



# Energy Supply Technical Work Group Teleconference Meeting #1

August 24, 2006

# Introductions

- Technical Work Group (TWG) members
- MT DEQ
- CCS TWG leaders
- Public

# Today's Agenda

- Introductions
- Purpose and Goals
- Review of the CCAC and TWG process
- Review and Discussion of the Montana Emissions inventory & forecast
- Review and Discussion of the Catalog of State Actions
- Next Steps for TWGs
- Agenda, Time and Date for Next Meeting
- Public Input and Announcements

# Part 1

- CCAC and TWG Process

# Purpose & Goals

- December 13, 2005 Letter from Montana Governor Brian Schweitzer
  - Montana Climate Change Advisory Group
  - Climate Action Plan
    - CCAG policy recommendations
    - Montana Greenhouse gas emissions inventory and forecasts

# Roles & Responsibilities

- Process Convened by Governor Brian Schweitzer
- MDEQ provides coordination and organization
- State agencies act as advisors
- CCAC members make recommendations
- TWGs advise stakeholders
- Public input and review for stakeholders
- CCS provides evaluative facilitation, final report

# Timing

- CCAC meetings
  - July, September, December, February, April, May
- TWG calls
  - Regularly scheduled
  - Two to three 90 minute calls in between each CCAG meeting
- Work Products
  - Initial GHG inventory & forecast: December 2006
  - Report to the Governor: July 2007

# Ten Step Work Plan

1. Develop initial GHG inventories and forecasts
2. Identify possible GHG mitigation options
3. Identify initial priorities for evaluation
4. Evaluate supply potential, cost effectiveness; additional and feasibility issues as needed
5. Identify barriers, alternative policy design needs
6. Modify, add or subtract options as needed
7. Evaluate cumulative results of options
8. Iterate to consensus, with votes as needed
9. Aggregate options into implementation scenarios
10. Finalize recommendations and report language

# TWG Next Steps

- Review and revision of Montana greenhouse gas (GHG) inventory and forecast
- Identify “priorities for analysis” from catalog of states actions
  - Add existing and new MT options as needed
  - Rank and screen options
  - Suggest initial “priorities for analysis” to the CCAC

# Sample Potential Options - Agriculture

Option No.	Climate Mitigation Option	Priority for Analysis	Potential GHG Emissions Reduction	Potential Cost or Cost Savings	Ancillary Impacts, Feasibility Considerations	Notes
AFW-1	AGRICULTURE – PRODUCTION OF FUELS AND ELECTRICITY					
1.1	Manure Digesters/Other Waste Energy Utilization**					
1.2	Biodiesel Production (incentives for feedstocks and production plants)					
1.3	Biomass Feedstocks for Electricity or Steam Production**					
1.4	Ethanol Production					

# Decision Criteria

- GHG reduction potential (CO<sub>2</sub>e)
- Cost per ton GHG removed
- Additional issues
- Feasibility issues

# Policy Template



**Policy Description:**

**Policy Design:**

- **Goals:**
- **Timing:**
- **Coverage of Parties:**

**Implementation Methods:**

**Related Policies/Programs in Place:**

**Estimated GHG Savings and Costs per tCO<sub>2</sub>e:**

- **Data Sources:**
- **Quantification Methods:**
- **Key Assumptions:**

**Key Uncertainties:**

**Additional Benefits and Costs:**

**Feasibility Issues:**

**Status of Group Approval:**

**Level of Group Support:**

**Barriers to Consensus:**

# End Product/Final Report

- Executive Summary
- Background, Purpose And Goals
- Policy Recommendations & Results
  - Agriculture And Forestry
  - Energy Supply
  - Residential, Commercial, Industrial
  - Transportation & Land Use
  - Waste management
  - Cross Cutting Issues
- Appendices

