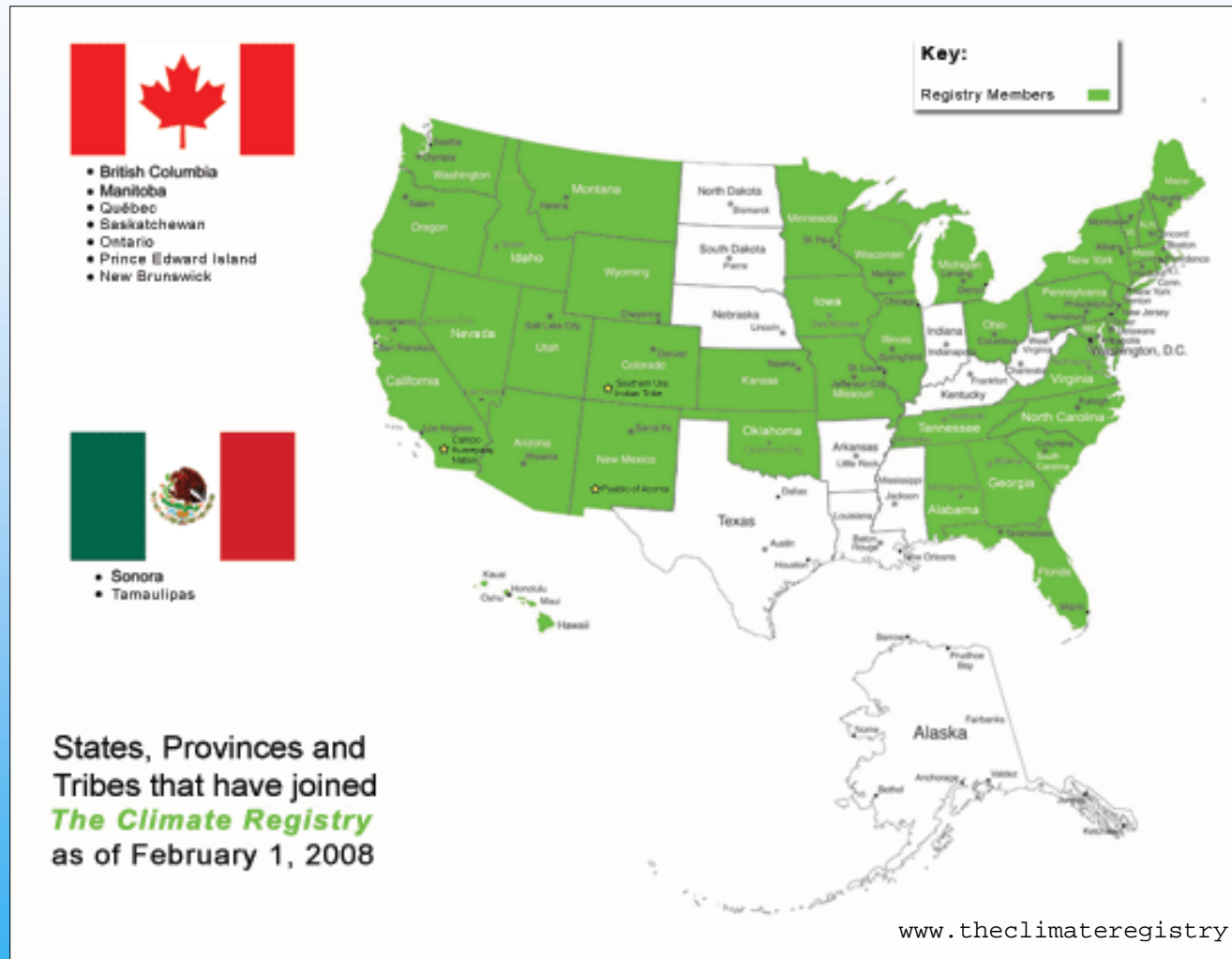
# Technical Work Group Roles

- Assist Climate Action Team
  - Identify full range of potential state actions
  - Identify suggested priorities for analysis
  - Suggest straw policy designs
  - Assist with analysis, development and review of options
  - Assist with development of policy alternatives
  - Assist with input to and review of Action Team reports
  - Review and assist with the state GHG inventory and forecast

# State Initiatives Overview

- The Climate Registry (TCR)
- Regional Greenhouse Gas Initiative (RGGI)
- Western Climate Initiative (WCI)
- Midwestern Greenhouse Gas Reduction Accord (MGA)

# Members of TCR



The  
Climate  
Registry

March 7, 2008

[www.flclimatechange.us](http://www.flclimatechange.us)

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# TCR Purpose

- Develop and manage a common greenhouse gas emissions reporting system with high integrity that is capable of supporting multiple greenhouse gas emissions reporting and emissions reduction policies for its member states/tribes and reporting entities; and
- Provide an accurate, complete, consistent, transparent, and verified set of greenhouse gas emissions data from reporting entities, supported by a robust accounting and verification infrastructure.

