

# Climate Change

Presentation by the Colorado Department of  
Public Health and Environment

Unless otherwise indicated, the GHG  
reduction strategies are options, but will not  
necessarily be included in the State's  
Strategic Plan

# Climate Change

- Emissions Inventory
- Emissions Trends
- State and Regional Initiatives in Electric, Transportation and Agricultural Sectors
- Cross-Cutting State and Regional Initiatives

# State Process

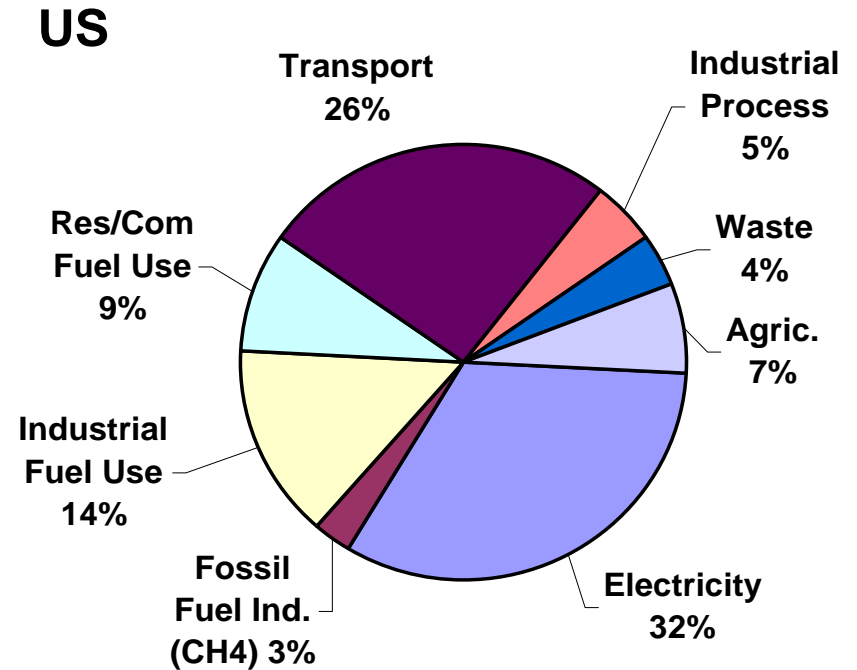
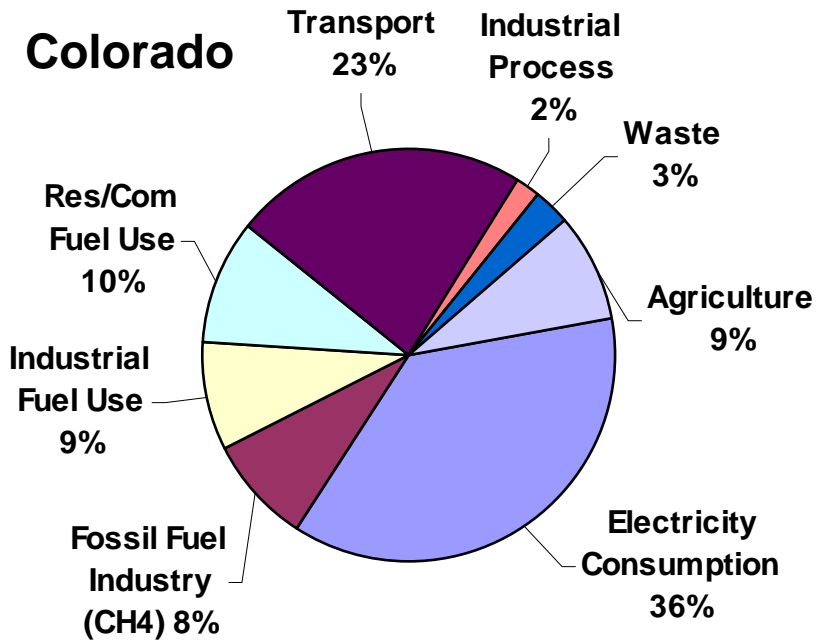
CDPHE Working with Governor's  
Policy and Energy Offices and the  
Department of Natural Resources to  
Devise a Strategic Plan