# Part 2

- MT Greenhouse Gas Inventory and Forecast review

# Montana GHG Emissions

- Inventory and Reference Case Projections
- Initial analysis by CCS for further discussion and final revision
  - Inventory of historical emissions from 1990 to most recent data year (2000-2004, depending on sector)
  - Projection of emissions to 2020

# Coverage

- Six gases per USEPA and UNFCCC guidelines
  - Carbon Dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous Oxide (N<sub>2</sub>O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur Hexafluoride (SF<sub>6</sub>)
  - Black Carbon considered separately
- All major emitting sectors
  - Electricity
  - Residential, Commercial, Industrial Fuel Use
  - Transportation
  - Agriculture and Forestry
  - Industrial Processes and Other Sources

# Inventory Approach

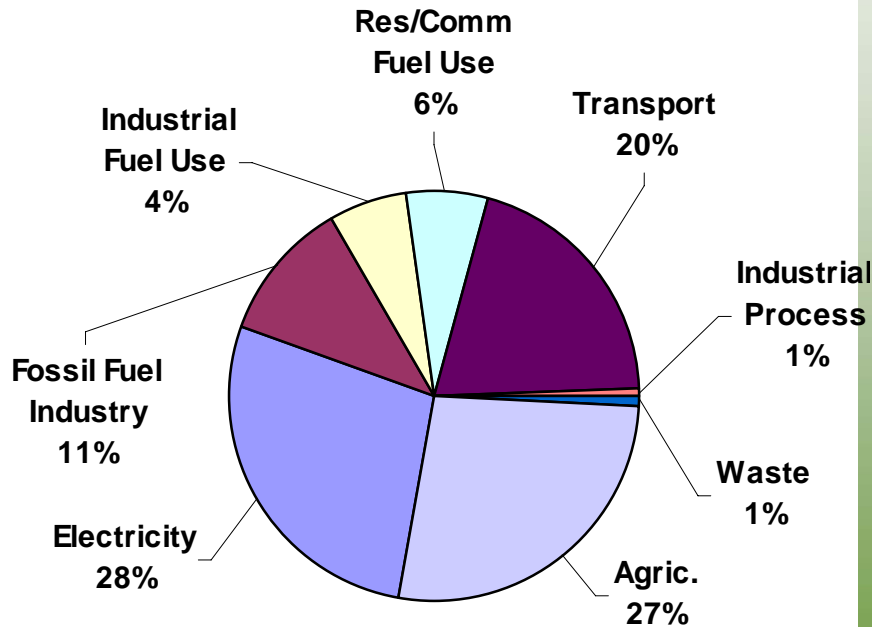
- Standard US EPA and UN methodologies, guidelines, and tools
- Emphasis on transparency, consistency, and significance
- Preference for Montana or regional data, where available
- Consumption and production-basis emissions from electricity generation
  - Very simplified approach used for initial analysis

# Projection Approach

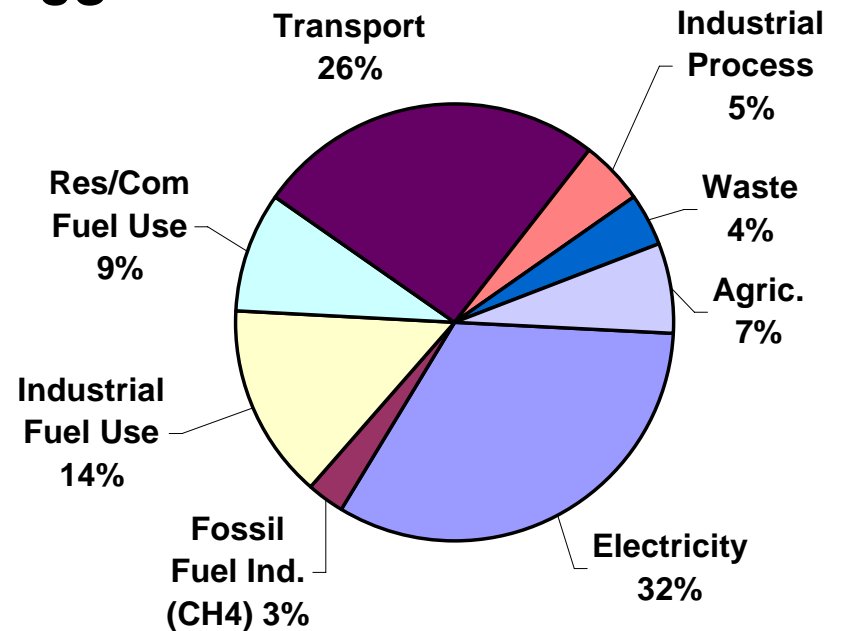
- Reference case assumes no major changes from business-as-usual
  - Includes approved policies and actions to the extent possible (e.g. Environmental Portfolio Standard)
- Growth assumptions from existing sources
  - US Census and Bureau of Labor & Statistics
  - US Energy Information Administration
  - Western Regional Air Partnership