# TCR General Reporting Protocol

## Fundamental Program Principles:

- Entity-wide, facility-level reporting
- Reporting all six GHGs
- Reporting of all Scope 1 (Direct) and Scope 2 (indirect electricity consumption) emissions
- North American Reporting
- Third Party Verification

# TCR General Reporting Protocol

- 141-Page Draft
- Public Comment ended November 29<sup>th</sup>
- Response to Comments Released January 9<sup>th</sup>
- Technical Workshops Ended Feb 20<sup>th</sup>
- TCR to Release Final GRP in March

# TCR General Verification Protocol

- 82-Page Draft
- Out for Public Comment Until March 14<sup>th</sup>
- Draft Verification Process:
  - Verification Body becomes accredited for Registry participation
  - Reporter selects Verification Body
  - Verification Body Conducts Case-Specific Evaluation of Conflict of Interest
  - Verification Body & Reporter Finalize Contract
  - Verification Body Submits Verification Notification Form to Accreditation Body & the Registry's Verification Oversight Panel
  - Verification Body Conducts Core Verification Activities
  - Verification Body Prepares Verification Report and Verification Opinion for Reporter & discusses it with them
  - Verification Body Submits Verification Documentation via CRIS
  - Registry Completes Reporting Process

# Regional Greenhouse Gas Initiative (RGGI)



RGGI

## RGGI Partners:

- New York
- Vermont
- New Hampshire
- Maine
- Connecticut
- New Jersey
- Delaware
- Massachusetts
- Rhode Island
- Maryland

## RGGI Observer:

- Pennsylvania

# RGGI MOU

- Stabilize carbon dioxide emissions from power plants at current levels until 2015, followed by a gradual decline to 10% reduction in emissions by 2019
- Applies to all fossil fuel power plants 25MW or larger
- Allowance allocation left to states except 25% must be used for consumer benefit or strategic energy purposes
- Offsets allowed from across the United States
- Generators allowed to use offsets for up to 3.3% of emissions
- Allowance banking and early reduction credits will be allowed without limitation

# RGGI Schedule

- MOU signed December 20, 2005
- Model Rule issued August 15, 2006
- Regional Organization incorporated, 2007
- Regional Auction held mid summer, 2008
- 3-year compliance period begins 1/1/2009
- First allowances surrendered for covered emissions, March 1, 2012

# Western Climate Initiative (WCI)

## Western Climate Initiative

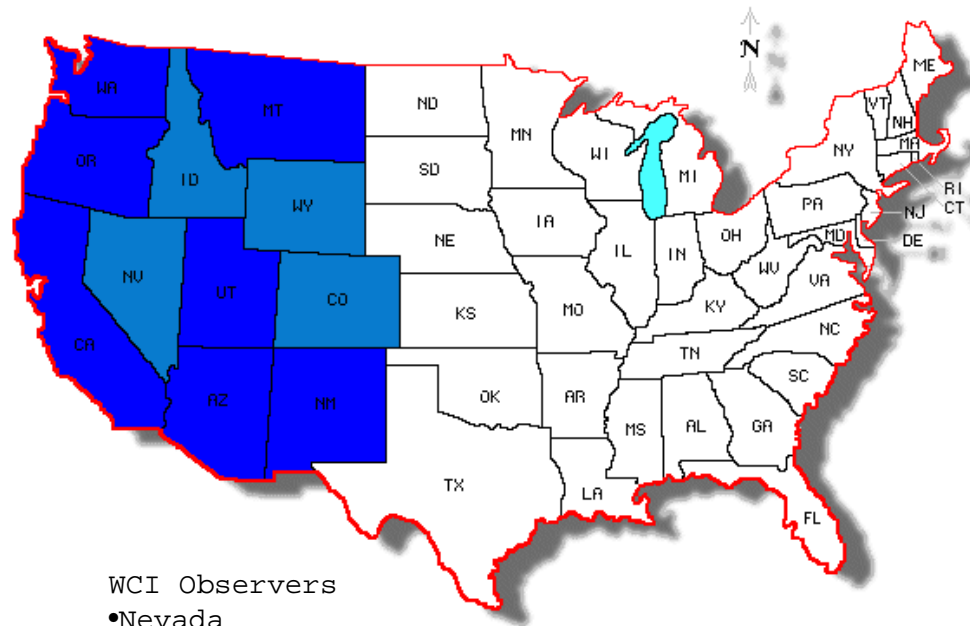
- - WCI - Partners
- - WCI - Observers

● Partners:  
British Columbia, Manitoba



### WCI Partners

- California
- Arizona
- New Mexico
- Washington
- Oregon
- Utah
- Montana
- British Columbia
- Manitoba



### WCI Observers

- Nevada
- Idaho
- Wyoming
- Colorado
- Alaska

3-4-08

<http://westernclimateinitiative.org>

# WCI Status

- Launched in February, 2007 by the Governors of AZ, CA, NM, OR and WA to develop regional strategies to address climate change
- WCI regional greenhouse gas emission reduction goal is 15% below 2005 levels by 2020
- Working groups tasked to recommend plan by September, 2008

# WCI Requirements

- Each Member:
  - Has adopted an economy-wide greenhouse gas reduction goal
  - Has developed or is developing a comprehensive multi-sector climate action plan to achieve the goal
  - Has committed to adopt greenhouse gas tailpipe standards for passenger vehicles
  - Is participating in The Climate Registry