# GHG Inventory

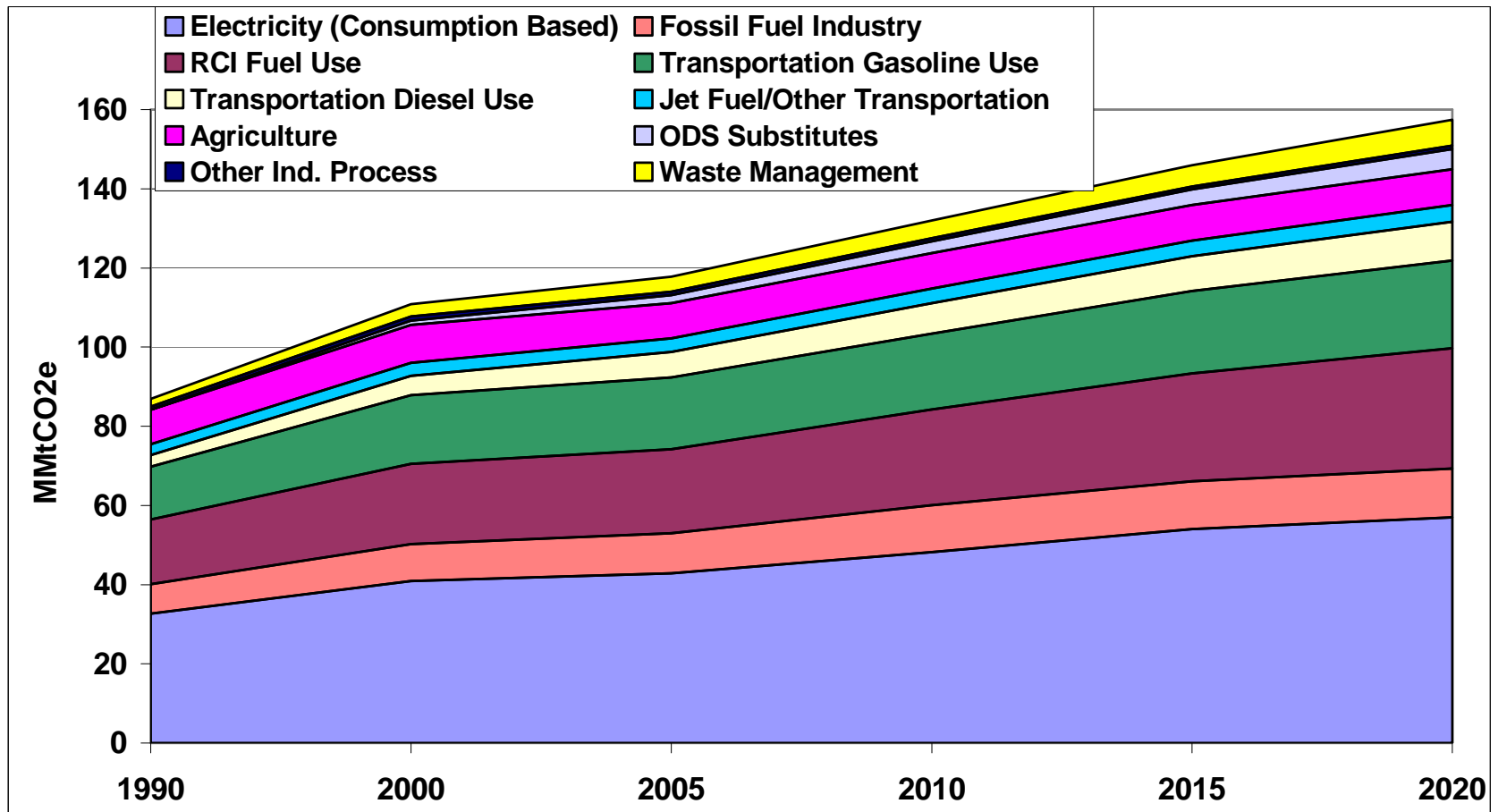
## Key Points

- Preliminary draft prepared by the Center for Climate Strategies with assistance from CDPHE
- Diagnosis of GHG emissions

