



Colorado Climate Action Panel
Energy Supply
Policy Work Group
Meeting #2
February 14, 2007



Agenda

- Introductions
- Approval of draft summary of Policy Work Group (PWG) Call #1
- Review and discussion of the Catalog of States Actions
- Review and discussion of the Colorado GHG Inventory and Forecast
- Next Steps of PWG's
- Agenda, Time and Date for Next Meeting
- Public Input and Announcements

Catalog of States Actions

- Refer to updated handout
 - Draft preliminary rankings of GHG potential, cost/cost savings for review and revision
 - Notation of actions from AZ, NM and MT
 - Supplemental descriptions of catalog actions
 - Addition of new potential actions

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

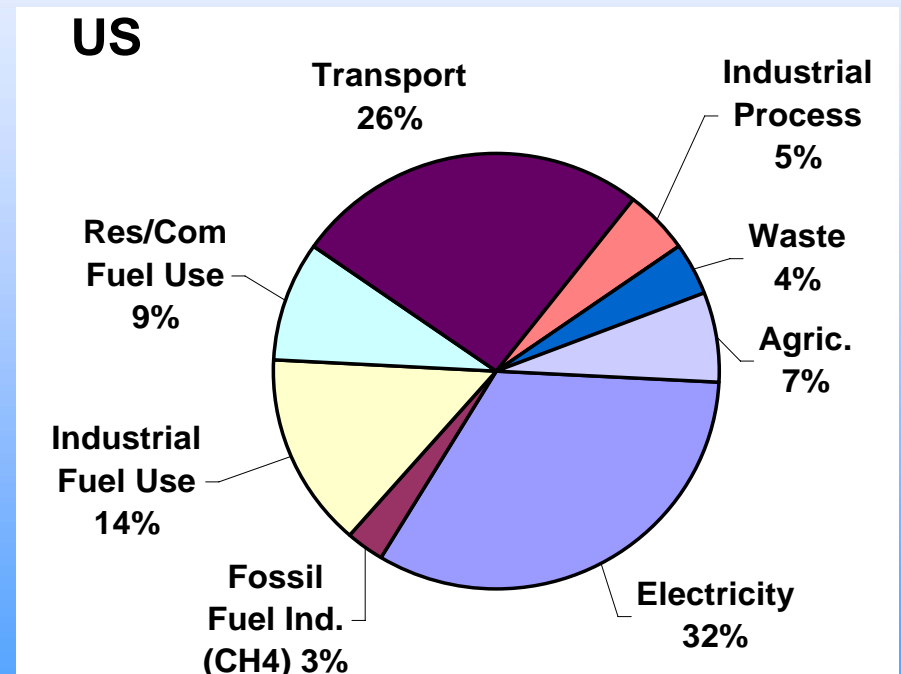
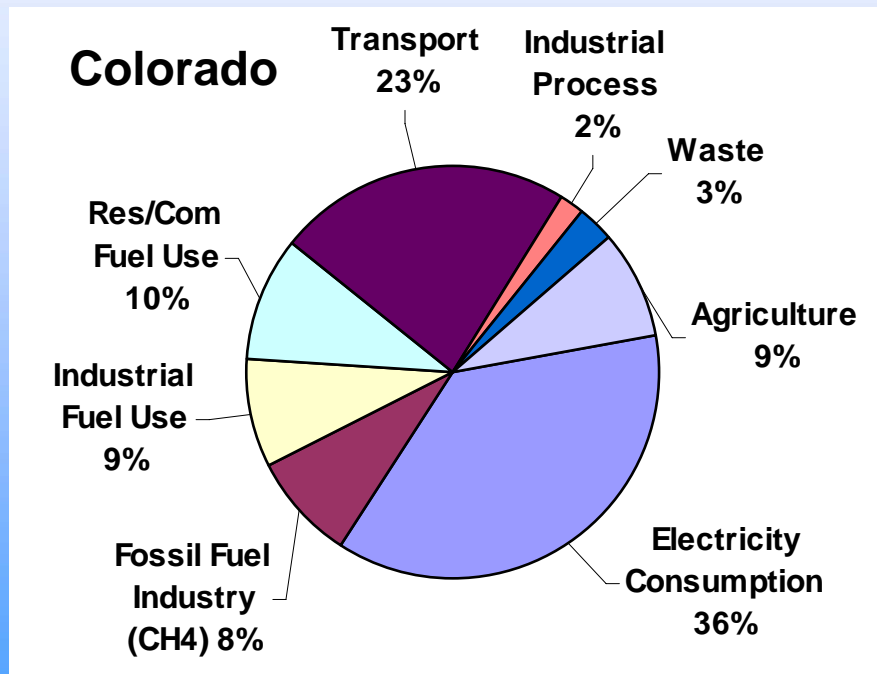
Inventory Approach