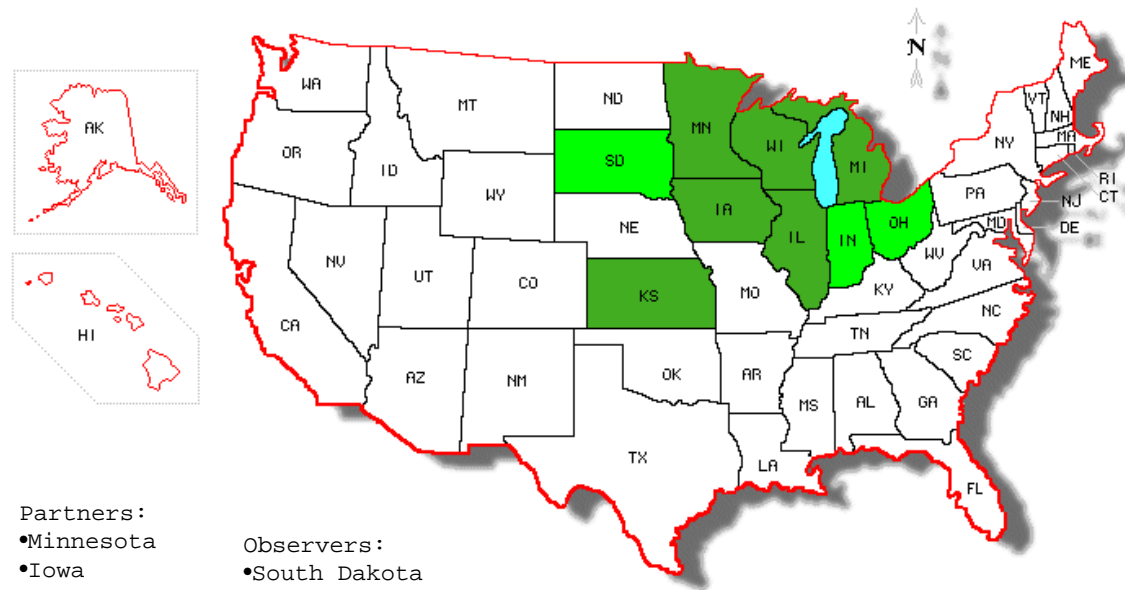
# WCI Scope

- Activities by which partners achieve the regional reduction goal should be comprehensive and economy-wide, including
  - Regional multi-sector market-based mechanisms
  - Actions in all sectors
  - Reduction in emission of any GHG reported to the UN Framework Convention on Climate Change by the USEPA and Environment Canada

# Midwestern Greenhouse Gas Reduction Accord

Midwestern Greenhouse Gas Reduction Accord

- - MGA - Partners
- - MGA - Observers
- Partners Plus Manitoba



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# MGA Status

- Joint resolution signed November 15, 2007 calling for the Program or Partners to
  - Establish GHG reduction targets and timeframes consistent with those of MGA member states and provinces
  - Develop a regional market-based and multi-sector cap-and-trade mechanism to help achieve GHG reduction targets
  - Join The Climate Registry
  - Develop and implement other associated mechanisms and policies as needed to achieve the GHG reduction targets



# An Overview of the Cap and Trade Model

# Rose-Zhang Permit Trading Model

- Purpose: Simulate basic features of cap & trade systems (and related policy refinements) to determine emission & cost implications
  - Extensive prior applications (Global, EU, US regions, RGGI)
  - Flexible & transparent framework
  - Readily accommodates data refinements & updates
  - Readily accommodates simple & complex designs

# R-Z Model Features

- Based on sound economic principles
- Main inputs (for each entity)
  - emission levels
  - marginal mitigation costs
  - initial permit allocations
- Main outputs (for each entity)
  - pre-trading mitigation costs
  - post-trading mitigation costs
  - permit purchases/sales (volume & value)
  - permit price

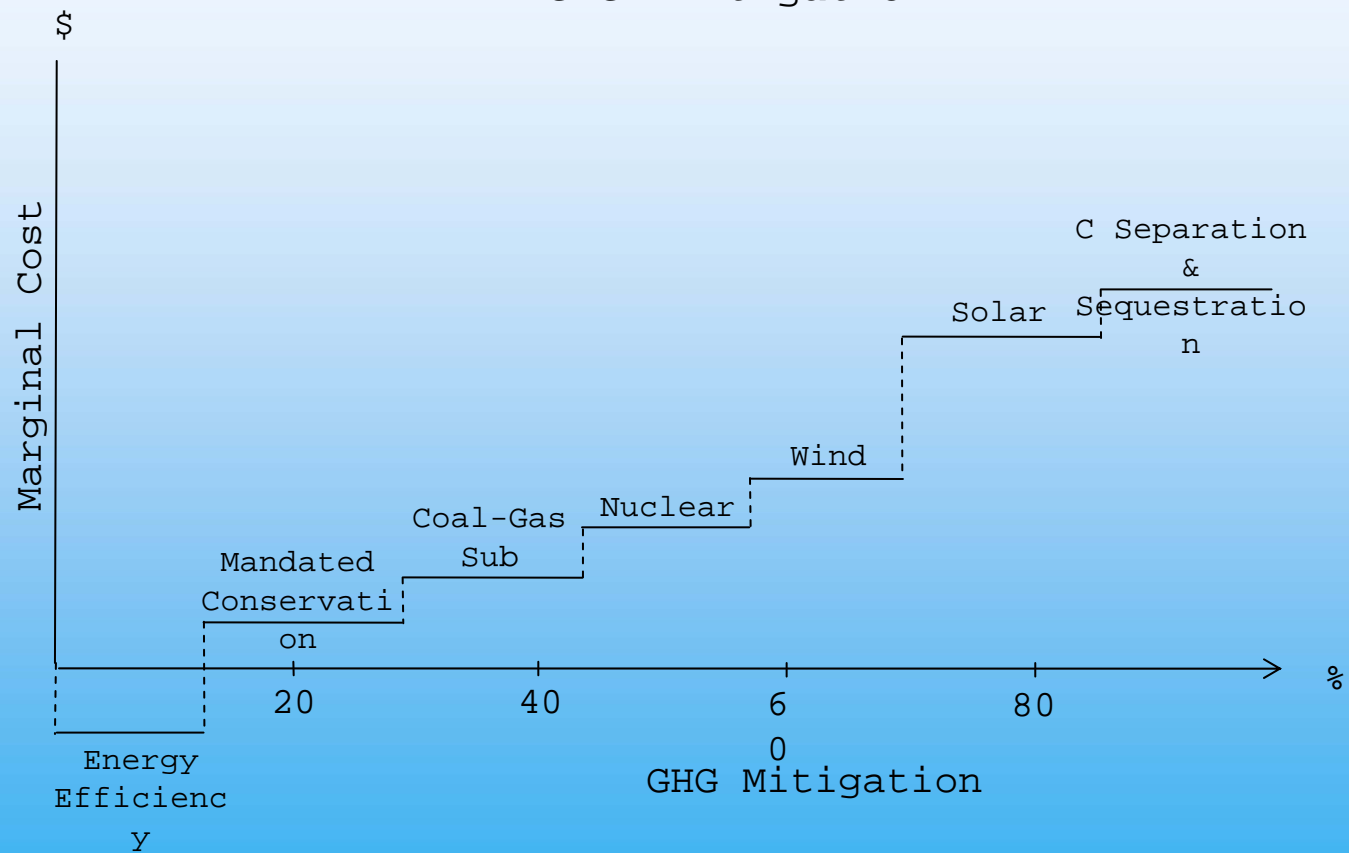
# Evaluation Of Permit Trading Flexibility

