Colorado Climate Project

Colorado Climate Action Panel
Agriculture, Forestry, and Waste Policy Work Group
Meeting #6
May 24, 2007

the ROCKY MOUNTAIN CLIMATE Organization

CCS
CENTER FOR CLIMATE STRATEGIES

Agenda

- Introductions
- Approval of draft summary of Policy Work Group (PWG) Call #5
- Review CAP Meeting Input on Straw Proposals
- Next Steps for the PWG
- Review and discussion of the Colorado GHG Inventory and Forecast
- Agenda, Time and Date for Next Meeting
- Public Input and Announcements

Ten Step Work Plan

- Develop initial GHG inventories and forecasts
- Identify possible GHG mitigation options
- Identify initial priorities for first round evaluation
- Evaluate GHG reduction potential, cost effectiveness, additional issues
- Identify potential barriers to consensus, alternatives
- Modify, add or subtract mitigation options as needed
- Evaluate cumulative results of mitigation options
- Iterate to consensus with new alternatives, with votes as needed
- Aggregate options into implementation scenarios
- Finalize recommendations and report language

CAP Meeting #4 Issues

- Discussion of input on Straw Proposals

AFW PWG Policy Options

Revised Number	***Preliminary Title***	***PWG Volunteers (lead volunteer in bold)***
AFW-1	*Agricultural Crop Management*	*Tony Frank[1], Mike Bowman,* ***Keith Paustian***
AFW-2	*Manure Management and Energy Utilization*	*Mike Bowman,* ***Meg Collins****, Susie Gordon*
AFW-3	*Reductions in On-Farm Energy Use*	***Tony Frank[1]****, Tom Compton*
AFW-4	*Biodiesel Production*	***Tony Frank[1]****, Keith Paustian, John Ashworth*
AFW-5	*Ethanol Production*	***Keith Paustian****, Tom Compton, Mike Bowman, Tony Frank,[1] John Ashworth*
AFW-6	*Preserve Lands with Carbon Storage Value*	***Tim Sullivan****, Tom Compton, Will Shafroth, Tom Fry*
AFW-7	*Biomass Feedstocks for Energy Production*	***Mike Bowman****, Mike Ryan, Tom Fry, Lynda Joyce*
AFW-8	*Forestry Programs to Enhance GHG Benefits*	***Mike Ryan****, Tom Fry, Tim Sullivan*
AFW-9	*Prevent Landfilling of Unprocessed Organic Material*	***Susie Gordon****, Eric Lombardi*
AFW-10	*Landfill Methane Energy Programs*	***Eric Lombardi****, Susie Gordon*

[1] *With the Farmer's Union.*

Next Steps for the PWG

- PWG volunteers help draft the following sections:
  - Policy Description
  - Policy Design
  - *Existing Policies/Programs In Place*
  - *Implementation Mechanisms*
  - *Additional Benefits and Costs*
  - *Feasibility Issues*

Next Steps (continued)

- CCS drafts the remaining sections
  - Types of GHG Reductions
  - Estimated GHG Savings and Costs
  - Key Uncertainties

Inventory and Forecast of Colorado GHG Emissions

- Preliminary analysis for further discussion and revision
  - Inventory of historical emissions from 1990 to most recent data year
  - Projection of emissions to 2020
- Prepared by CCS for Colorado Department of Public Health & Environment (CDPHE) under contract to the Western Regional Air Partnership (WRAP)

Coverage

- Six gases per USEPA and UNFCCC guidelines
  - Carbon Dioxide (CO2), Methane (CH4), Nitrous Oxide (N2O, Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur Hexafluoride (SF6)
  - Black Carbon considered separately
- All major emitting sectors
  - Electricity
  - Fossil Fuels
  - Residential, Commercial, Industrial Fuel Use
  - Transportation
  - Agriculture, Forestry and Waste
  - Industrial Processes and Other Sources