- 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

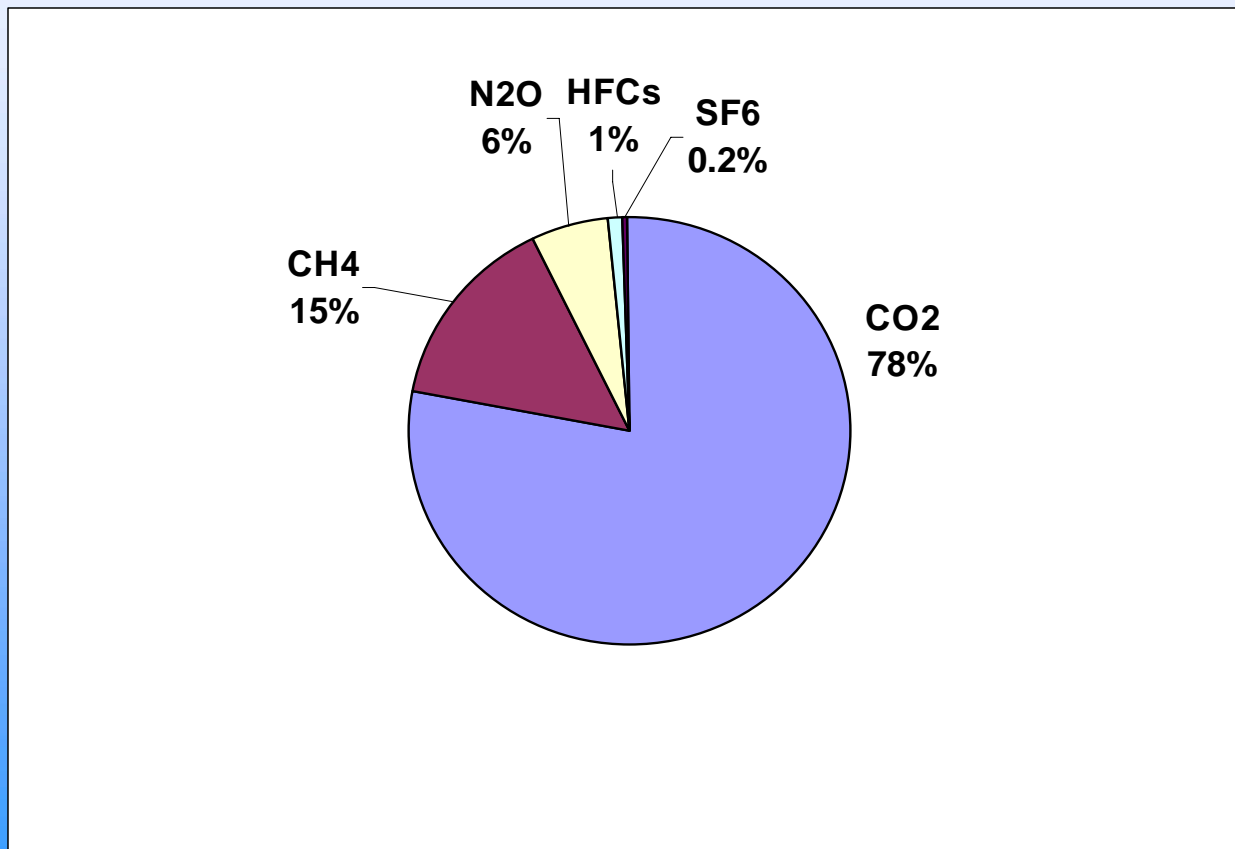
Projection Approach

- 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

