

GREENHOUSE GAS EMISSIONS TRADING 2007

Opportunities And Risks For
The Fast Seconds



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Strategic planning for
the new carbon
economy





- The first and oldest non-profit dedicated to improving the environment through market participation
- Holds the largest bank of retired emission reduction credits - over 5 *billion* pounds of SO₂, NO_x and CO₂e



Why start now?

- It's the right thing to do
- The risks of inaction are now outweighed by the risk of acting too soon
 - Mandatory market-based regulation is inevitable
 - The downside risks can be managed
 - Early actors are likely to be protected
 - The upside opportunity is significant

1957

- Roger Revelle and Hans Seuss of the Scripps Institute of Oceanography publish first expression of concern that Climate Change is caused by HUMAN activity

April 2, 2007

U.S. Supreme Court publishes its decision in Massachusetts v. EPA

- Brought by a group of states and other stakeholders to compel the EPA to regulate Greenhouse Gas Emissions
- In a 5 -4 decision the majority found that the harms associated with global warming are serious and well recognized
- The Court said that the EPA can and *should* regulate Greenhouse Gas Emissions

What will be affected?

What won't?

The Six Greenhouse Gasses

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF₆)

Measuring The Greenhouse Gasses

CO₂e –

Carbon Dioxide Equivalent expressed in terms of radiative forcing capacity.



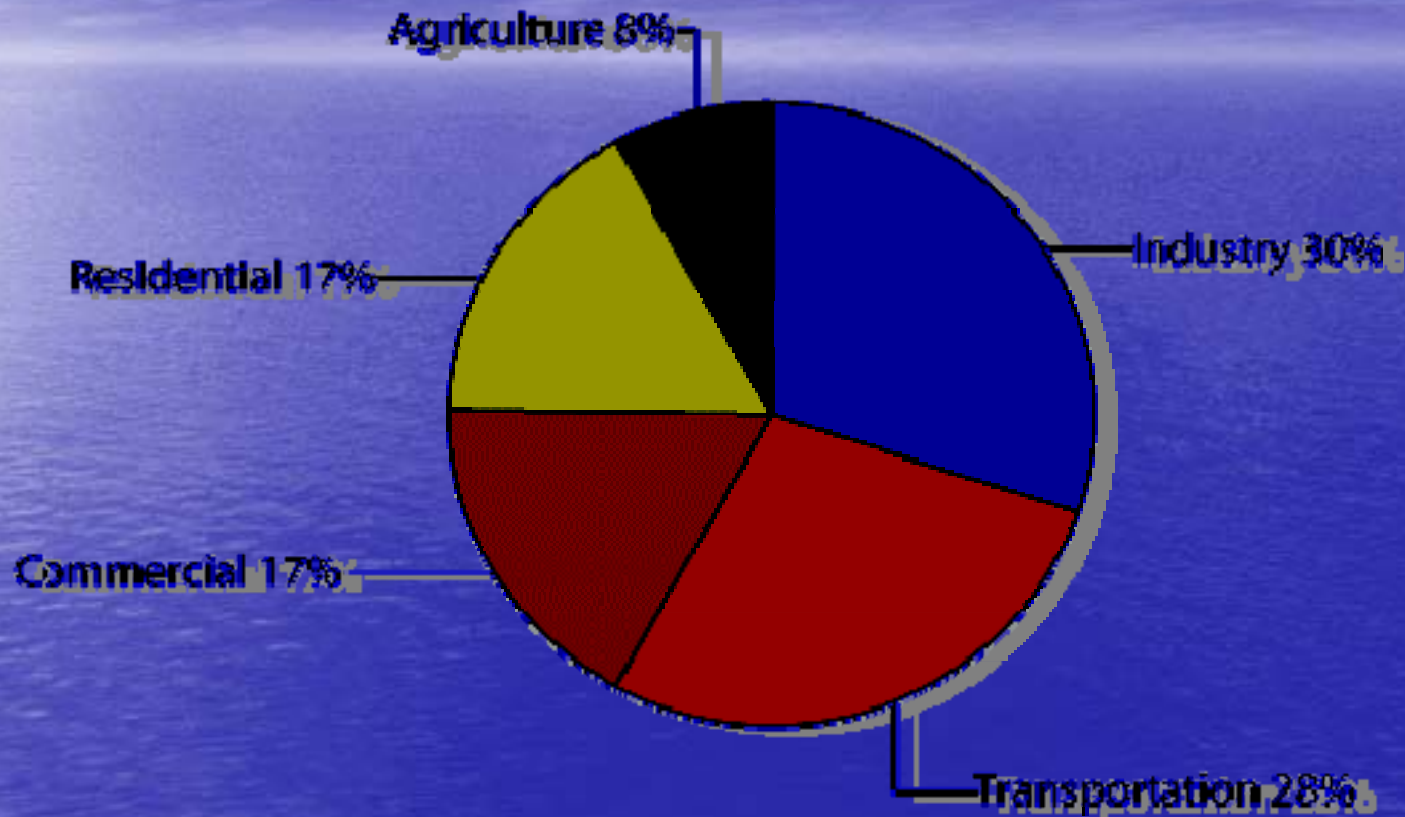
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Global warming potential (GWP) of the six GHG's