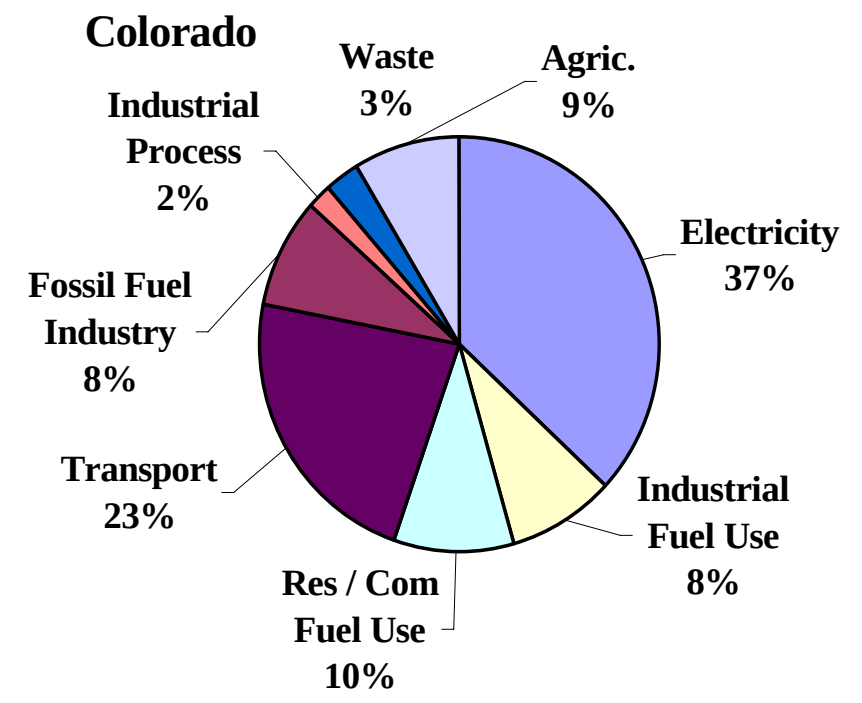
Inventory Approach

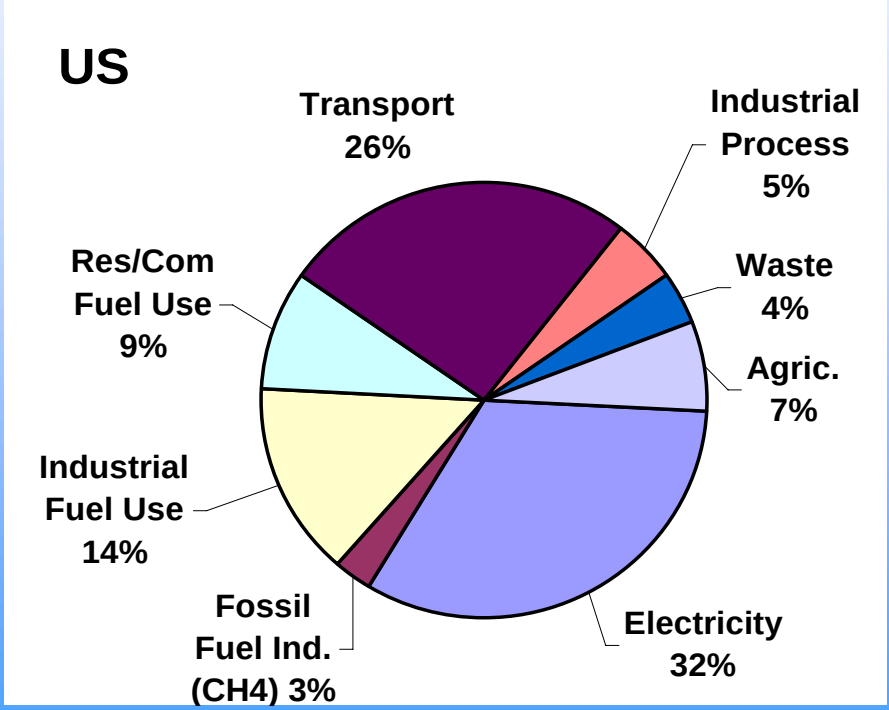
- Standard US EPA and UN methodologies, guidelines, and tools
- Emphasis on transparency, consistency, and significance
- Preference for Colorado or regional data, where available
- Consumption and production-basis emissions from electricity generation
  - Very simplified approach used for initial analysis

