

# Climate Change Action Goals: Overview of the Climate Change Science Relating to Reduction Goals

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Fifth Climate Change Policy Task Force  
Meeting  
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Portsmouth, NH  
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# Overview

- Review the recommendations found in recent climate science
  - Target Atmospheric Concentrations
  - Rate of Emission Reductions
- Review the Regional and State climate change action goals



# Science

## Intergovernmental Panel on Climate Change 2007

### 4<sup>th</sup> Assessment

- The scientific evidence suggests that an increase in annual global mean surface temperature greater than 2 - 2.5°C (3.6 - 4.5°F) above pre-industrial levels would very likely result in dangerous consequences that impact:
  - food production
  - biodiversity
  - ***uncontrollable and unpredictable changes in the Earth's climate system***



# Science

## Intergovernmental Panel on Climate Change 2007

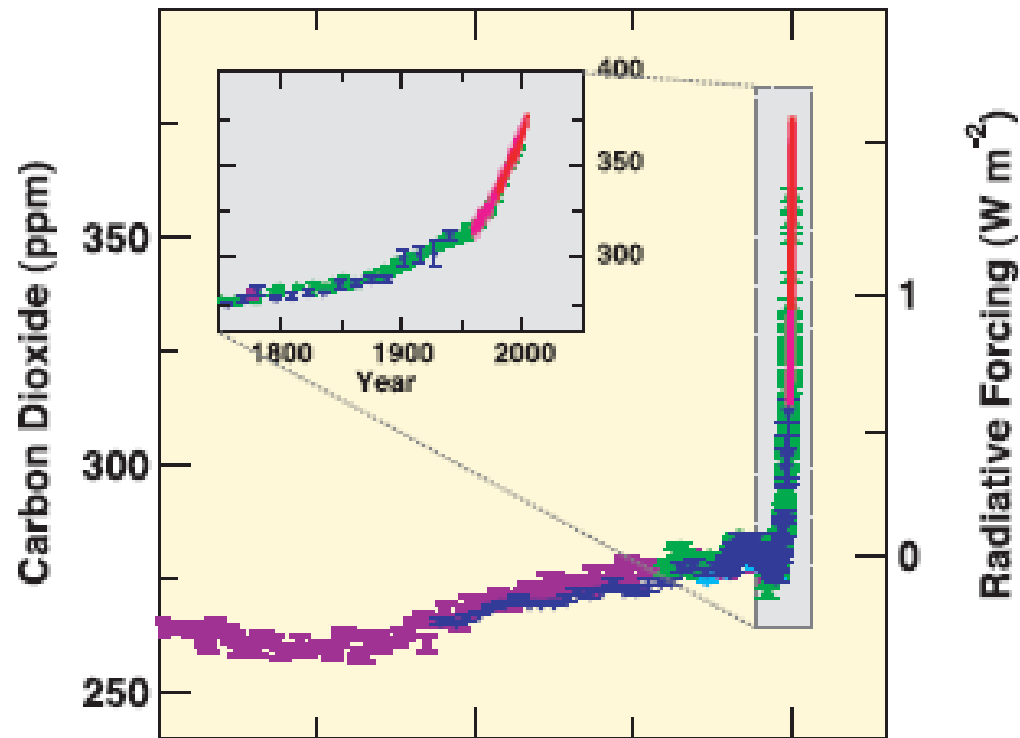
- To avoid reaching this level of global warming, Earth system models indicate that greenhouse gas (GHG) concentrations in the atmosphere would have to be held to around **450 ppm in CO<sub>2</sub> equivalents**
- **Current GHG concentration is 383 ppm (2007)**



# Science

## Atmospheric CO<sub>2</sub> Concentration

### CHANGES IN GREENHOUSE GASES FROM ICE CORE AND MODERN DATA



# Science

## Intergovernmental Panel on Climate Change 2007

- To stabilize at 450 ppm global emissions must reach:
  - 25 % to 40 % below 1990 levels by 2020
  - 80 % to 95 % below 1990 levels by 2050



# Science

Union of Concerned Scientists

2007

## **“How to Avoid Dangerous Climate Change: A Target for US Emissions Reduction”**

Current science indicates that 450 ppm stabilization target provides may be insufficient to stabilize global climate.