- Carbon dioxide (CO₂) 1
- Methane (CH₄) 23
- Nitrous oxide (N₂O) 296
- Hydrofluorocarbons (HFCs) 12 - 12,000
- Perfluorocarbons (PFCs) 5,700 – 11,900
- Sulphur hexafluoride (SF₆) 22,200

GHG Emissions By Sector (U.S.)

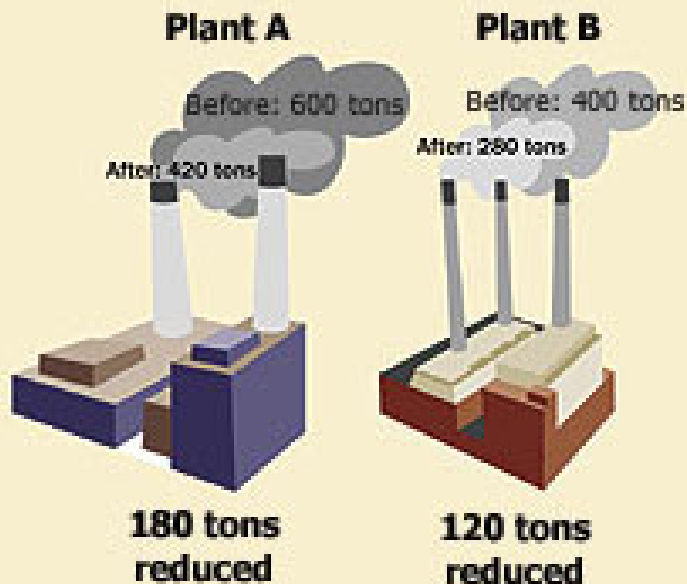


Policy Tools

- Command & Control
- Market mechanisms
 - Carbon Tax
 - Incentive Programs
 - Cap & Trade / Markets

Command & Control

Traditional Approach: 30% Mandatory Reduction



Total Emissions Reduced: 300 tons
Cost to Reduce: \$12,000

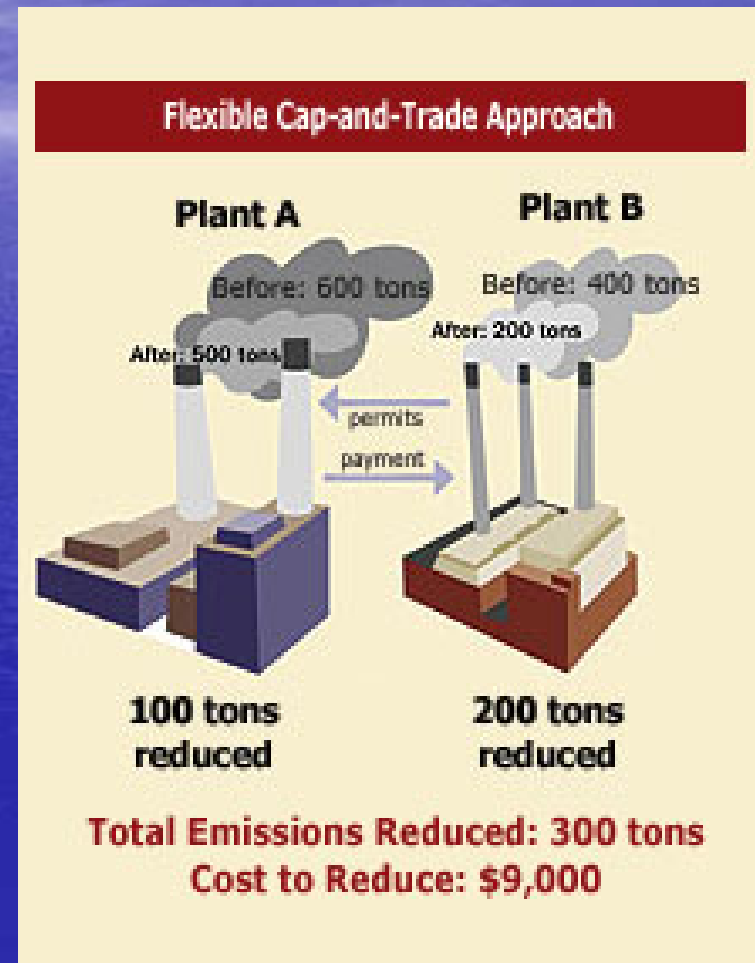
Legislative command for all regulated entities to reduce by a fixed amount, e.g. 30% below established baseline