Projection Approach

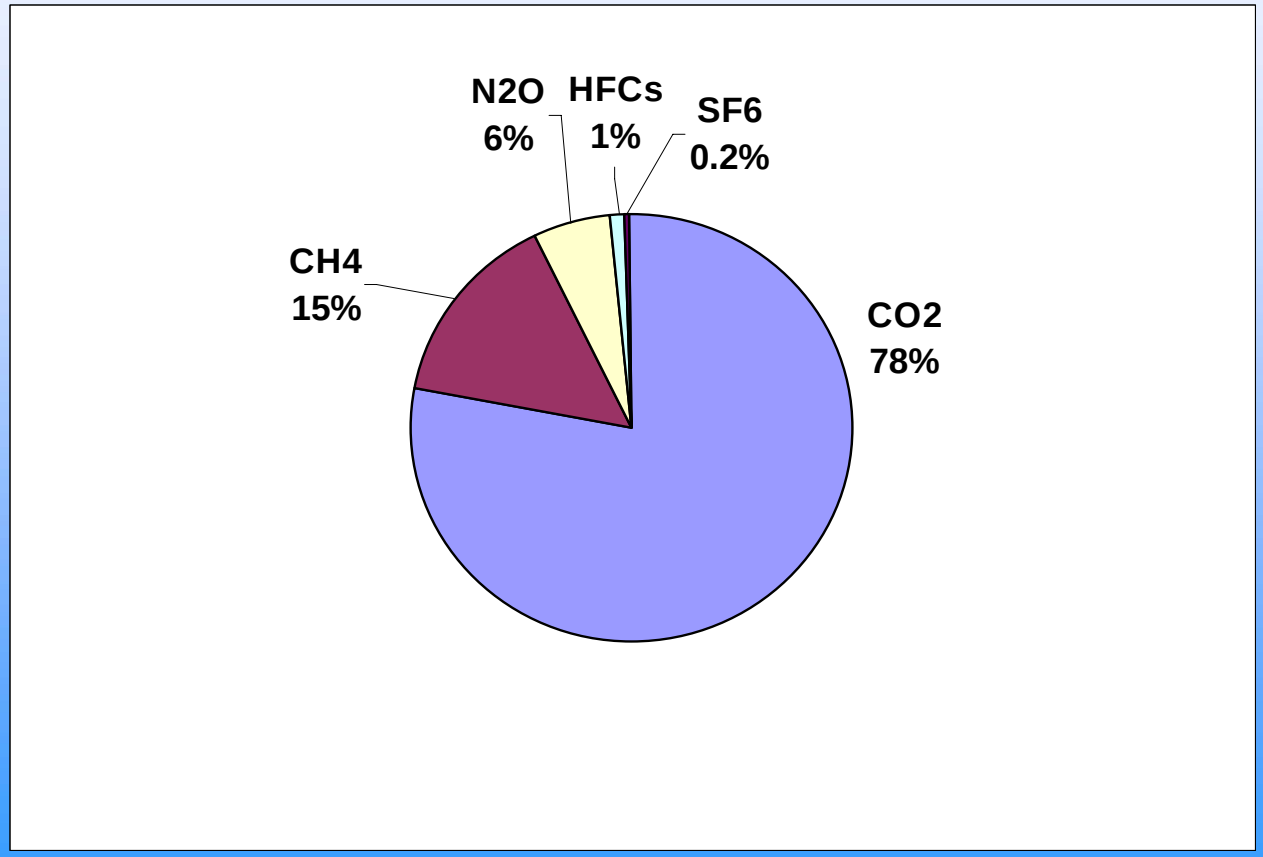
- Reference case assumes no major changes from business-as-usual (BAU)
  - Includes approved policies and actions to the extent possible (e.g., Energy Efficiency, Renewable Energy)
- Growth assumptions from existing sources
  - US Census and Bureau of Labor & Statistics
  - US Energy Information Administration