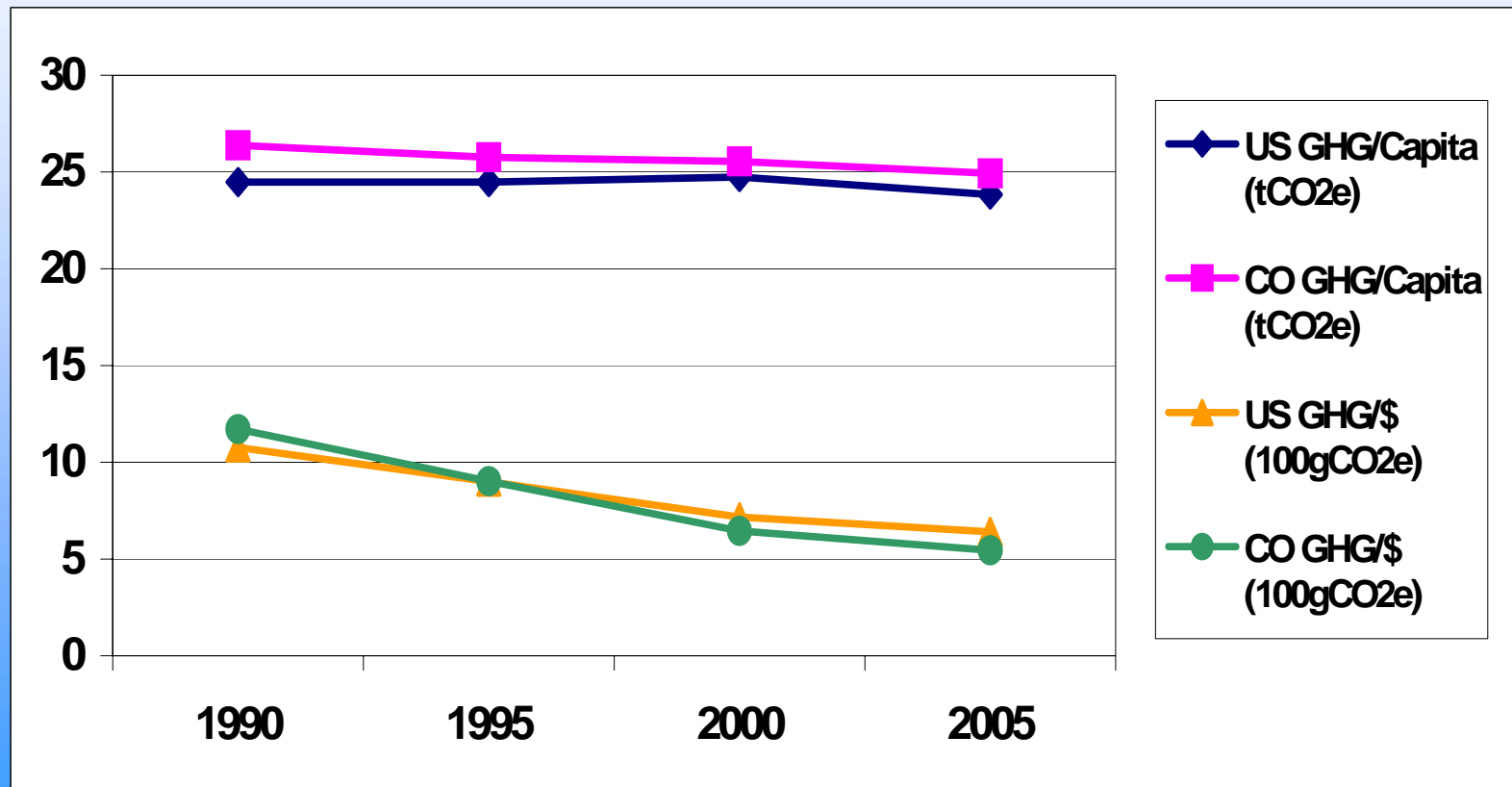
Colorado & US Emissions By Sector, Year 2000



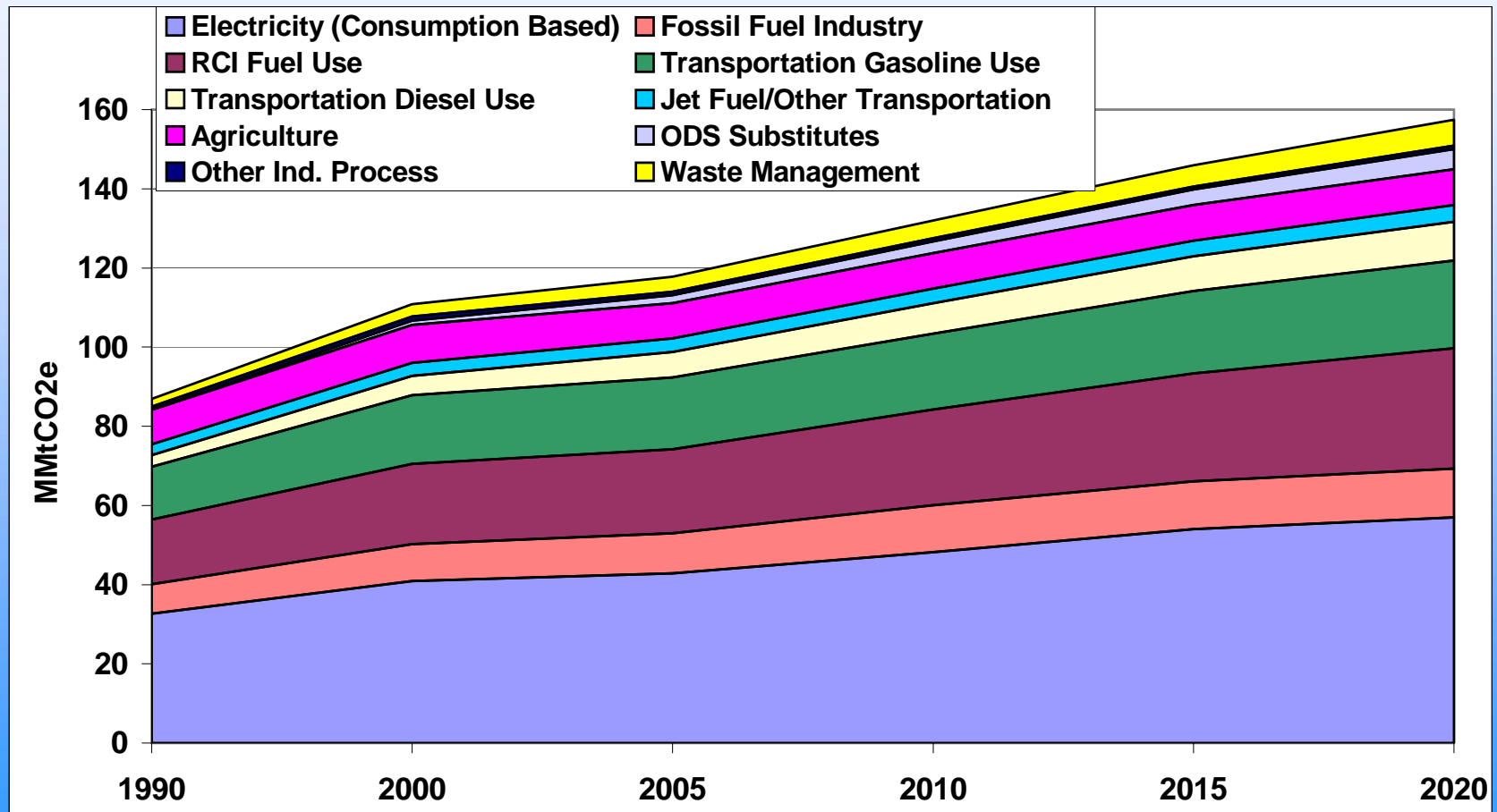
Colorado Emissions By GHG, Year 2000 (MMtCO₂e Based)