Each entity has to comply regardless of the cost

Cap & Trade

Legislative cap on emissions requiring **total** emissions reduction of, e.g., 30%

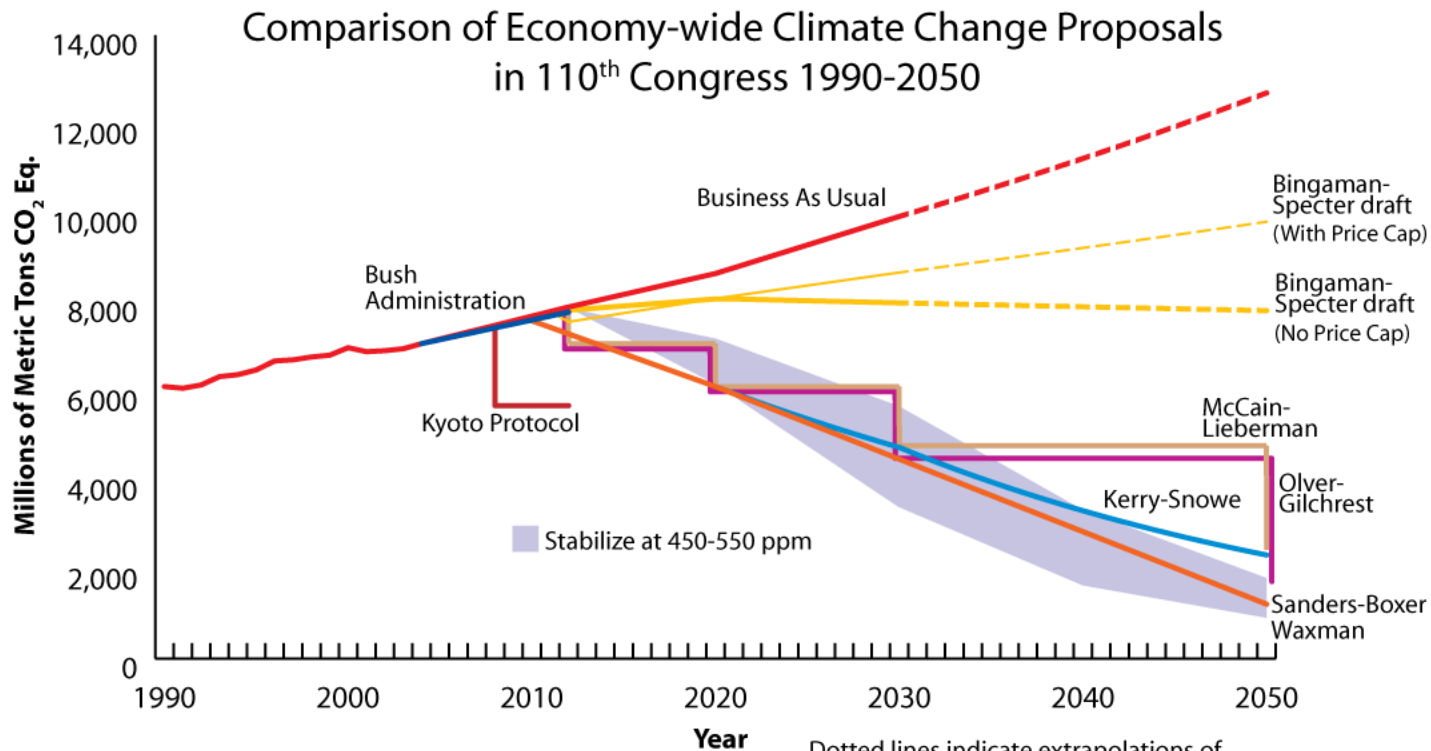
Emission reductions are achieved by entities that can reduce emissions at the lowest cost