Colorado & US Emissions By Sector, Year 2000

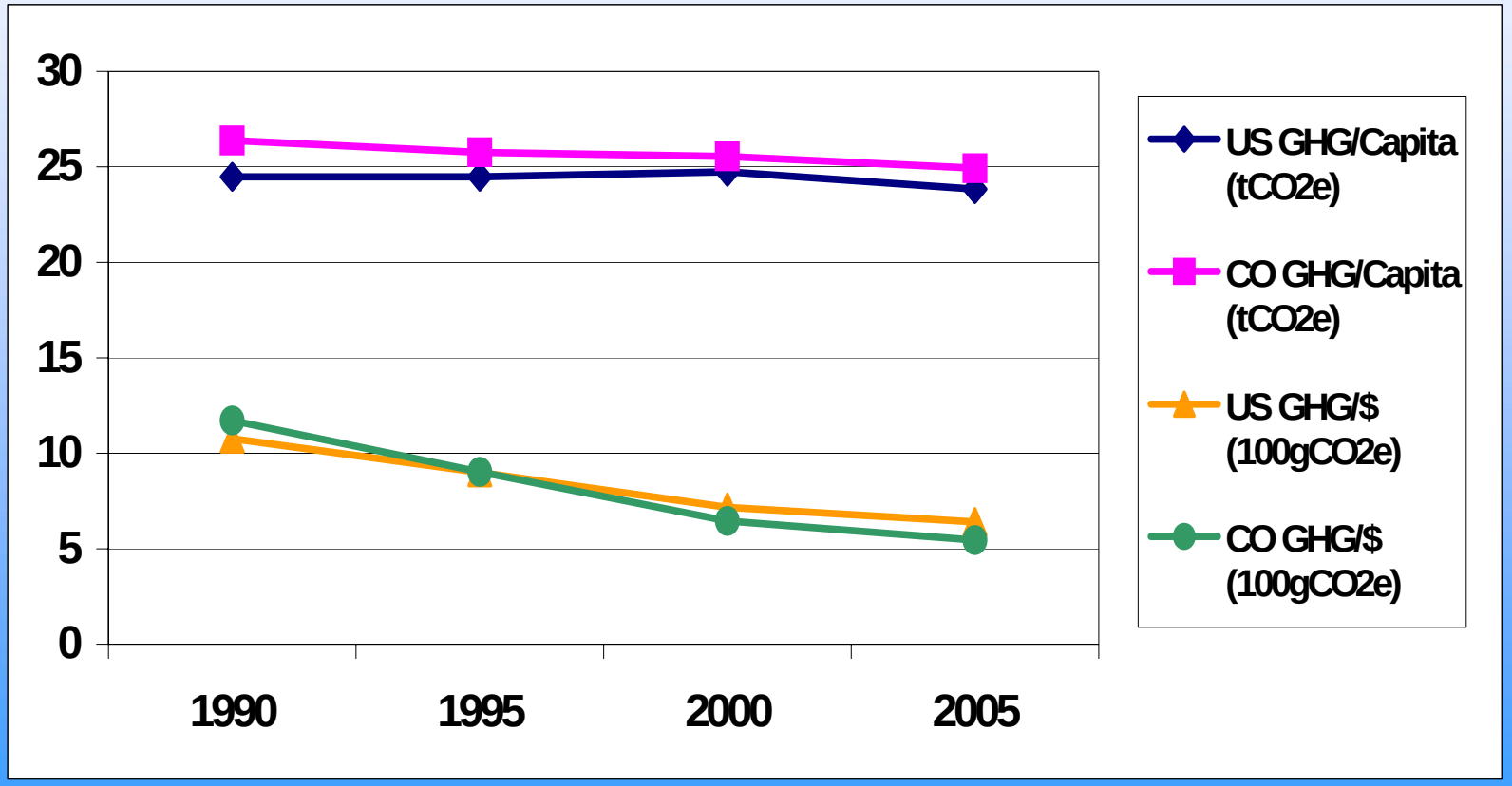




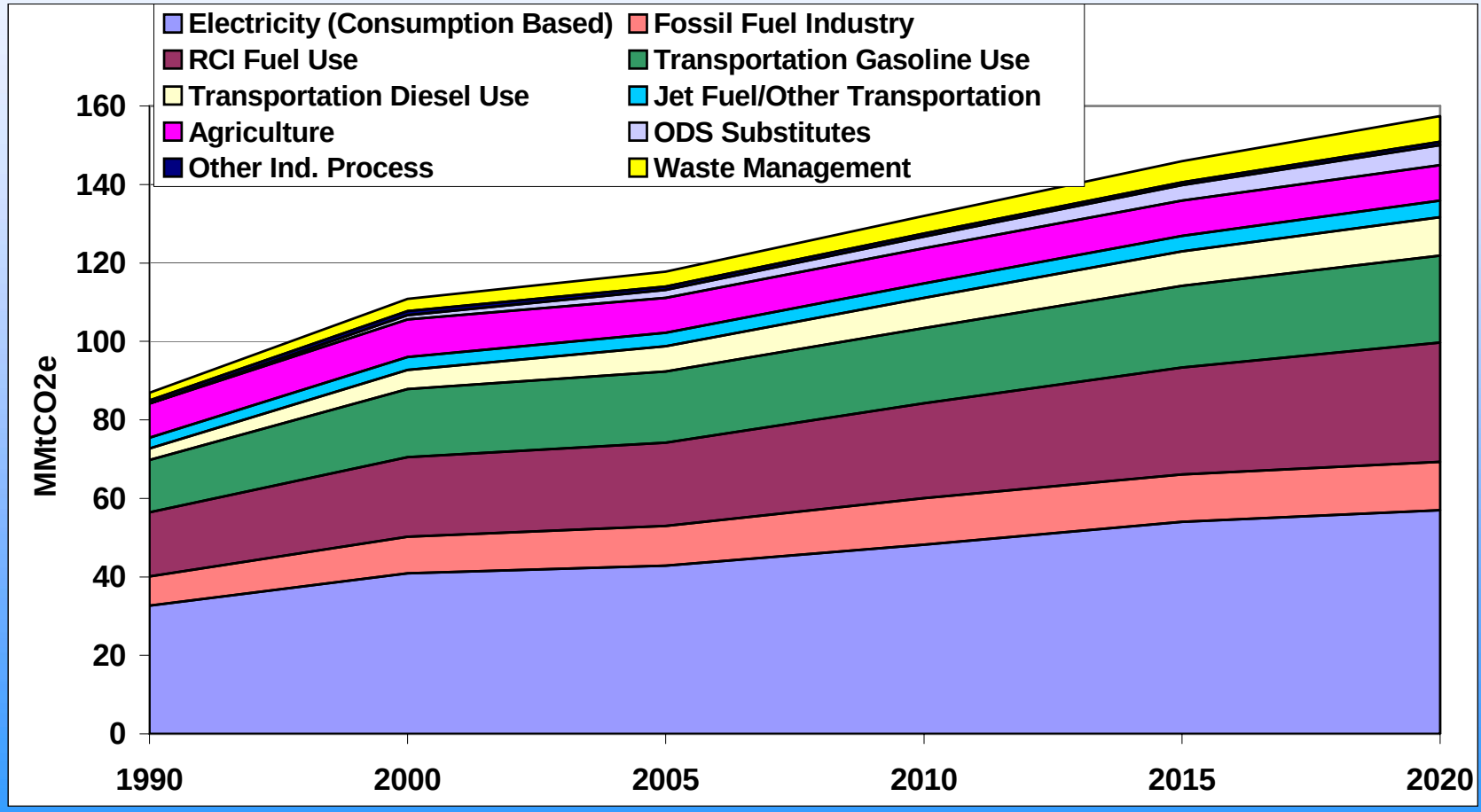