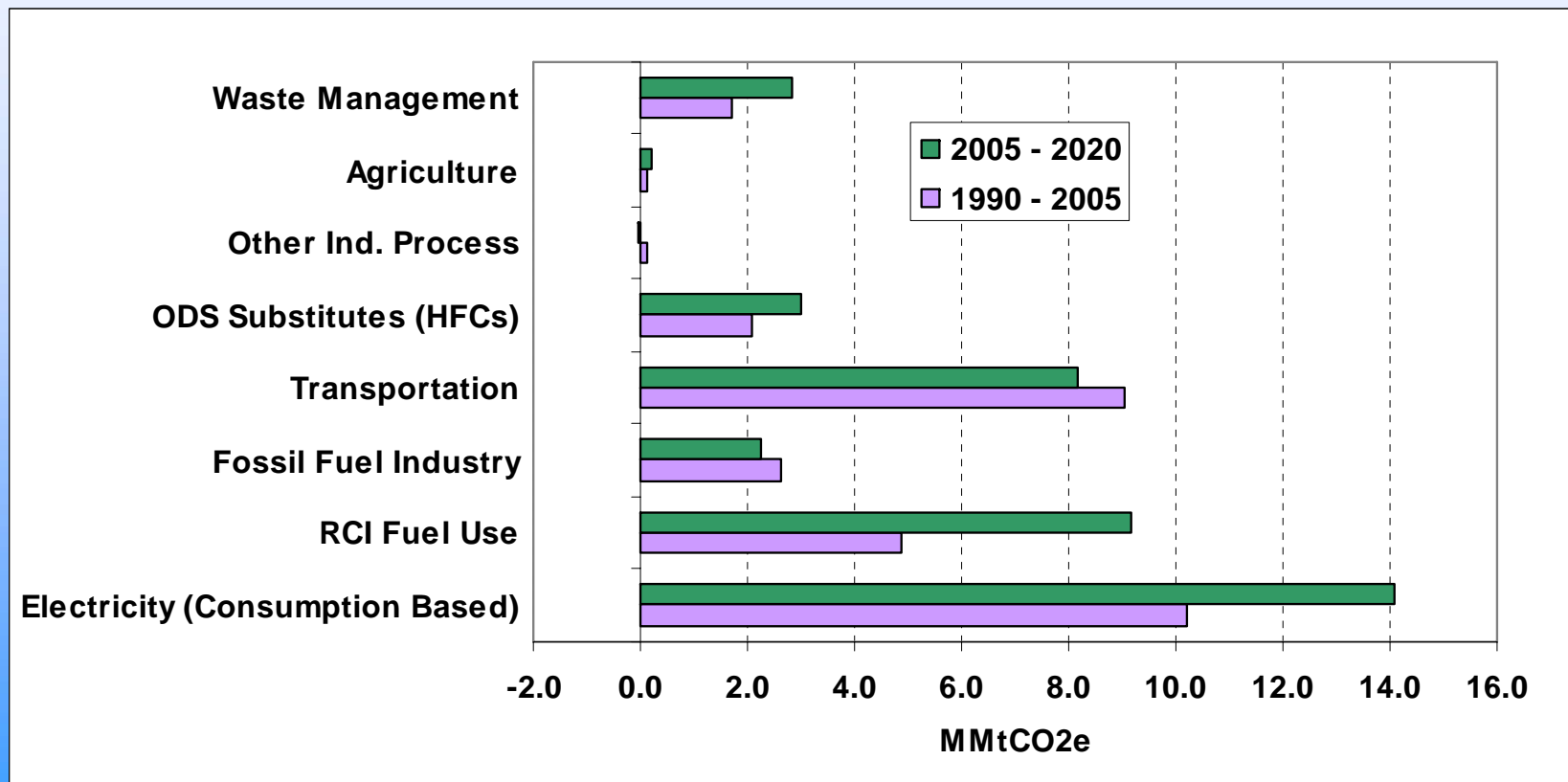
Per Capita and GSP/GDP GHG Emissions, 1990-2002