**Therefore, a 450 ppm CO<sub>2</sub>eq stabilization target should represent the upper limit on concentrations of heat-trapping emissions set by any policy that seeks to avoid dangerous climate change.**

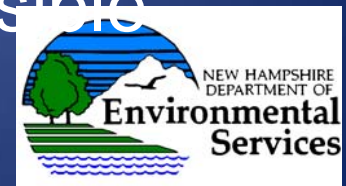


# Science

Hansen *et al.*,  
2008

## “Target Atmospheric CO<sub>2</sub>: Where Should Humanity Aim”

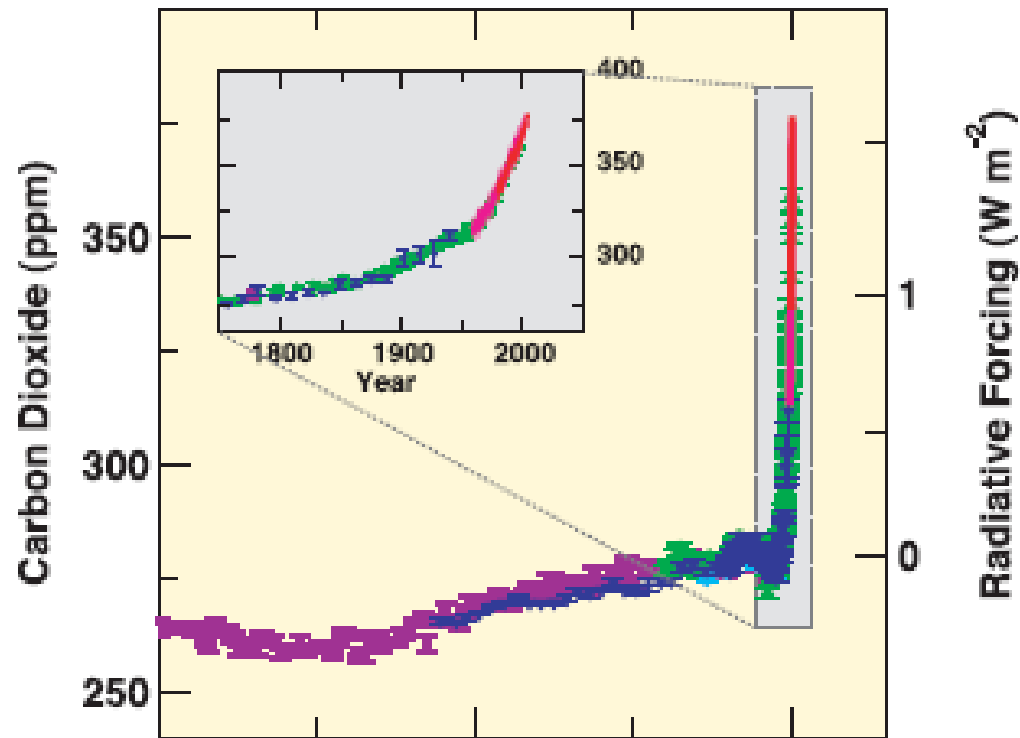
- Climate is twice as sensitive as assumed by IPCC
- Over longterm CO<sub>2</sub> can not be maintained in atmosphere above 350 and stabilize climate
- Atmospheric CO<sub>2</sub> needs to be stabilized as low as possible and as quickly as possible