Colorado Emissions By GHG, Year 2000 ($MMtCO_2e$ Based)



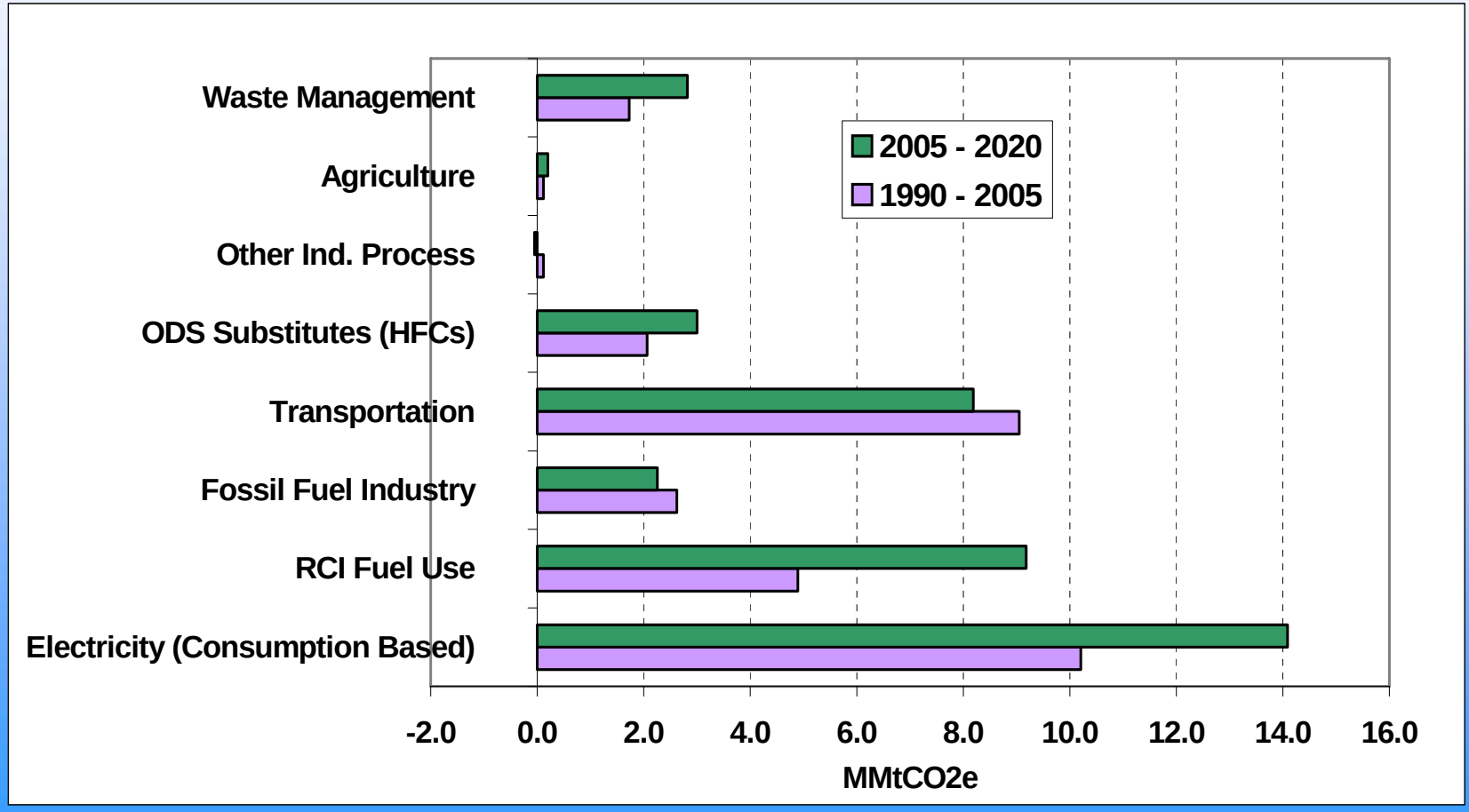
Per Capita and GSP/GDP GHG Emissions, 1990-2002