(All entries represent departure from CO2 mitigation only unless otherwise indicated)

Study/Application	How	What	Where
Rose-Oladosu (2002) U.S.	Sequestration Permit price 64% lower	Methane Permit price 23% lower	
Stevens-Rose (2002) Global			Global trading Cost savings 85%
Springer (2003) Global		Methane and nitrous oxide Permit price 25-49% lower	From Annex I trading to global trading Average permit price 67% Lower
Zhang (2004) Global			From Annex I trading to global trading Permit price 76 - 79% lower
Akimoto et al. (2004) Global	Sequestration CO <sub>2</sub> shadow price 32% lower		
IPCC (2001) Global			Global trading Marginal abatement costs 29 - 78% lower
Rose-Zhang (2004) U.S.			National trading Cost savings 41%

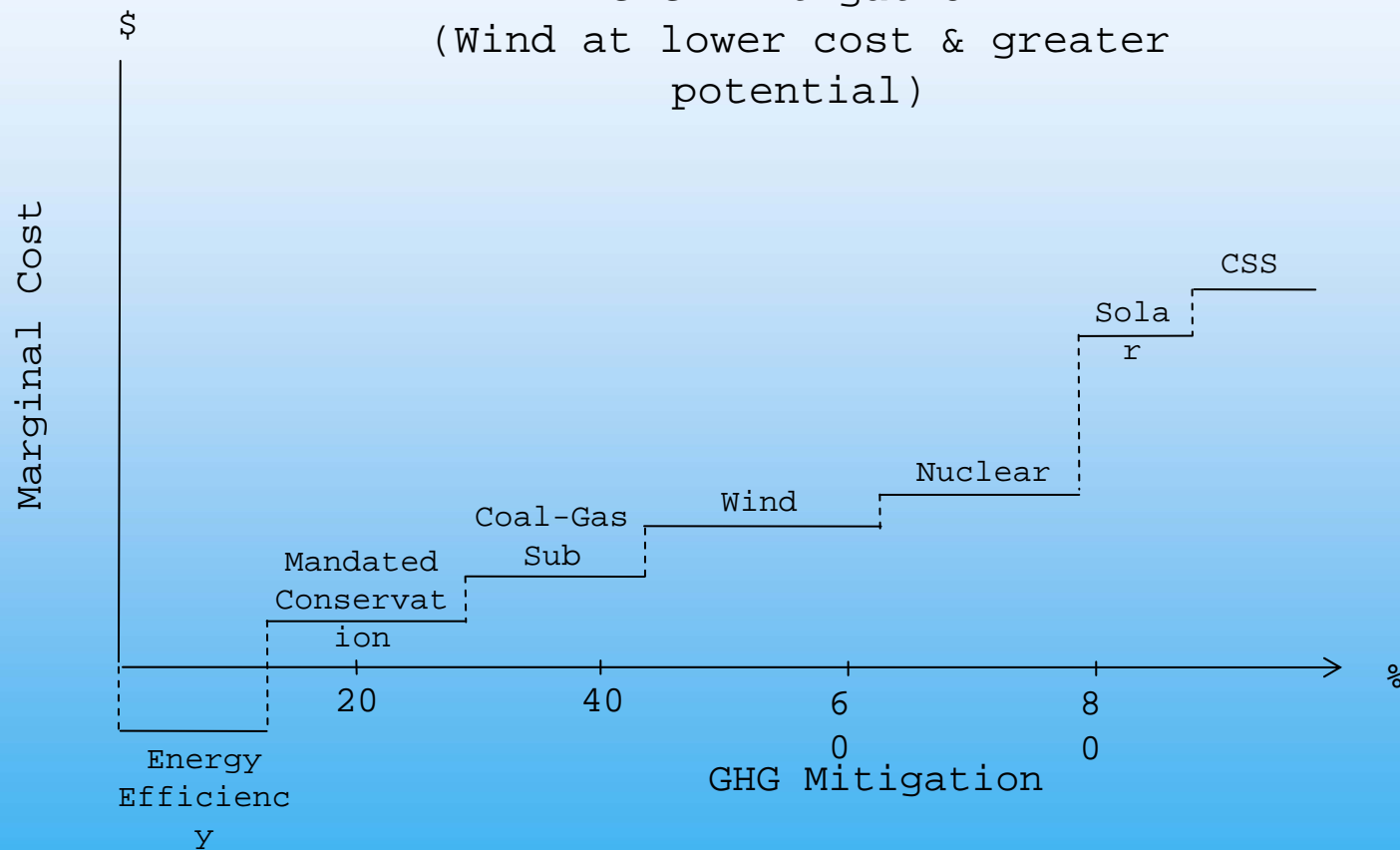
# Sample Cost Curve

Figure 1. Marginal Costs of GHG Mitigation



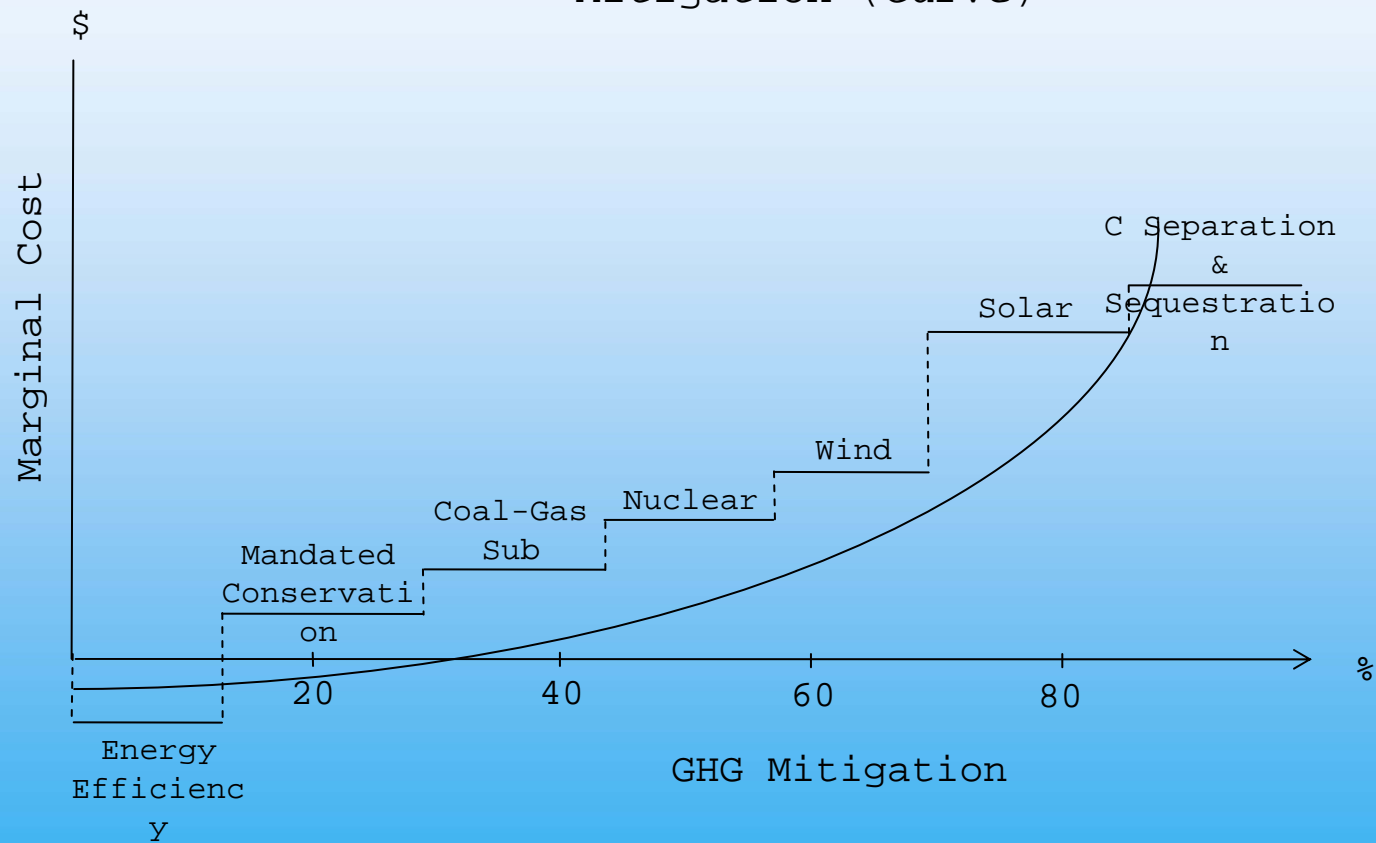
# Sample Cost Curve

Figure 2. Marginal Costs of  
GHG Mitigation  
(Wind at lower cost & greater  
potential)



# Sample Cost Curve

Figure 3. Marginal Costs of GHG Mitigation (Curve)