# Science

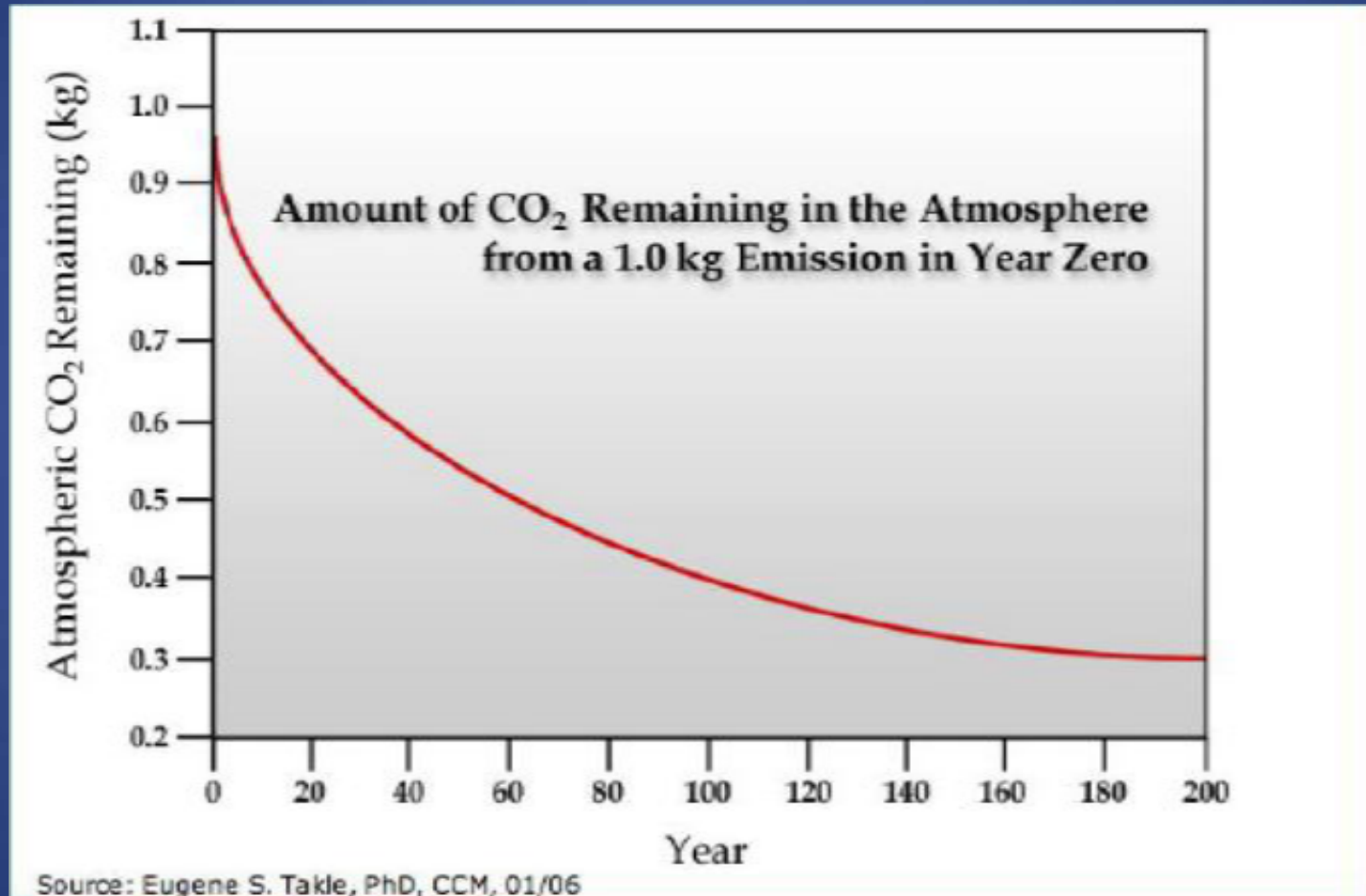
## Atmospheric CO<sub>2</sub> Concentration