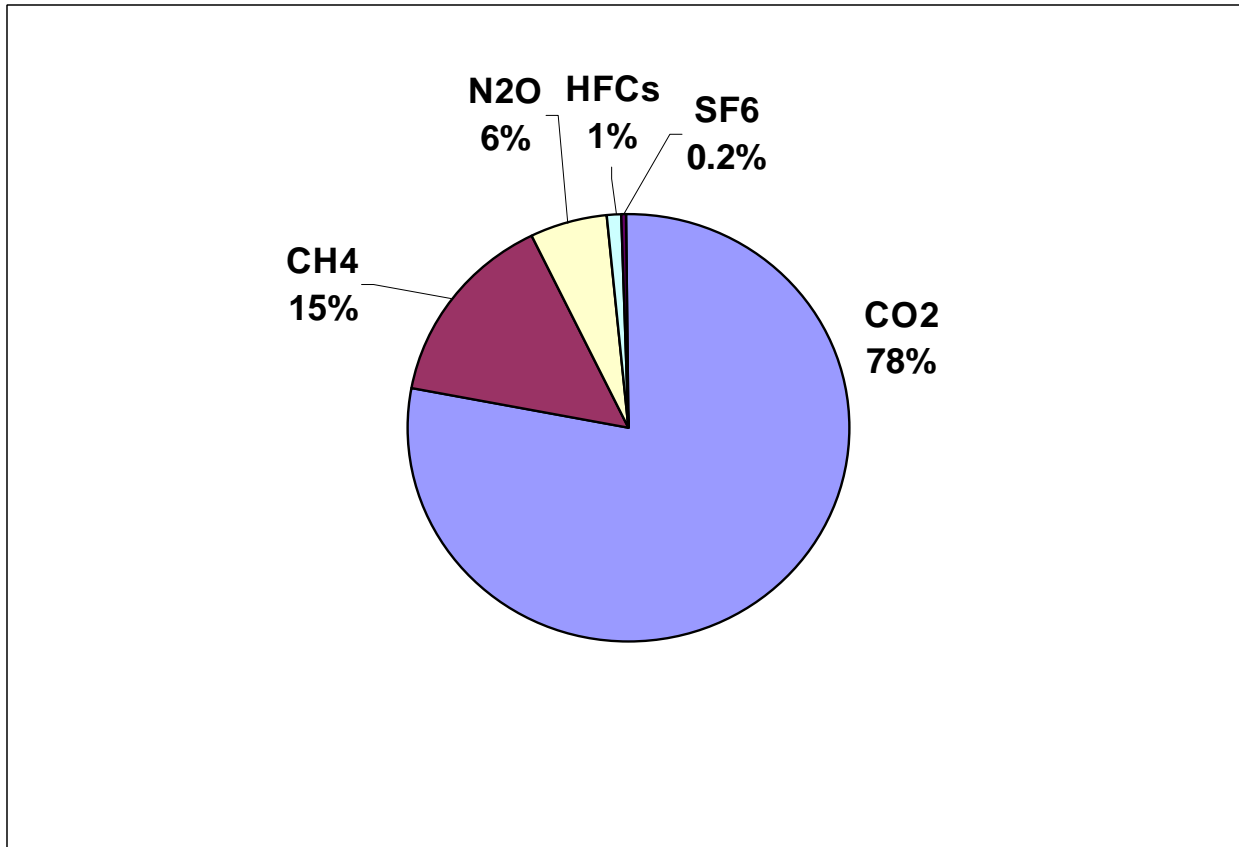
# Colorado & US Emissions By Sector Year 2000