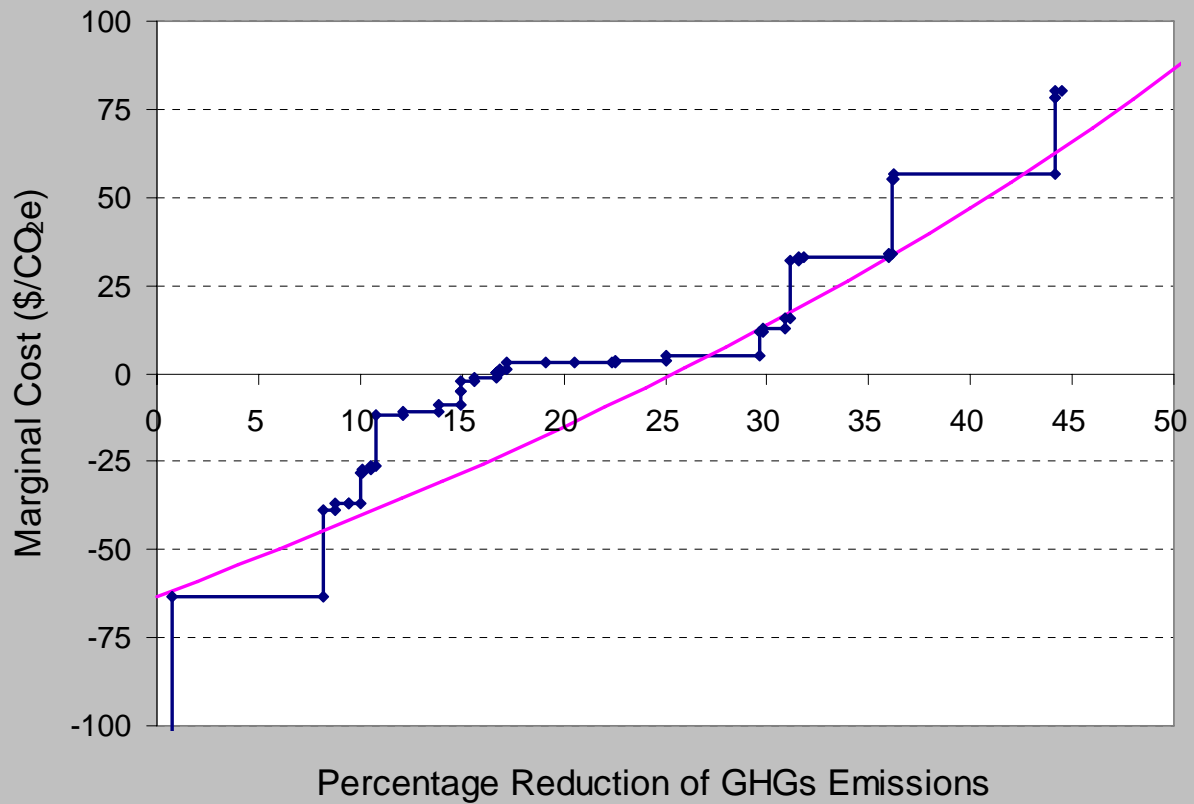
# Minnesota as an Example

GHG Mitigation Options List of Minnesota, 2025

Sector	Climate Mitigation Actions	Estimated 2025 Annual GHG Reduction Potential (MMtCO <sub>2</sub> e)	Estimated Cost or Cost Savings per ton GHG Removed	GHG Reduction Potential as Percentage of 2025 Baseline Emissions	Cumulative GHG Reduction Potential	Weights (add-up to 100)
RCI	MN: Improved Uniform Statewide Building Codes	0.005	-\$576.00	0.00%	0.00%	0.01
RCI	MN: Support Strong Federal Appliance Standards and Require High State Standards in the Absence of Federal Standards	1.4	-\$124.00	0.71%	0.71%	1.59
RCI	MN: Maximize Savings From the Utility Conservation Improvement Program (CIP)	14.7	-\$63.20	7.44%	8.15%	16.72
TLU	MN: Adopt California Clean Car Standards	1.16	-\$39.00	0.59%	8.74%	1.32
AFW	MN: Agricultural Crop Management_B. Nutrient Management	1.3	-\$37.00	0.66%	9.39%	1.48
RCI	MN: Non-Utility Strategies and Incentives To Encourage Energy Efficiency and Reduce GHG Emissions	1.3	-\$37.00	0.66%	10.05%	1.48
RCI	MN: Conservation Improvement-Type Program for Propane and Fuel Oil Efficiency	0.05	-\$28.00	0.03%	10.08%	0.06
RCI	MN: Green Building Guidelines and Standards Based on Architecture 2030	0.94	-\$27.00	0.48%	10.55%	1.07
ES	MN: Transmission System Upgrading, Including Reducing Transmission Line and Distribution System Loss--Natural gas transmission and distribution upgrades	0.4	-\$26.10	0.20%	10.75%	4.32
AFW	MN: Forestry Management Programs to Enhance GHG Benefits_B. Urban forestry	2.7	-\$12.00	1.37%	12.12%	3.07
AFW	MN: Front-End Waste Management Techs._B. Recycling	3.4	-\$11.00	1.72%	13.84%	4.10
AFW	MN: In-State Liquid Biofuels Production_A. Ethanol carbon content	2.2	-\$9.00	1.11%	14.95%	0.47
RCI	MN: Program To Reduce Emissions of Non-Fuel, High-Global-Warming-Potential GHGs	0.05	-\$5.00	0.03%	14.98%	5.63
AFW	MN: Agricultural Crop Management_A. Soil Carbon Management	1.3	-\$2.00	0.66%	15.64%	10.24
TLU	MN: Climate-Friendly Transportation Pricing / Pay as You Drive	2.1	-\$1.00	1.06%	16.70%	0.46
ES	MN: Generation Performance Standard	0	\$0.00	0.00%	16.70%	2.50