Gross Colorado GHG Emissions By Sector, 1990-2020



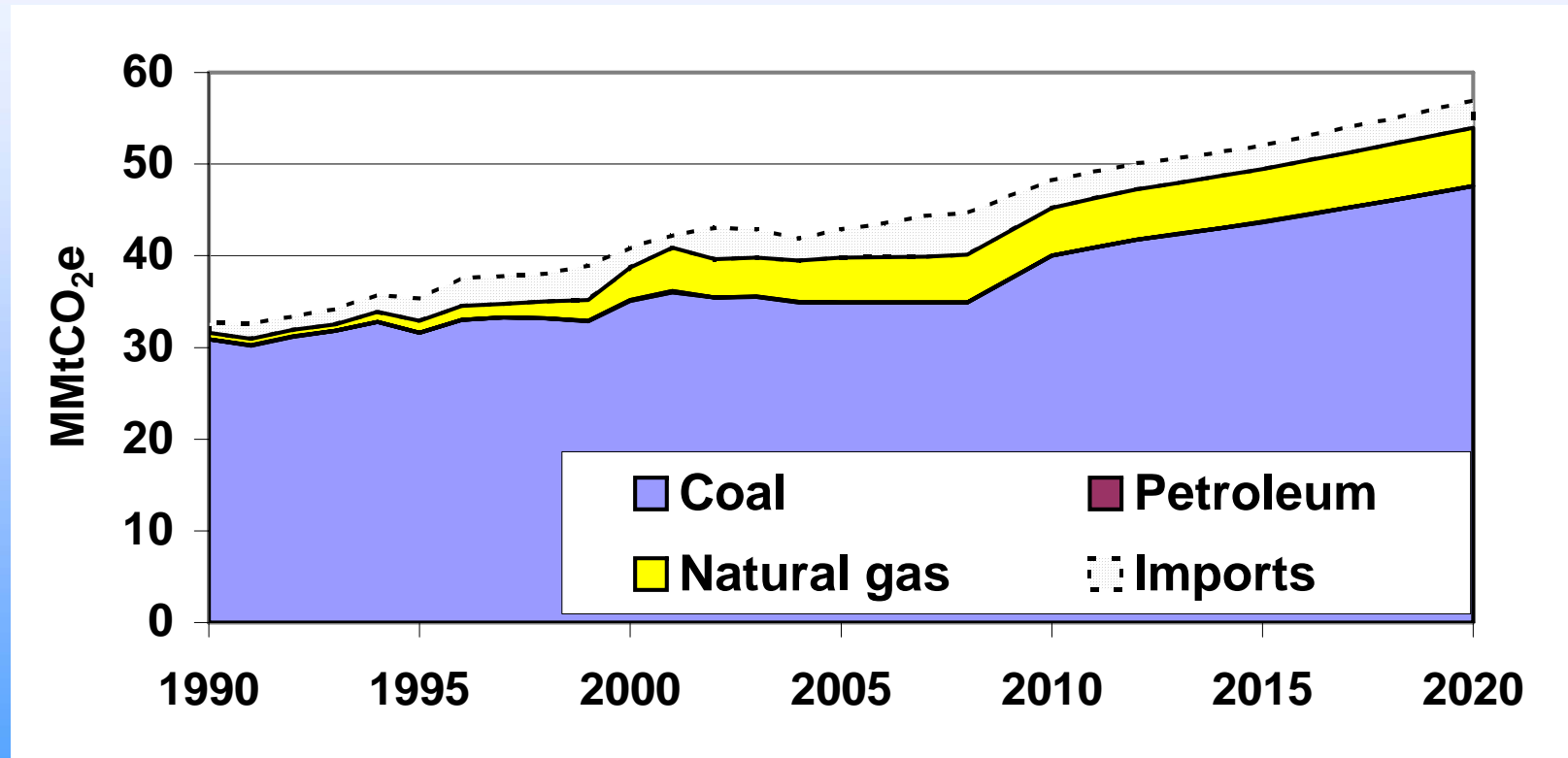
Colorado Emissions Growth (MMtCO₂e Basis)



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 options
- Consumption and Production methods
- Net and Gross methods