Gross Colorado GHG Emissions By Sector, 1990-2020



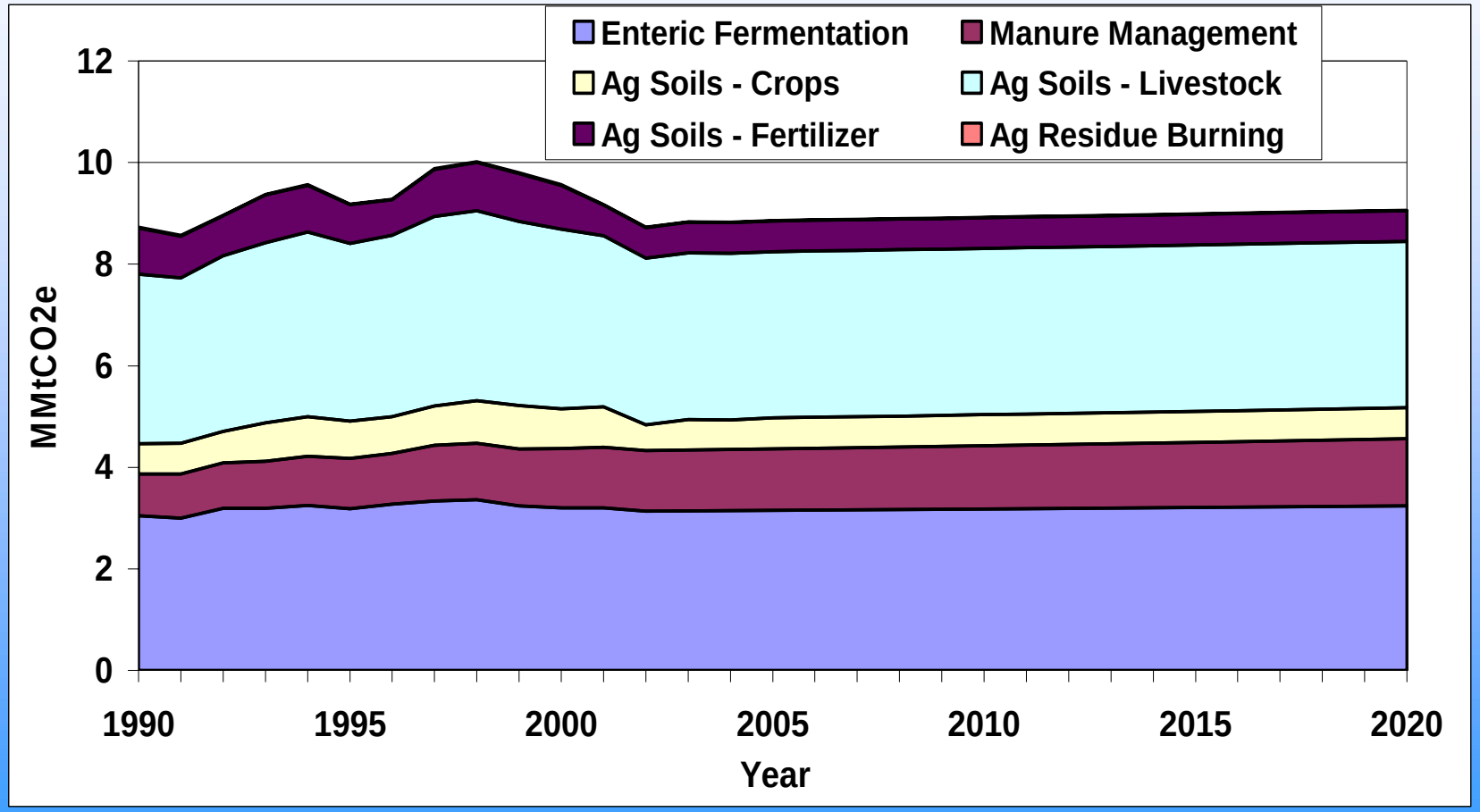
Colorado Emissions Growth
(MMtCO_2e Basis)