### CHANGES IN GREENHOUSE GASES FROM ICE CORE AND MODERN DATA



# Science

## CO<sub>2</sub> Atmospheric Residence Time



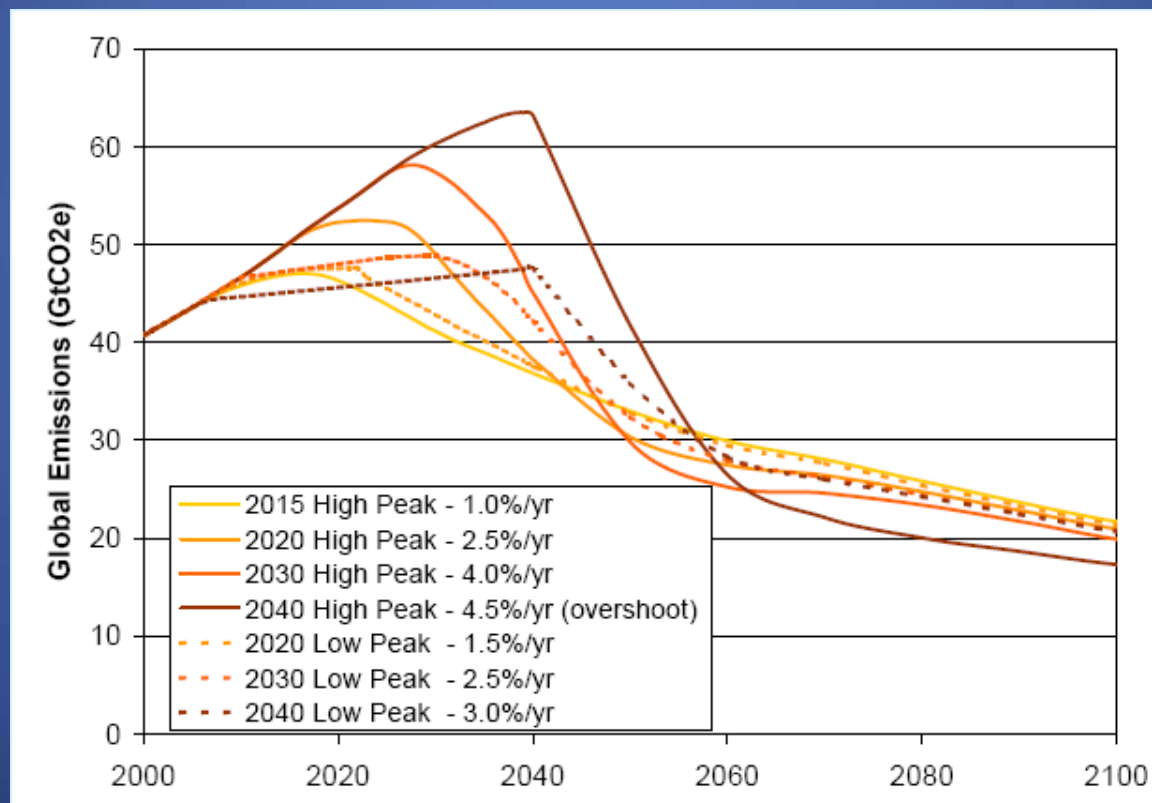
*Delays in the system require early*

# Science

## Stern Review

### 2007

## Delayed Action Requires Greater Reductions Later



(Stern Review, 2007)

# Science

## Stern Review

### 2007

## Pathways to Stabilization

Stabilisation Level (CO <sub>2</sub> e)	Date of peak global emissions	Global emissions reduction rate (% per year)	Percentage reduction in emissions below 2005* values	
			2050	2100
450 ppm	2010	7.0	70	75
	2020	-	-	-
500 ppm (falling to 450 ppm in 2150)	2010	3.0	50	75
	2020	4.0 - 6.0	60 - 70	75
	2030	5.0[1] - 5.5 [2]	50 - 60	75 - 80
	2040	-	-	-
550 ppm	2015	1.0	25	50
	2020	1.5 - 2.5	25 - 30	50 - 55
	2030	2.5 - 4.0	25 - 30	50 - 55
	2040	3.0 - 4.5 [3]	5 - 15	50 - 60

(Stern Review, 2007)

# Policy

Regional Commitments

2001

## NEG/ECP Climate Change Goals 2001 Action Plan

- Short-term goal 1990 emissions by 2010
- Mid-term 10% below 1990 by 2020
- Long-term approximately 75-85% below current levels (*to be modified as the science evolves*)