# Montana & US Emissions By Sector, Year 2000

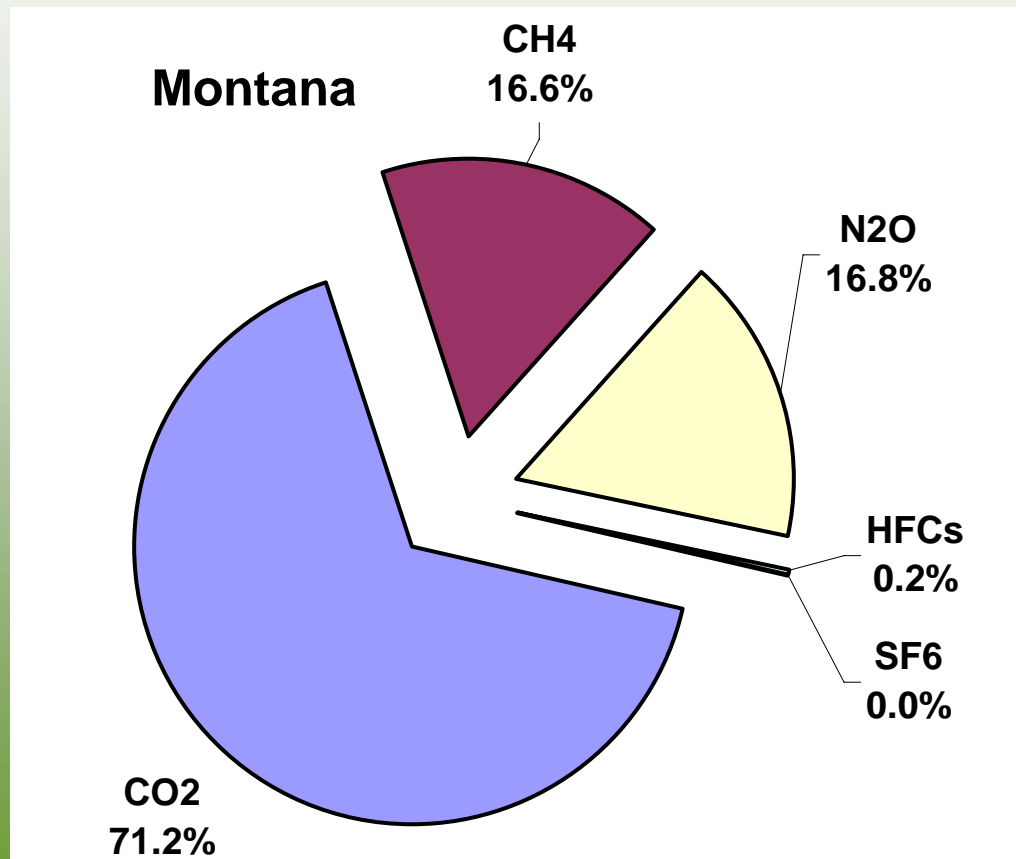