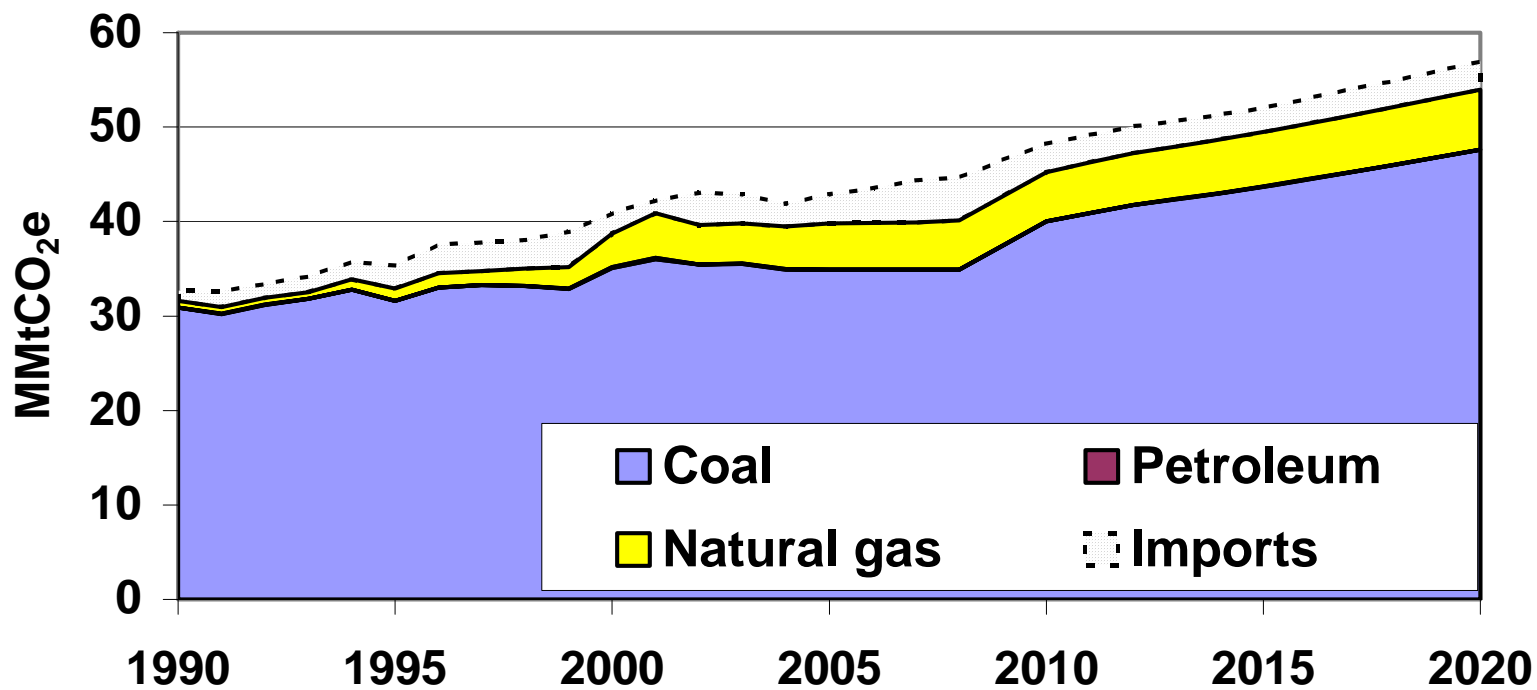
# Gross Colorado GHG Emissions By Sector 1990-2020



# Colorado Emissions By GHG Year 2000 (MMtCO<sub>2</sub>e Based)



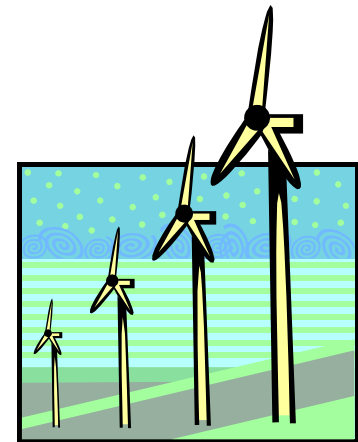
# Electricity



# Electricity GHG Emissions Reduction Strategies

## Renewable Energy

- **Solar**
- **Wind**
- **Biomass**
- **Hydroelectricity**



# Electricity GHG Emissions Reduction Strategies

## Renewable Energy

- **House Bill 1281: Renewable Portfolio Standard.**  
Expanded renewable energy portfolio standard: 20% by 2020 and 10% for electric coops and municipalities
- **House Bill 1279: Tax Credits for Renewable Energy**
- **House Bill 1087: Wind for Schools**



# Electricity GHG Emissions Reduction Strategies

## Renewable Energy: Transmission

- **Senate Bill 91: Renewable Resource Generation Development Areas**
- **Senate Bill 100: Energy Resource Zones Transmission Development**
- **House Bill 1150: Clean Energy Authority**

# Electricity GHG Emissions Reduction Strategies

## Cleaner Non-Renewable

- Emerging technologies
  - Integrated gasification combined cycle
  - Carbon capture and sequestration
  - Liquid fuel conversion w/ CCS