Electricity



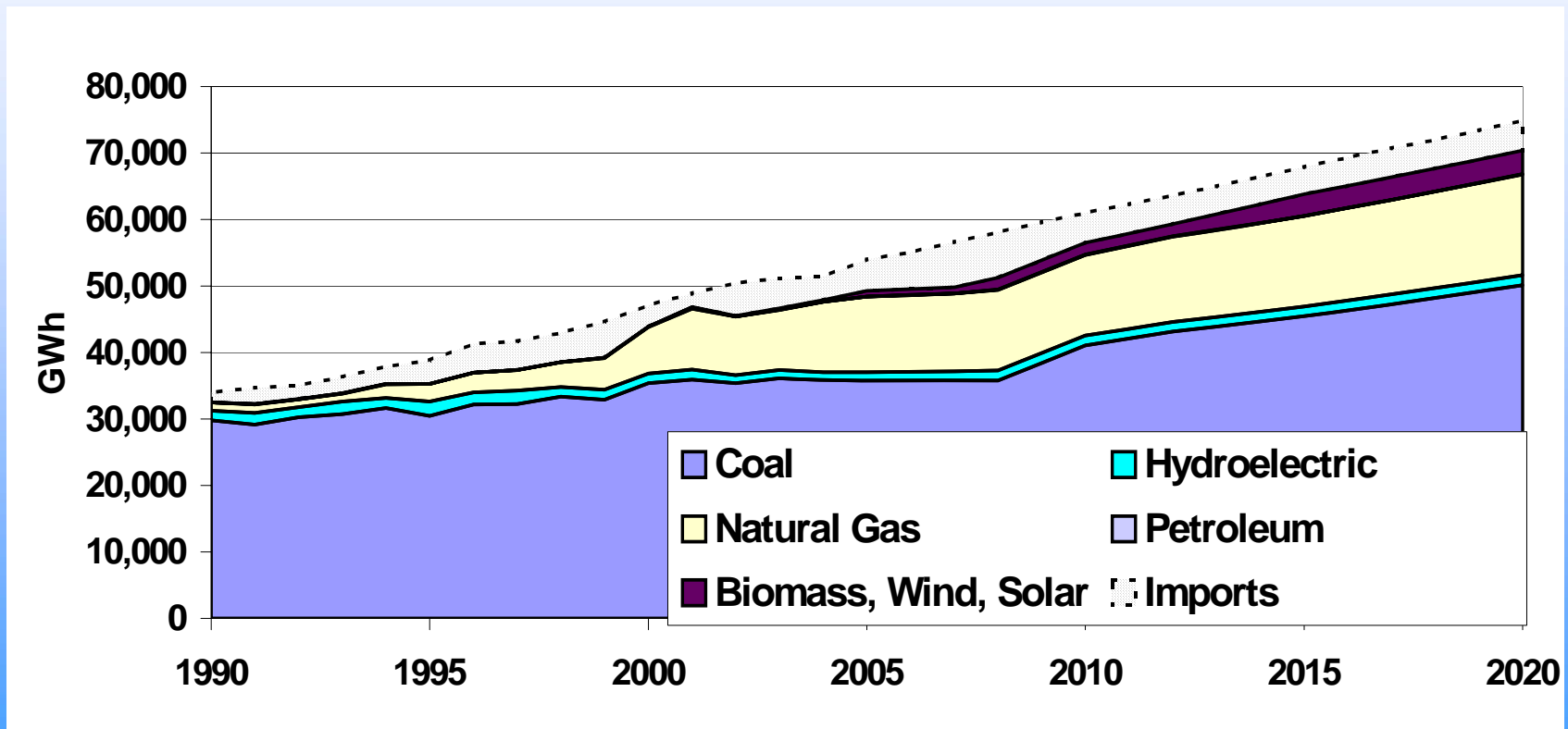
Electricity

- Data Sources
 - US DOE, EIA State Energy Data
 - Historic energy consumption and electricity sales
 - Colorado's Electricity Future, Xcel/PSCo website
 - Projected electricity sales
 - Proposed plants and generation through 2010
 - US DOE, Annual Energy Outlook
 - Projected generation, amount and type, 2010-2020
- Methods
 - Historic – use energy consumption and emission factors
 - Projections for energy based on growth and mix of new generation, emissions based on energy X emission factors