Summary of Legislation Pending in 110th Congress

	Bingaman/Specter	Sanders/Boxer	Feinstein/Carper	Lieberman/McCain	Kerry/Snowe
Scope	Economy-wide	Economy-wide	Electricity Sector	Economy-wide	Economy-wide
Coverage	All six GHGs	All six GHGs	All six GHGs	All six GHGs	All six GHGs
Emissions Targets	<p>Mandatory Caps</p> <ul style="list-style-type: none"> 2012: GHG emissions intensity 2.6% below 2011 levels, decreasing by a further 2.6% each year through 2021 2022: emissions intensity to drop by 3% each successive year <p>Long-term goal:</p> <ul style="list-style-type: none"> none 	<p>Mandatory Caps</p> <ul style="list-style-type: none"> 2020: 1990 GHG levels 2030: 26.7% below 1990 levels 2040: 57.4% below 1990 levels 2050: 80% below 1990 levels <p>Long-term goal:</p> <ul style="list-style-type: none"> 450 ppm concentration stabilization 	<p>Mandatory Caps</p> <ul style="list-style-type: none"> 2011-2014: capped at 2006 levels 2015: capped at 2001 levels 2016-2019: cap declines 1% from previous year 2020 and thereafter: emissions cap declines 1.5% each year <p>Long-term goal:</p> <ul style="list-style-type: none"> none 	<p>Mandatory Caps</p> <ul style="list-style-type: none"> 2012-2019: 6,130 million tons of CO₂e 2020-2029: 5,239 million tons of CO₂e 2030-2049: 4,100 million tons of CO₂e 2050: 2,096 million tons CO₂e thereafter <p>Long-term goal:</p> <ul style="list-style-type: none"> none 	<p>Mandatory Caps</p> <ul style="list-style-type: none"> 2020: 1990 GHG levels 2021-2030: emissions reduced by 2.5% per year 2031-2050: emissions reduced by 3.5% per year <p>Long-term goal:</p> <ul style="list-style-type: none"> 450 ppm concentration stabilization
Regulated Entities	<p>Set forth in the Act</p> <p>Coal mines, petroleum refineries, natural gas processors, importers of fossil fuels, and selected non-fuel entities</p>	<p>Determined by EPA</p>	<p>Set forth in the Act</p> <p>All electricity generating entities of 25 MW or greater</p>	<p>Set forth in the Act</p> <p>All facilities that emit 10,000 tons CO₂e per year, petroleum refineries, and importers</p>	<p>Determined by EPA</p> <p>Sources or sectors with greatest GHG emissions, as determined by the EPA</p>

Bills Pending in 110th Congress



WORLD RESOURCES INSTITUTE

Dotted lines indicate extrapolations of Energy Information Administration projections
 Modified: May 10, 2007

Early Action

Concrete Steps

GHG Reduction Projects

- Process Changes
- Agriculture
- Energy Efficiency / Alternative Energy
- GHG Capture and Destruction
- Carbon Dioxide Storage and Sequestration

Strategic Analysis

Carbon Exposure Assessment
Carbon Opportunity Assessment



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Carbon Exposure Assessment

- How will my suppliers, business operations or products be affected by climate change legislation?
 - Upstream
 - Downstream

Carbon Exposure Assessment

- Supply impact
 - Will my raw materials be regulated?
 - Will my raw materials prices increase?
 - Should I consider bundling, unbundling or offsetting the carbon content of my raw materials?

Carbon Exposure Assessment

- Operations impact
 - Industrial operations
 - Office / Facilities management
 - Energy consumption

Carbon Exposure Assessment

- Product impact
 - Will my product be regulated?
 - Will my customers demand product changes?

Carbon Opportunity Review

- Does my company have any processes, operations or products that could be altered to lower GHG emissions?
 - What is the *relative* cost of doing so?

If the legislation is
still pending ...

Fast second: How smart companies bypass radical innovation to enter and dominate new markets.

- Paul Geroski, Mark Constantinos (2005).

A **Fast Second** lets other companies innovate and experiment to create new markets. Then the fast second enters the market just as the dominant design is about to emerge, helps create the dominant design, and uses its [size] position to capture the market.



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A Fast Second lets other companies innovate and experiment to create new markets.

- We have learned from the successes and *failures* of the Kyoto markets.
- The basic building blocks and infrastructure have been created.
- Trading in the EU ETS exceeded \$20 billion in 2006.

The fast second enters the market just as the dominant design is about to emerge

- The US has two significant regional markets coming online in the next 12 to 24 months.
- There are 5 Climate Change bills pending in Congress, and all of them contemplate using some form of trading
- The imperative to link to global markets will dictate the basic parameters of the US markets

The fast second helps create the dominant design

- Stakeholders will get a better seat at the table
- Participants will have a better shot at maximizing the value of their assets
- The real value will be in the details

The fast second uses its position to capture the market

- The impacts here will be economy wide – the “market” *is* your product market
- The companies that are able to take early advantage and reduce their costs or, better, find new revenue streams, will capture the market

Early Action

Controlling the risks



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Early Action Risk -

- The reductions achieved today may not be fully credited under the legislation that is ultimately passed
 - I may unintentionally set my compliance baseline higher
 - I may generate reductions that won't be useful in a compliance market

Early Action Risk Controls

- Good project selection, planning and management
- Legislative monitoring and *participation*
- Keep the back door open



Getting it right

- Don't underestimate the value of these opportunities or the importance to your business
- The industry is relatively new, but remarkably developed – take advantage of the lessons learned and the existing expertise