# Policy

Regional Commitments

2007

## NEG/ECP Climate Change Goals 31st Conference of NEG-ECP

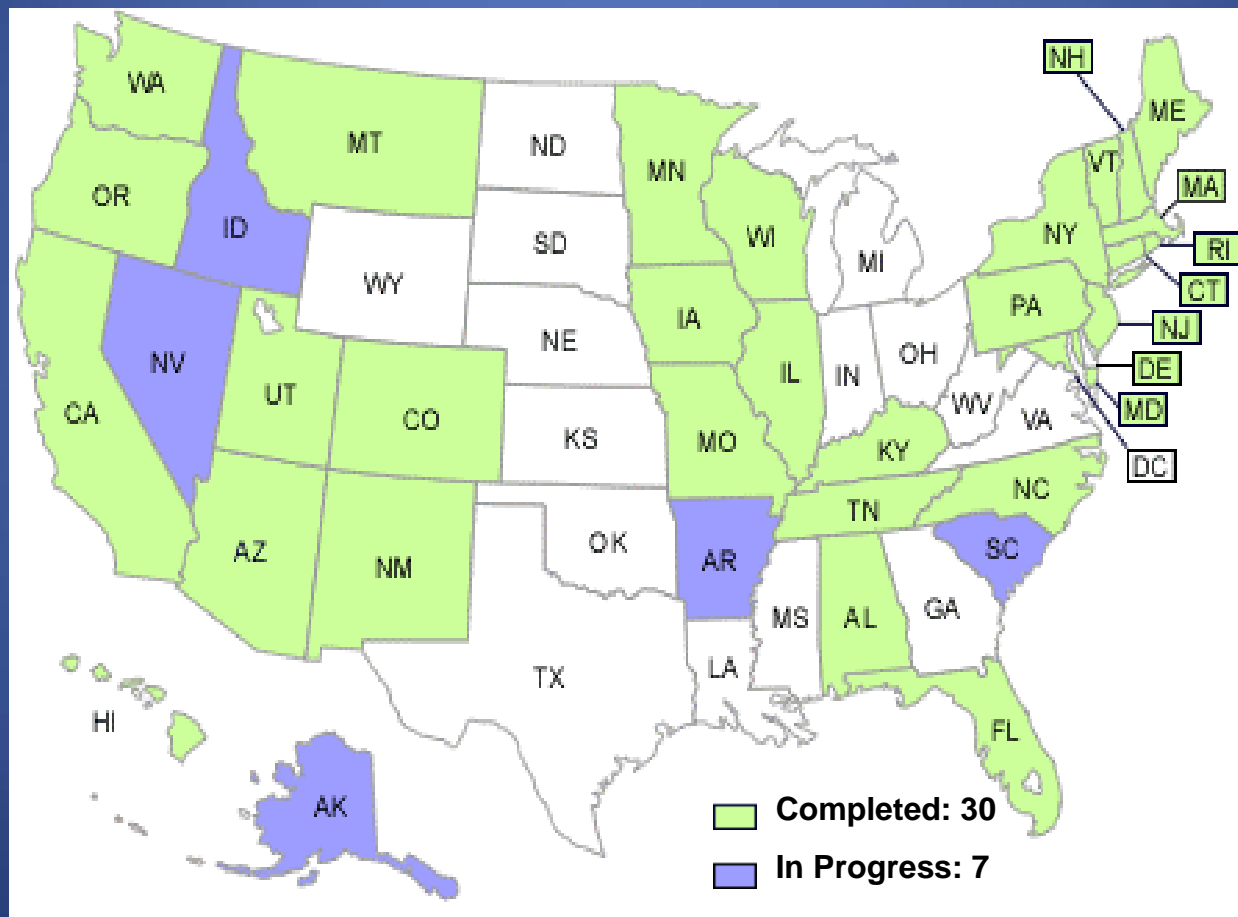
- Mid-term 10% below 1990 by 2020
- *Achieve reductions consistent with a global reduction of 75-85% below 2001 levels by 2050*



# Policy

## State Climate Change Action Plans

Current to May 2008



# Policy

## NE State Climate Change Goals 2007 and Prior

State	Mid-Term	Long-term
Connecticut*	10% below 1990 by 2020	75-85% below 2001 by 2050
Massachusetts (July 2008)	10-25% below 1990 by 2020	80% below 1990 by 2050
Maine*	10% below 1990 by 2020	75-85% below 2001 by 2050
Rhode Island*	10% below 1990 by 2020	75-85% below 2001 by 2050
Vermont	50% below 1990 by 2028	75% below 1990 by 2050