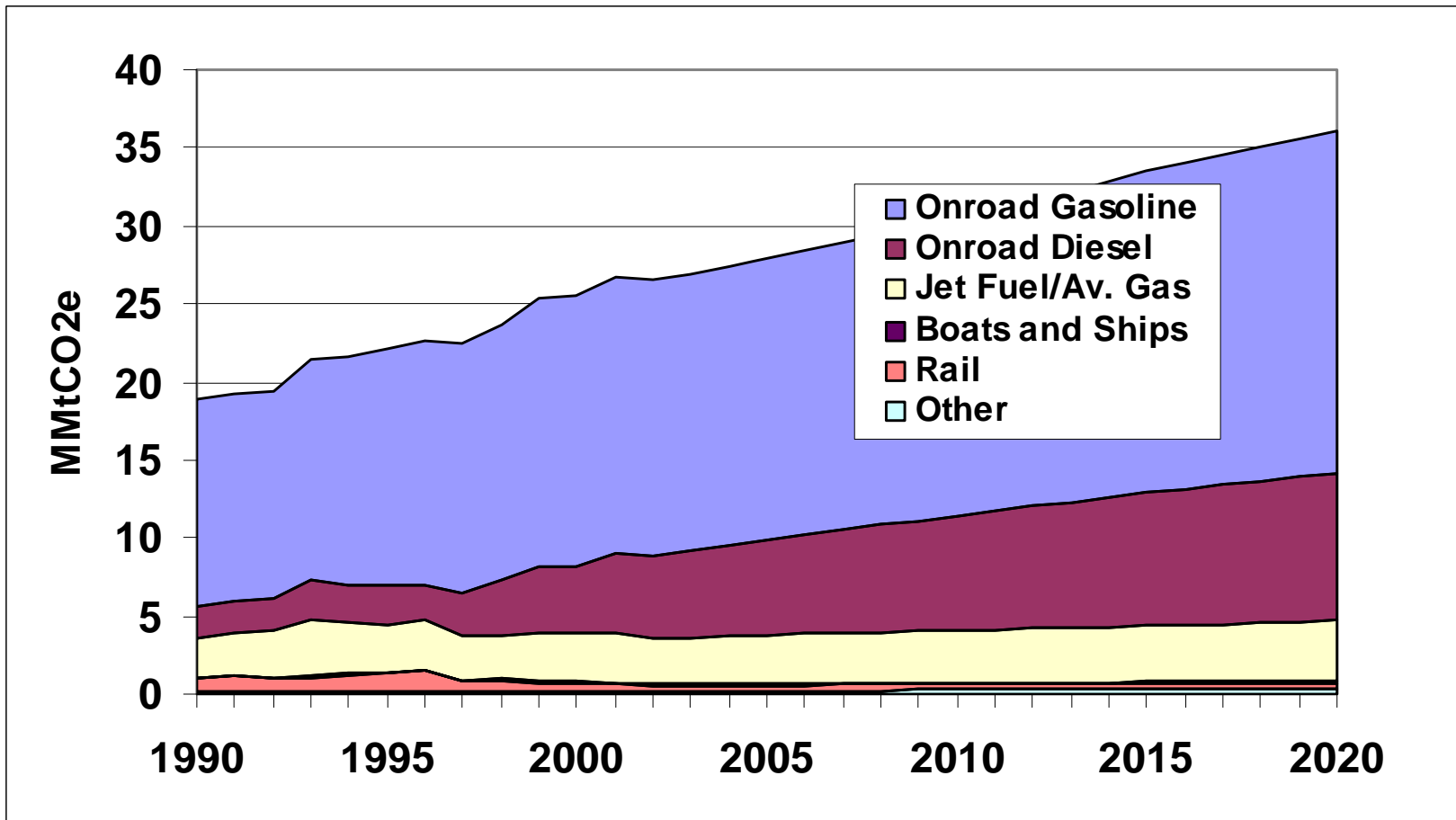


# Electricity GHG Emissions Reduction Strategies

## Cleaner Non-Renewable

- Emissions Performance Standard
- Low Carbon Portfolio Standard
- Cross-cutting measures