## Montana



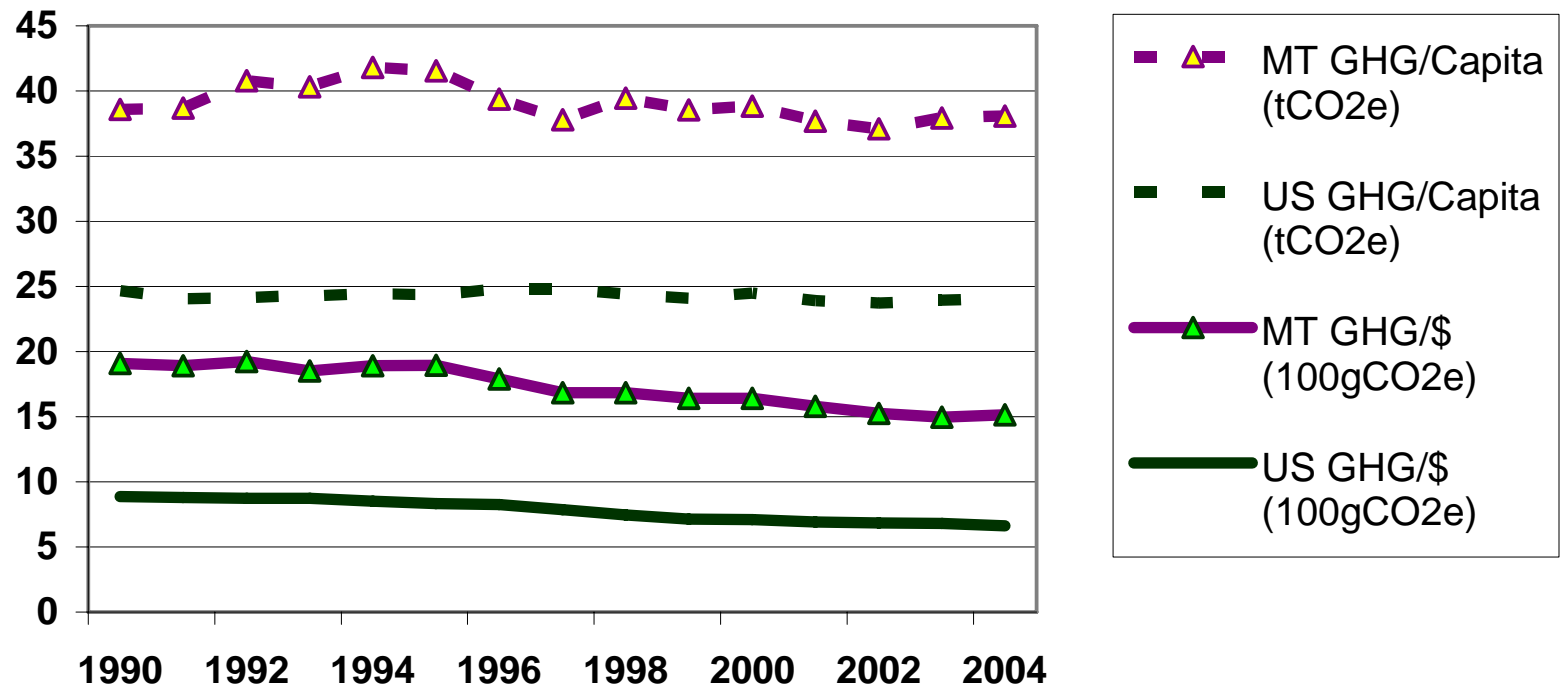
## US