Key Points

- Preliminary draft prepared by CDPHE and CCS under WRAP project
- Preliminary draft for PWG and CAP review and revision, as needed
- Helpful for diagnosis of GHG emissions, but not a baseline for modeling or compliance for individual sources
- Consumption and Production methods
- Net and Gross methods

Agriculture



Agriculture

- Data Sources
  - Crop Acreage: USDA/NASS
  - Livestock: USDA/NASS
  - Fertilizer: Fertilizer Institute
- Methods
  - Crops: SGIT emission factors and crop acreage
  - Livestock: SGIT emission factors and livestock populations
  - Fertilizer: SGIT fertilizer consumption
  - No growth assumed for Ag Soils and Ag Residue Burning emissions
  - 1997 USDA estimates for Ag soil carbon sinks (-2.0 MMt)

Agriculture

- Key Assumptions
  - No growth or significant change in crop production for the future
  - Dairy cattle population growth (1.8%/year); no growth for other livestock categories
    - Based on Colorado Agricultural Statistics Service data
- Key Uncertainties
  - Projection data

Forestry

Carbon Pool	$MMtCO_2e/yr$
Live Trees	-15.3
Standing Dead Trees	-1.5
Live Understory	-0.9
Down and Dead Trees	-1.0
Forest Floor	-5.2
Soils	-7.1
Harvested Wood Products	-0.8
Total	**-31.8**