ES	MN: Nuclear Power Support and Incentives--Installation of a nuclear power station in 2020	0	\$0.00	0.00%	16.70%	0.46
ES	MN: Advanced Fossil Fuel Technology Incentives, Support or Requirements	0	\$0.00	0.00%	16.70%	0.96
TLU	MN: Expand Transit, Bicycle, and Pedestrian Infrastructure	0.3	\$0.00	0.15%	16.85%	0.50
AFW	MN: End of Life Waste Management Practices_A. Landfilled Waste Methane	0.73	\$1.00	0.37%	17.22%	9.56
AFW	MN: Expanded Use of Biomass Feedstocks for Electricity, Heat, or Steam Production	3.8	\$3.00	1.92%	19.14%	0.22
AFW	MN: Forest Protection--Reduced Clearing and Conversion to Non-Forest Cover	2.7	\$3.00	1.37%	20.51%	0.22
AFW	MN: Front-End Waste Management Techs._A. Source Reduction	3.6	\$3.00	1.82%	22.33%	17.86
AFW	MN: Front-End Waste Management Techs._C. Composting	0.41	\$3.00	0.21%	22.54%	0.03
RCI	MN: Incentives & Resources To Promote Combined Heat and Power (CHP)	4.95	\$3.80	2.50%	25.04%	0.72
AFW	MN: In-State Liquid Biofuels Production_C. Gasoline Displacement	9	\$5.00	4.55%	29.60%	0.00
ES	MN: Efficiency Improvements, Repowering and other Upgrades to Existing Plants--Biomass co-	0.4	\$12.00	0.20%	29.80%	100.00
AFW	MN: Forestry Management Programs to Enhance GHG Benefits_A. Forestation	2.2	\$13.00	1.11%	30.91%	0.00
TLU	MN: Reduce Maximum Speed Limits	0.4	\$15.50	0.20%	31.11%	0.00
AFW	MN: End of Life Waste Management Practices_C. WTE Preprocessing	0.84	\$32.00	0.43%	31.54%	0.00
AFW	MN: Land Use Management Approaches for Protection and Enrichment of Soil Carbon_A. Preserve Land	0.44	\$33.00	0.22%	31.76%	0.00
AFW	MN: Forestry Management Programs to Enhance GHG Benefits_D. Restocking	8.4	\$33.00	4.25%	36.01%	0.00
AFW	MN: Land Use Management Approaches for Protection and Enrichment of Soil Carbon_B. Reinvest in Minnesota--Clean Energy (RIM-CE)	0.19	\$34.00	0.10%	36.11%	0.00
AFW	MN: In-State Liquid Biofuels Production_B. Fossil diesel displacement	0.19	\$55.00	0.10%	36.20%	0.00
ES	MN: Renewable and/or Environmental Portfolio Standard	15.7	\$56.40	7.94%	44.15%	0.00
ES	MN: Distributed renewable energy	0.023	\$78.10	0.01%	44.16%	0.00
AFW	MN: End of Life Waste Management Practices_B. Residuals Management	0.63	\$80.00	0.32%	44.48%	0.00