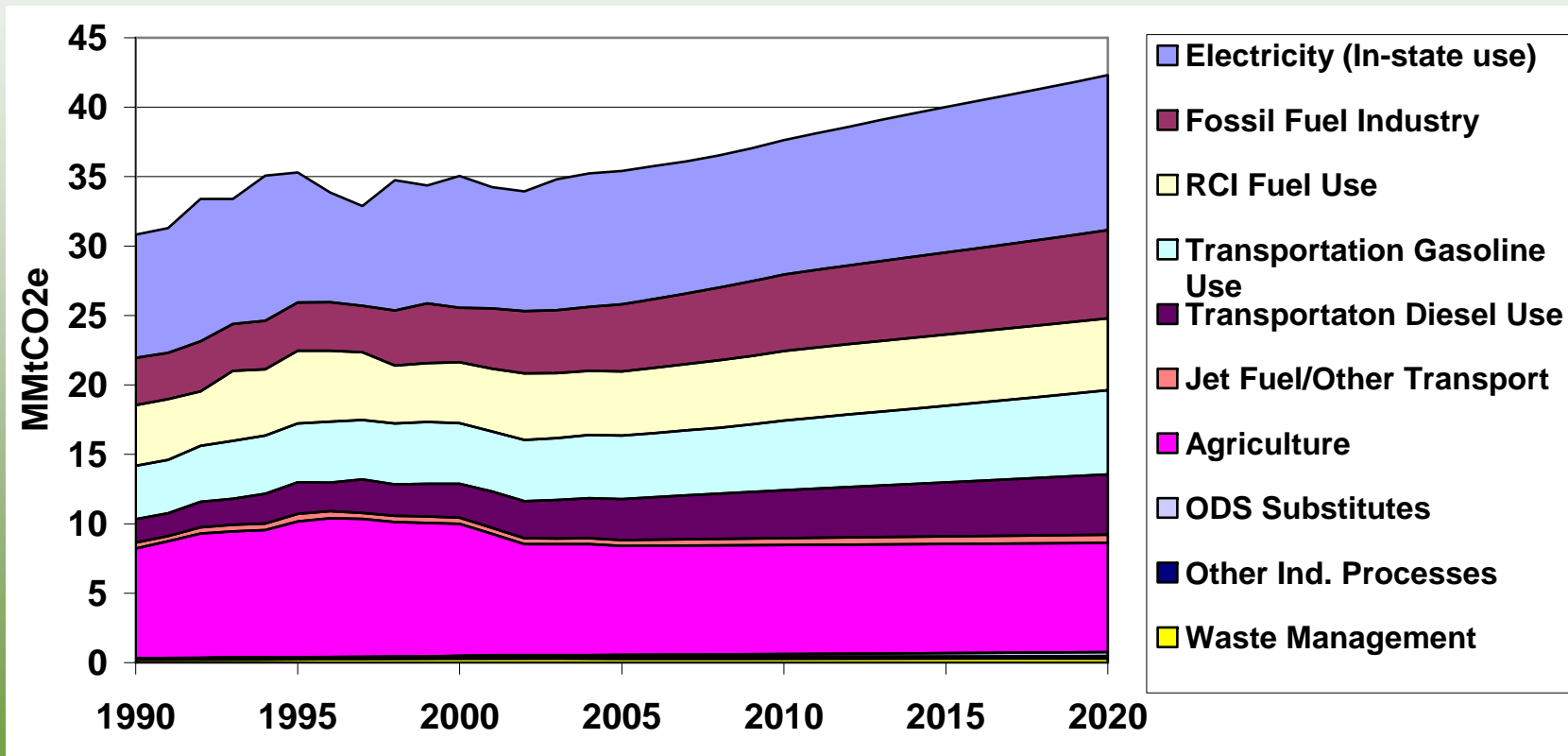
# Montana Emissions By GHG, Year 2000