# Transportation



# Transportation GHG Emissions Reduction Strategies

- Clean Car Program/Emissions Standards
- Low Carbon Fuel Standard
- CAFE

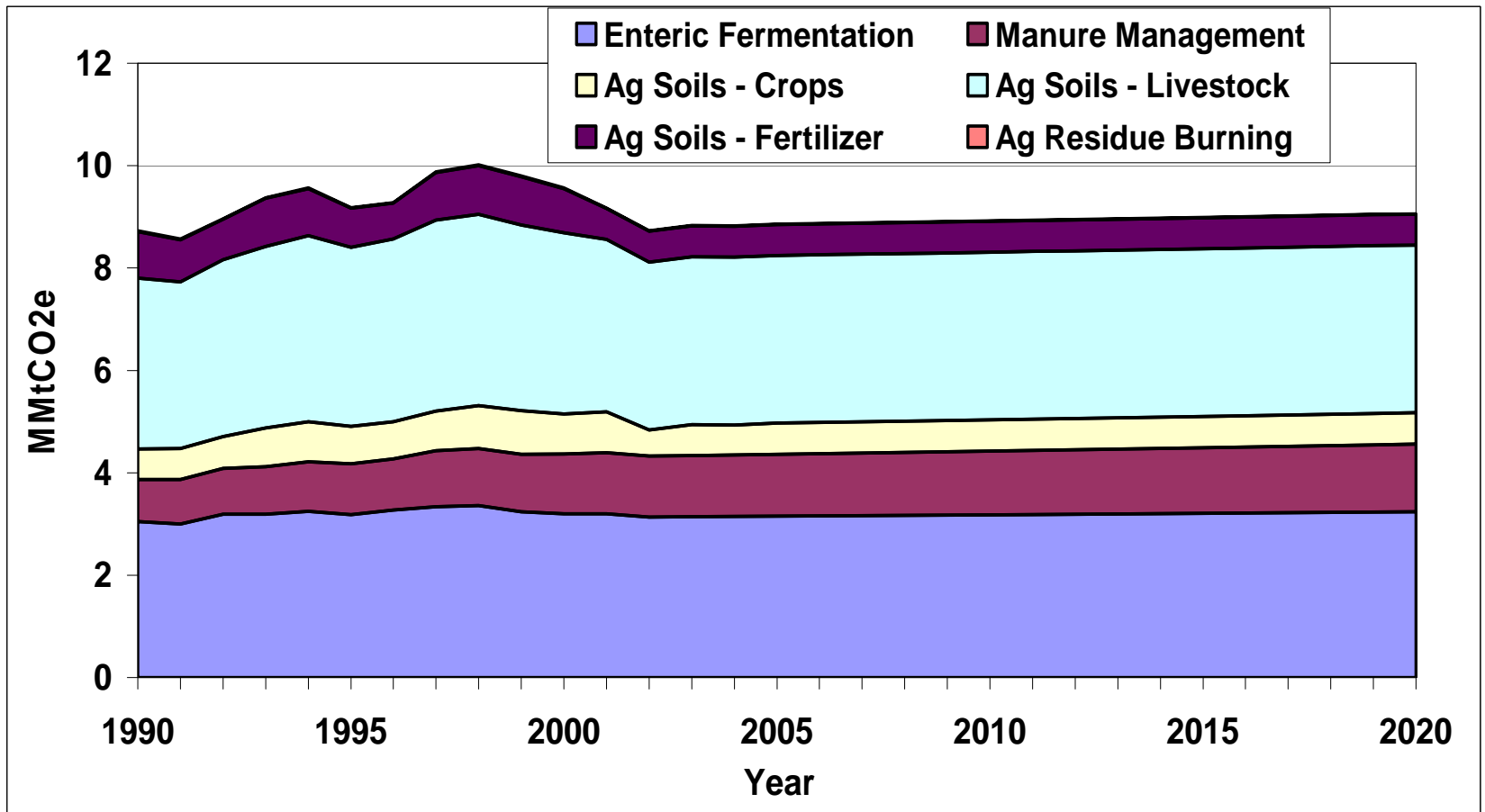


# Transportation GHG Emissions Reduction Strategies

Smart Growth Planning



# Agriculture



# Agriculture GHG Emissions Reduction Strategies

## Mitigation

- Soil Sequestration
- Reduced Emissions
  - Soil
  - Livestock



# Agriculture GHG Emissions Reduction Strategies

## Biomass Energies

- Ethanol
- Biodiesel
- Methane
- Energy Crops
- Agricultural Residues



# Agriculture GHG Emissions Reduction Strategy Incentives

- Marketable Carbon Credits
- Offsets
- Set Aside Programs
- Commodity Credit Payments/Subsidies
- Tax Credits