<sup>1</sup> 2025 projected consumption-based gross CO<sub>2</sub> emission level is 197.65 Million Metric Tons CO<sub>2</sub>e.

Economy-wide Stepwise and Fitted  
Marginal Cost Curves of MN, 2025



# Sample Outputs

## (multi-state cap and trade)

TABLE IM1-2025. ECONOMY-WIDE EMISSION TRADING SIMULATION AMONG SIX MIDWESTERN STATES PLUS MANITOBA IN YEAR 2025

(million dollars or otherwise specified)

State	Before Trading	After Trading			Cost Saving	Permits Traded	Emission Reduction w/ Trading		Emission Reduction Goal
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO <sub>2</sub> )	(million tCO <sub>2</sub> )	(percent from BAU)	(percent from BAU)
IA	-478	-910	344	-565	87	7.10	47.91	38.01	43.65
IL	-1,581	-941	-756	-1,697	116	-15.61	138.64	43.02	38.18
KS	-621	-1,392	510	-882	261	10.53	42.27	34.94	43.65
MI	-1,663	-1,445	-234	-1,679	16	-4.83	109.06	39.95	38.18
MN	-439	-972	451	-521	81	9.31	79.82	40.38	45.09
WI	-915	-706	-233	-939	24	-4.81	67.32	41.11	38.18
MB	-178	-122	-83	-204	26	-1.70	8.10	39.29	31.02
Total	-5,876	-6,487	0	-6,487	611	26.94 <sup>b</sup>	493.11	40.28	40.28

<sup>a</sup> Permit Price = \$48.45/tonCO<sub>2</sub>e. This is the price of the last permit sold, which is also equal to the price of the last ton of CO<sub>2</sub>e mitigated (its *marginal* mitigation cost). It is the same for each state for a given case. The *average* mitigation cost per unit of CO<sub>2</sub> equivalent in this simulation differs for each state. For MN, for example, it is -\$12.17/tonCO<sub>2</sub>e. Please note that the average mitigation cost is related to mitigation level of a state, which for this case is 40.38% below the baseline level in 2025 for MN. Multiplying the average mitigation cost by the number of tons of CO<sub>2</sub> mitigated will equal the *total* mitigation cost for each state.

<sup>b</sup> Represents number of permits bought or sold.

# Sample Outputs

## (Minnesota only cap and trade)

Emission Trading Simulation Among Four Sectors in Minnesota  
(million dollars or otherwise specified)

State	Before Trading	After Trading <sup>a</sup>			Cost Saving	Permits Traded	Emission Reduction After Trading		Emission Reduction Cap
	Mitigation Cost	Mitigation Cost	Trading Cost	Net Cost		(million tCO <sub>2</sub> e)	(million tCO <sub>2</sub> e)	(percent from BAU)	(percent from BAU)
Power Sector	2,653	-692	1,141	449	2,203	17.42	24.14	30.38	52.31
Transportation Sector	-68	216	-457	-241	173	-6.98	20.71	52.06	34.51
Other	928	-9	584	575	352	8.92	24.97	31.80	43.16
Sequestration	0	272	-1,268	-996	996	-19.36	19.36	n.a.	n.a.
Total	3,512	-213	0	-213	3,725	26.35 <sup>b</sup>	89.18	45.10	45.10

<sup>a</sup> Permit Price = \$65.48/tonCO<sub>2</sub>e.

<sup>b</sup> Represents number of permits bought or sold.

# Policy Refinements

- Production-based vs. Consumption-based allocation
- Economic sector (emitter) disaggregation
- Offsets
- Flexibility
  - how (e.g., sequestration)
  - what (e.g., CO<sub>2</sub>, methane, nitrous oxides, SFCs)
  - where (e.g., alternative configurations of states)
  - when (e.g., permit banking & borrowing)

# Potential Permit Trading Anomalies

- Participants as a whole gain from flexibility
- However, individual states may not because new entrants:
  - may raise the permit price
  - may undercut existing states' permit sales
  - may be able to exercise monopoly power
  - may increase inequities

# Regional Greenhouse Gas Initiative (RGGI) Overview

- **John P. Cahill** was the Secretary and Chief of Staff to New York Governor George E. Pataki and Development Chief of Lower Manhattan. John advised the Governor on a wide array of critical policy issues, including the Regional Greenhouse Gas Initiative. Prior to joining the Governor's staff in February 2001, John spent more than five years with the Department of Environmental Conservation, including four as Commissioner.
- **Peter R. Smith** served as Acting President and then President and Chief Executive Officer of the New York State Energy Research and Development Authority (NYSERDA) during the Pataki Administration through the period RGGI was being developed.