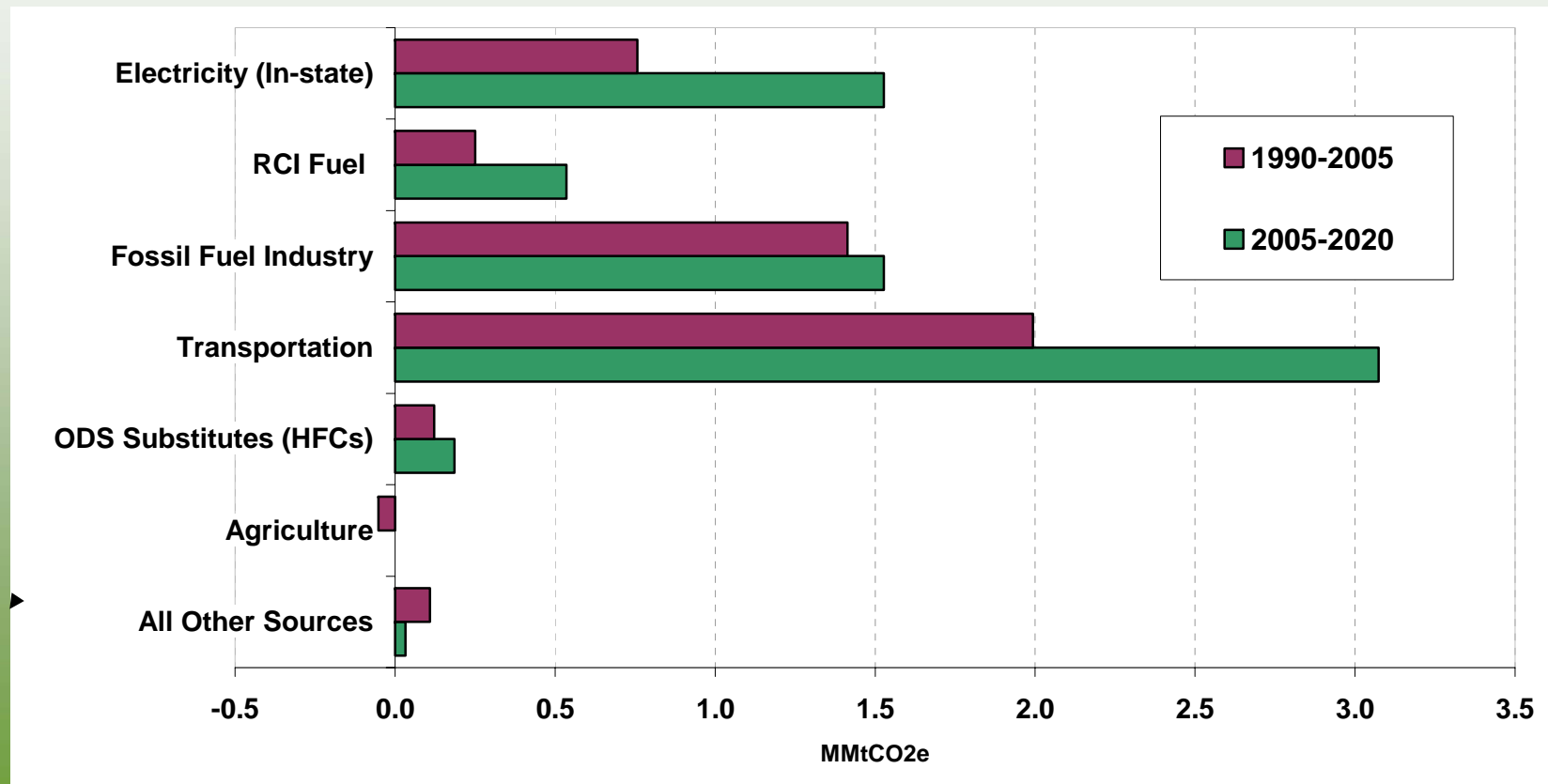
# Per Capita and GSP/GDP GHG Emissions, 1990-2002