Electricity

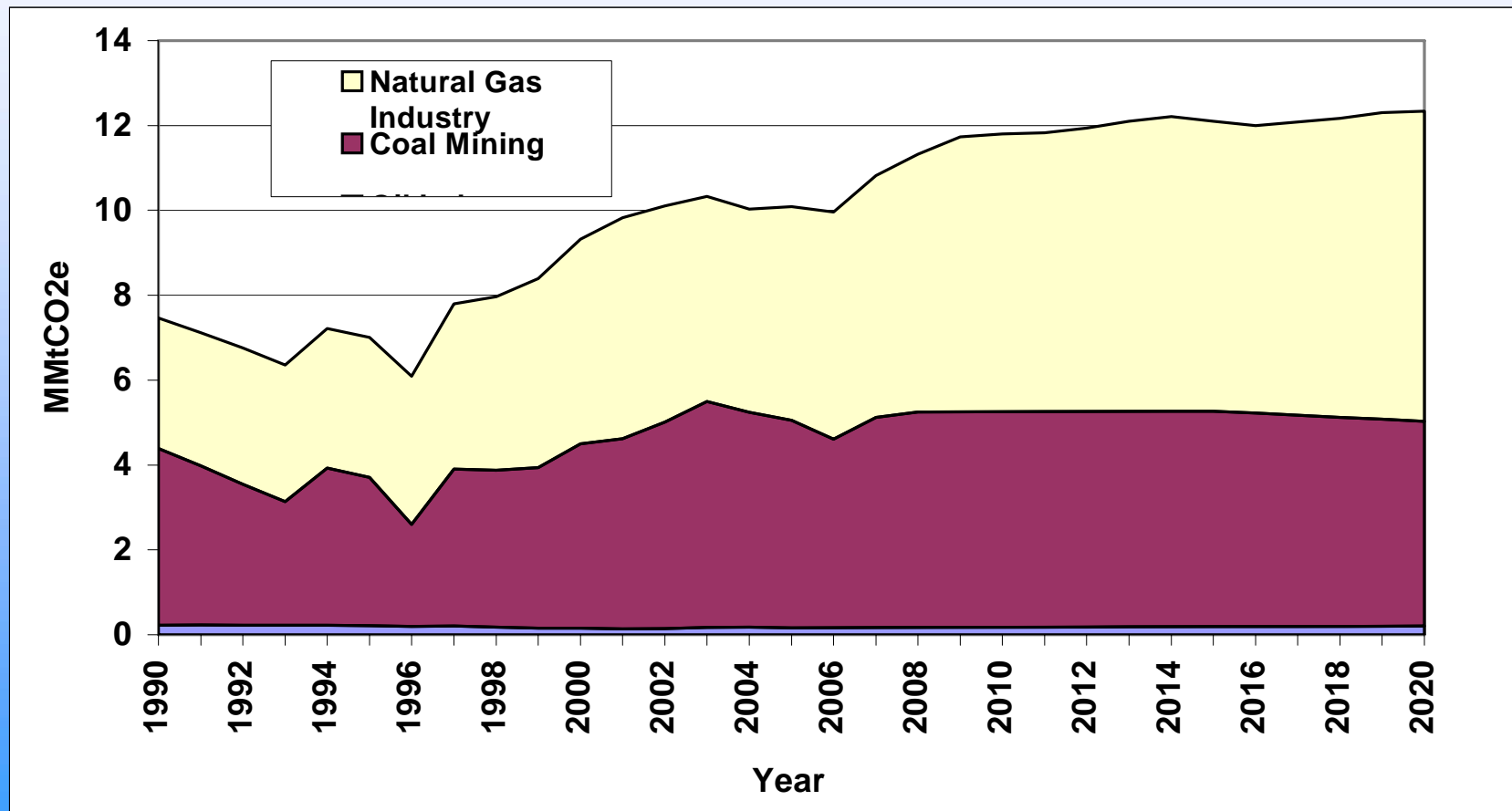
- Key Assumptions
 - Electricity sales grow at 2.9% to 2010, 2.1% to 2020
 - Generation grows at 2.8% to 2010, 2.2% to 2020
 - RPS met by IOUs and 4 public utilities (65% of sales), 10% of sales by 2015, wind and solar
 - New non-renewables plants
 - 90% coal / 10% natural gas for 2007 to 2010
 - 75% coal / 25% natural gas for 2011 to 2020
- Key Uncertainties
 - Amount of new generation / mix of non-renewables
 - Source of electricity imports and exports

Electricity



Source: Colorado Energy Plan, 2005

Fossil Fuel Production



Fossil Fuel Production

- Data sources
 - Natural Gas – Gas Facts, US DOE (wells, pipelines, processing)
 - Oil Industry – US DOE (oil produced and refined)
 - Coal Mining – US EPA National GHG Inventory
- Methods
 - Based on US State GHG Inventory Tool
 - Activity x emission factors