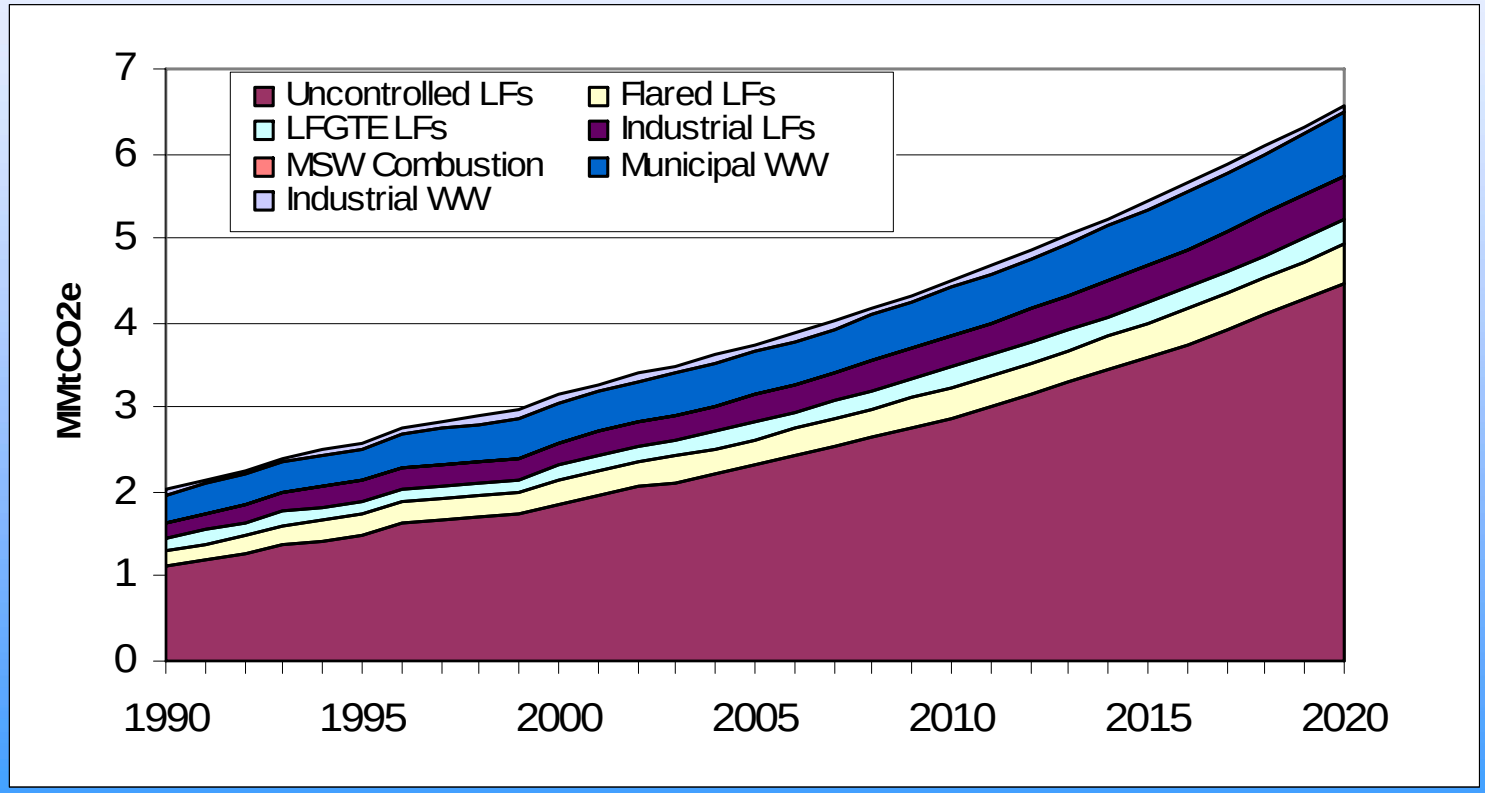
Forestry

- Data Sources
  - USFS carbon stock for 2 inventories (1983/1984-2005) based on FORCARB2 model
  - USFS also provides modeled estimates for harvested wood products
- Methods
  - Forestry: USFS FORCARB2 carbon stock change model provides carbon pools for each inventory cycle
  - Flux calculated for each pool based on difference in time between inventory cycles
  - Carbon pool data for the 1983/1984-2005 time-period used to quantify flux.

Forestry

- Key Assumptions
  - 1983-2005 carbon stock change representative of current conditions
  - No significant change in sequestration from 2006-2020
- Key Uncertainties
  - Effects of future development on forested acreage
  - Effects of near-term climate change on forest sequestration levels
  - Effects of increasing wildfire activity on sequestration levels

Waste Management



Waste Management

- Data sources
  - EPA LMOP Database
  - CDPHE Survey on landfills
  - CDPHE data on WW flows for meat/poultry processors
  - State population and SGIT default data for municipal WW treatment
- Methods
  - SGIT with data sources above
  - CCS post-processing to account for controls and growth

Waste Management

- Key Assumptions
  - Growth Rates
    - Landfills – based on historic emissions growth
    - Industrial WW – held constant at 2005 levels
    - Municipal WW – CO population projections
- Key Uncertainties
  - Future controls applied to uncontrolled landfills
  - Industrial landfills – SGIT default of 7% of municipal landfills
  - Industrial WW – growth for meat/poultry; lack of data for pulp/paper and food/vegetable processing

Next PWG Meeting

- Agenda:
  - Review progress on Policy Options
  - Discuss Remaining Steps on Policy Option Development
  - Continue review and potential revision of Colorado GHG inventory and forecast, as needed
- Date & Time: see next slide
- Next CO CAP Meeting: 7/12/2007

Remaining PWG Meetings

- CAP Meeting Schedule: Late July or early August; 9/11 or 9/12.
- Suggested PWG Dates: 6/15; 7/13; 8/2 or 8/3.

Public Input, Announcements