# Policy

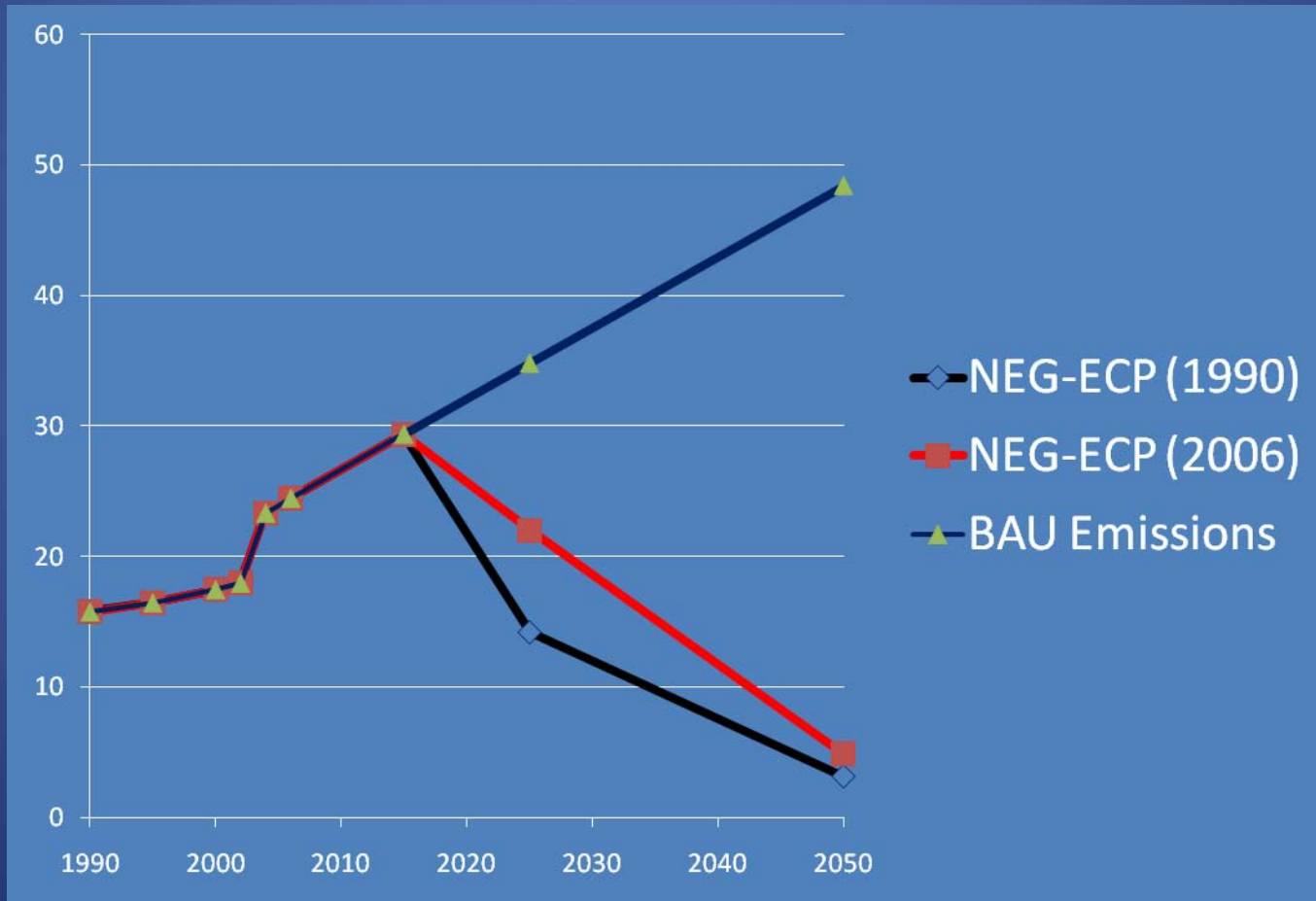
## State Climate Change Goals 2008

State	Short-Term	Mid-Term	Long-Term
Maryland (August 2008)	10% below 2006 by 2012  15% below 2006 by 2015	25-50% below 2006 by 2020	90% below 2006 by 2050
Massachusetts (July 2008)		10-25% below 1990 levels by 2050	80% below 1990 levels by 2050



# Effect of Base Year on GHG Reductions

## NH Emission Scenarios



# Effect of Base Year on GHG Reductions

- Base year determines rate of emission reduction over time
- Base year affects the final emission level that is achieved



# Questions

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