# C&T Catalog of State's Actions

- Please refer to separate catalog documents
  - Catalog (table)
  - Short descriptions of policy options
- Excerpted from larger all-sector catalog

# C&T Recommendations Expectations

- Refer to separate *Market Mechanisms Policy Menu* document sent earlier.

## Action Team Phase I Recommendation:

“The Action Team recommends that Florida pursue a market-based policy of “cap and trade” by creating tradable emissions allowances as the preferable means meeting the utility sector emissions cap and the statewide emission reduction targets directed by Governor Crist in Executive Order 07-127.”

# Action Team Phase I Recommendation:

“... This design process should result in final recommendations for several considerations, including but not limited to:

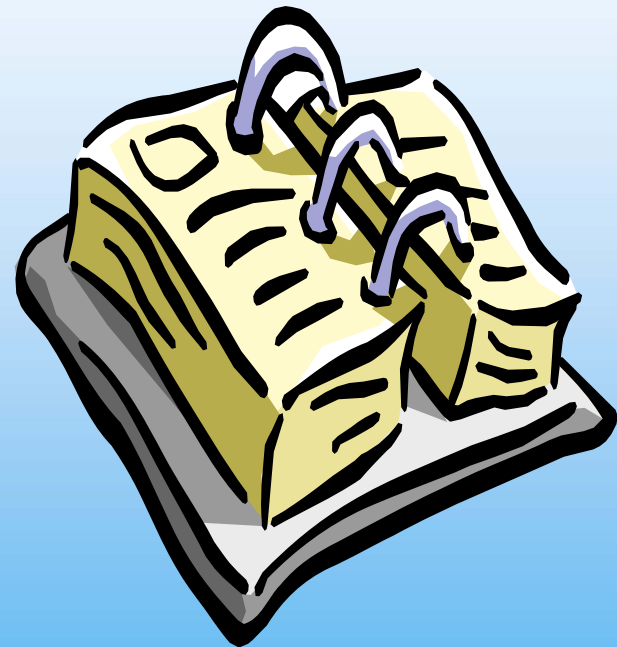
- An allowance allocation process,
- Economic and emergency safety valves,
- The creation and use of emission offset credits,
- A “leakage” strategy regarding the migration of emissions into surrounding states,
- Trial periods, and
- Timeframes for full implementation.
- The design process should consider linking a Florida-based allowances trading market with other regional or international markets.”

# Next Steps

- Today- Identify potential actions that are missing from the Catalog
- Today- Discuss Expectations for Recommendations
- After FL Action Team Meeting #2-
  - Narrow scope for analysis:
    - Geographic
    - Sectors
  - Begin work on other policies

# Next Action Team Meeting

- Agenda:
  - Review and approve potential additions to the catalog of state actions
  - Review and approve TWG suggested updates to the FL emissions inventory and projection
  - Review progress on cap-and-trade design issues
- March 17, 2008, Tallahassee

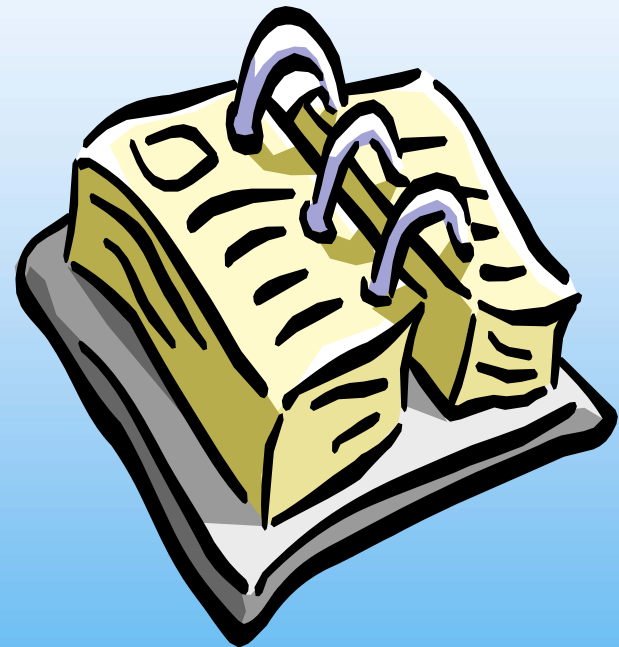


## Timing – Action Team Meetings

<b>Date</b>	<b>Action</b>
February 1, 2008	1 <sup>st</sup> Action Team meeting
March 17, 2008	2 <sup>nd</sup> Action Team meeting
May 29, 2008	3 <sup>rd</sup> Action Team meeting
July 9, 2008	4 <sup>th</sup> Action Team meeting
August 6, 2008	5 <sup>th</sup> Action Team meeting
September 5, 2008	6 <sup>th</sup> Action Team meeting
October 1, 2008	Phase II Final Report due
Between Action Team Meetings	TWG conference calls and meetings

# Next TWG Meetings

- Agenda:
  - Formulate catalog of potential state actions
  - Review TWG suggested updates to the FL emissions inventory and projection
  - Prepare to identify initial priorities for analysis
- Friday, March 28, 2008  
2:00 PM – 4:00 PM Eastern
- Friday, April 25, 2008  
2:00 PM – 4:00 PM Eastern



# Public Input, Announcements