# GHG Emissions Reduction Strategies Affecting Multiple Sectors

- GHG Inventory and Multi-State Registry
- GHG Reduction Goal
- Efficiency and Conservation
- Market-Based Emissions Trading
- Carbon Taxes
- Offsets

# GHG Registry

- 36 States
- Committees
  - Programs and Protocols
  - Finance and Development
  - Stakeholder Advisory

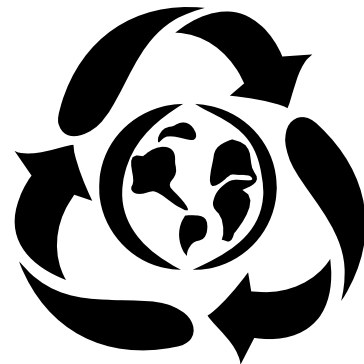


# GHG Reduction Goal

- **Example:** 15% below year 2005 levels by 2015. That would equate to a 32% reduction from business as usual levels in 2015.
- **Science:** Need 80% reduction below current levels by 2050.

# Efficiency and Conservation

- Building Codes
- Appliance Standards
- Rebates
- Tax Incentives
- Education
- And much more...



# Energy Efficiency

- House Bill 1037: Concerning Energy Efficiency
- Senate Bill 51: High Performance State Buildings
- House Bill 1309: School Energy Efficiency

# Greening Government Executive Order

- By fiscal year 2011-2012, achieve at least a 20% reduction in energy consumption and paper use below 2005-2006 levels
- By January 2008, develop energy management plan
- By June 2012, achieve a 25% reduction in petroleum consumption by state vehicles

# Market-Based Emissions Reductions: Cap and Trade

- Primary Components:
  - Cap
  - Compliance period
  - Freely tradable allowances: allocated or auctioned
  - Compliance options: reduce emissions, buy allowances, or buy offset credits
  - Enforcement: penalty for non-compliance
  - Safety Valve?

# Market-Based Emissions Reductions: Cap and Trade

- Cap-and-trade program consists of two basic requirements for the source:
  - (1) Source must measure, monitor, and report its emissions to a central registry account; and,
  - (2) At the end of the compliance period, source must hold sufficient allowances in its allowance account to cover all emissions in that compliance period.

# Market-Based Strategy

## Cap-and-Trade

- Regional Greenhouse Gas Initiative (RGGI)
  - 10 northeastern states
  - Electric sector
  - Initial cap approximately equivalent to 1990 emissions
  - First compliance period begins on January 1, 2009

# Market-Based Strategy

## Cap-and-Trade

- Western Climate Initiative
  - 6 States, 2 Canadian Provinces, 8 Observer Jurisdictions
  - Status and Process

# Offset Credit

- Offsets expand the cap on covered sources in exchange for reductions outside the sector
- To receive credit, the reduction should be real, surplus (or additional), verifiable, permanent, and enforceable (RSVP & E).

# Safety Valve

- Allows the regulated entities additional time to “true up” their emissions and allowances if the allowance price equals or exceeds a certain price per ton over a specified period of time.
- Offsets Safety Valve: expands offset possibilities if allowance price equals or exceeds a certain price per ton over a specified period of time.

# Carbon Tax

- Government assesses per unit charge for pollution
  - Pollution charge results in reduced pollution because pollution costs the firms money.
  - Firms will reduce pollution as long as it is less expensive to reduce rather than pay the charge.
  - Emissions reductions uncertain.

# Carbon Tax versus Cap and Trade

<ul style="list-style-type: none"><li>• Extent of emissions reductions uncertain</li></ul>	<ul style="list-style-type: none"><li>• Emissions reductions fixed by Cap</li></ul>
<ul style="list-style-type: none"><li>• Price of carbon set at level of tax</li></ul>	<ul style="list-style-type: none"><li>• Price of carbon is function of supply and demand in emissions market</li></ul>
<ul style="list-style-type: none"><li>• Both establish market signal to reduce emissions</li></ul>	<ul style="list-style-type: none"><li>• Both establish market signal to reduce emissions</li></ul>
<ul style="list-style-type: none"><li>• Source of revenue that can be used for complementary purposes</li></ul>	<ul style="list-style-type: none"><li>• Source of revenue can come from auction of allowances</li></ul>

# END

- Today's Discussion:
  - Inventory
  - Trends
  - Emissions Reduction Strategies