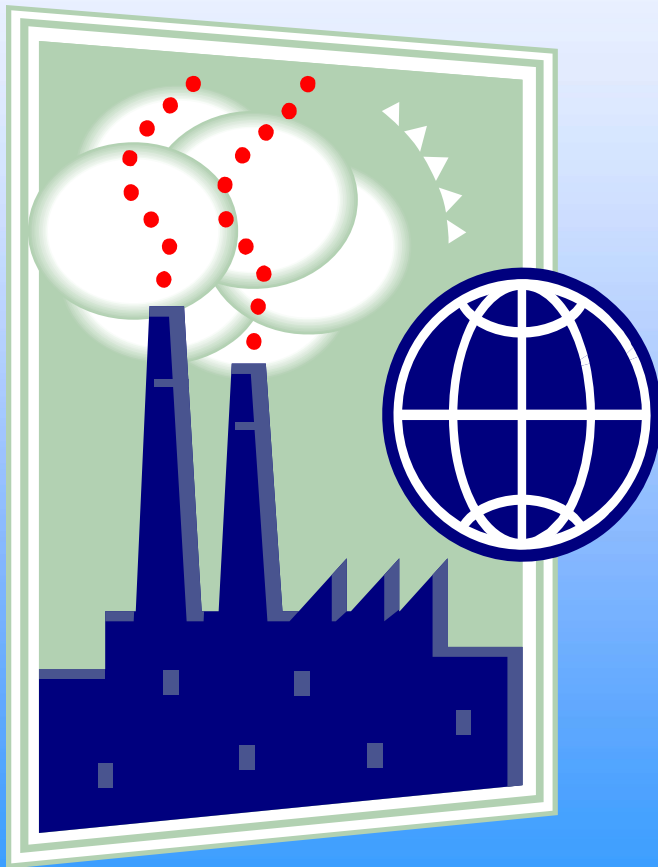
Fossil Fuel Production

- Key Assumptions
 - Growth Rates
 - Oil and NG production
 - follow 2000-2005 growth rate through 2009
 - 2010-2020 based on US DOE, Annual Energy Outlook
 - Coal
 - Emissions follow Colorado Geological Survey coal production projections (intensity held at 2004 level)
- Key Uncertainties
 - Future production of fossil fuels
 - Production from Oil Shale
 - Coal bed methane – entrained CO₂

Black Carbon

- One of two carbonaceous aerosol species – BC and Organic Carbon (OC)
- Also known as light absorbing carbon (LAC) and elemental carbon (EC)
- Absorbs solar energy and warms the troposphere (like GHG's)

Sources of Black Carbon



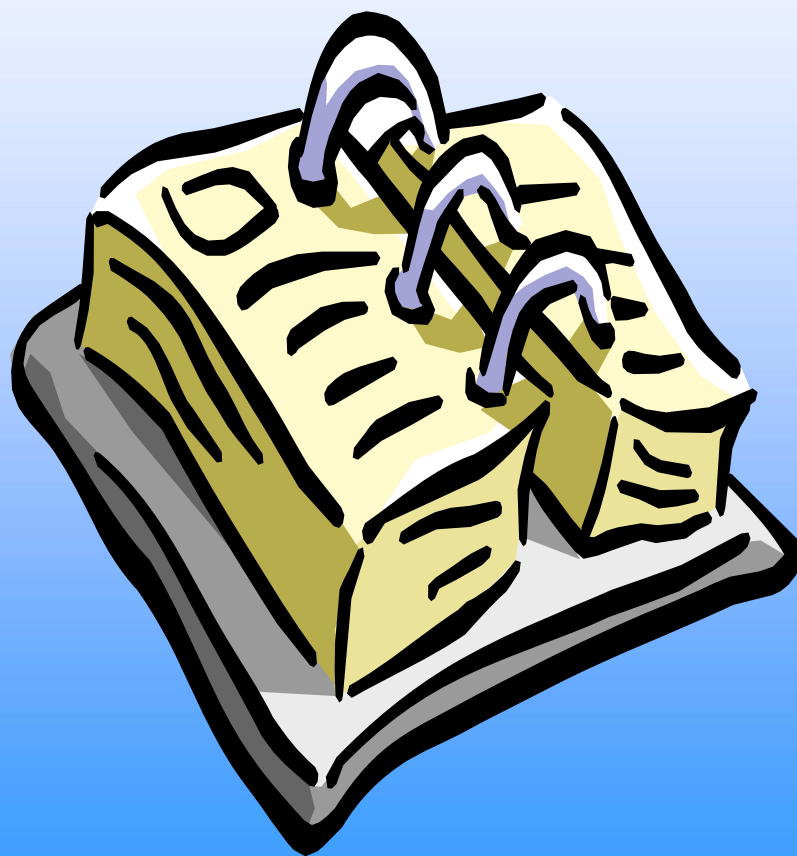
- Fossil Fuel Combustion
- Biomass Combustion
- Other (Minor) Sources

Black Carbon Emissions

- 2002
 - 6.8 MMtCO₂e
 - Primary Contributors:
 - nonroad diesel (54%)
 - onroad diesel (26%)
 - rail (7%)
 - nonroad gasoline engines (5%)
- 2018
 - Nonroad diesel drops from 3.7 to 1.1 MMtCO₂e
 - Onroad diesel drops from 1.7 to 0.4 MMtCO₂e

Next PWG Meeting

- Agenda:
 - Begin balloting for top priorities for analysis in each PWG
 - Continue review and potential revision of Colorado GHG inventory and forecast
- Time and Location TBD



Public Input, Announcements