# Gross Montana GHG Emissions By Sector, 1990-2020



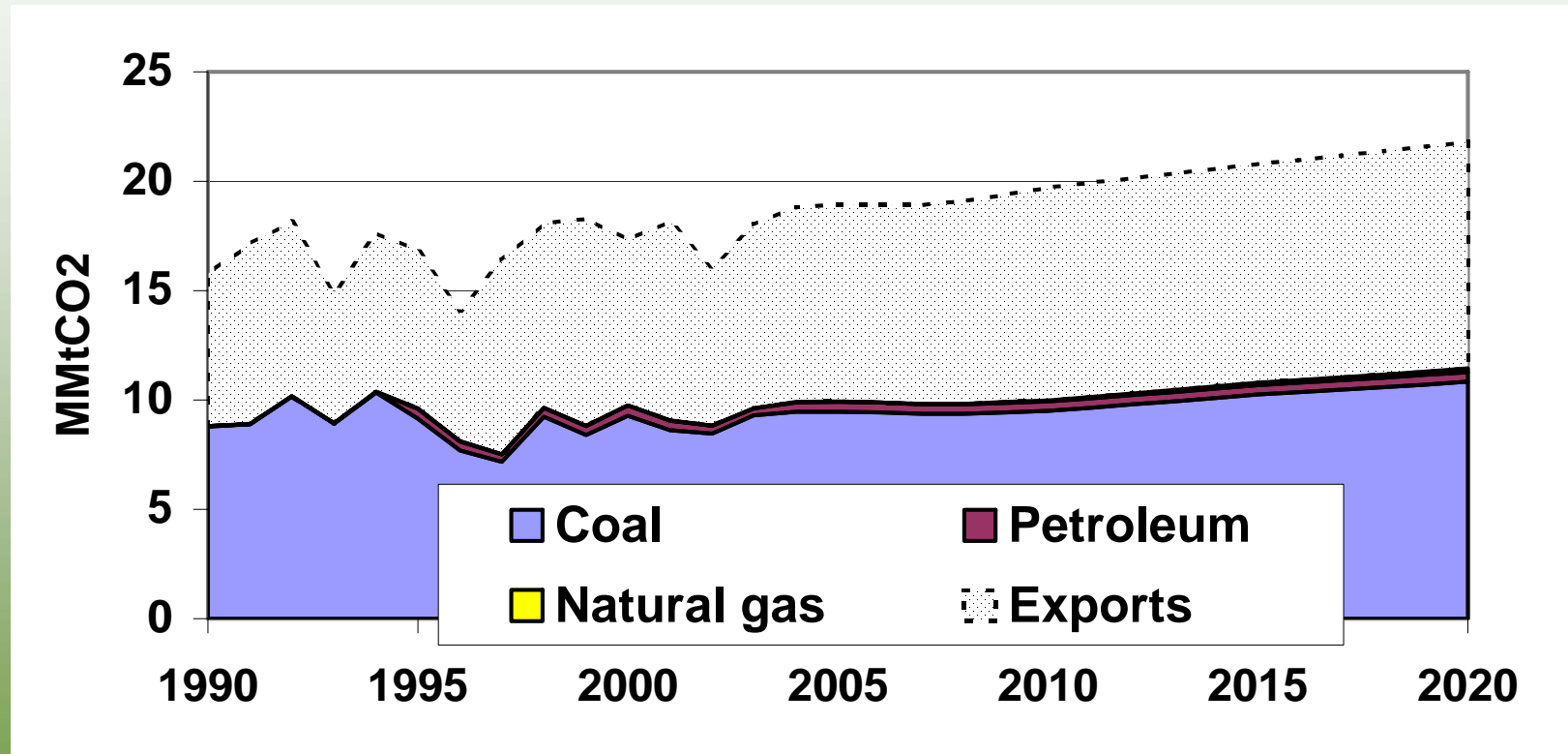
# Montana Emissions Growth



# Key Points

- Preliminary draft for TWG review and revision, as needed
- Helpful for diagnosis of GHG emissions, but not a compliance baseline
- Consumption v. production methods
- Role of biological carbon stocks

# Emissions from Electricity Generation



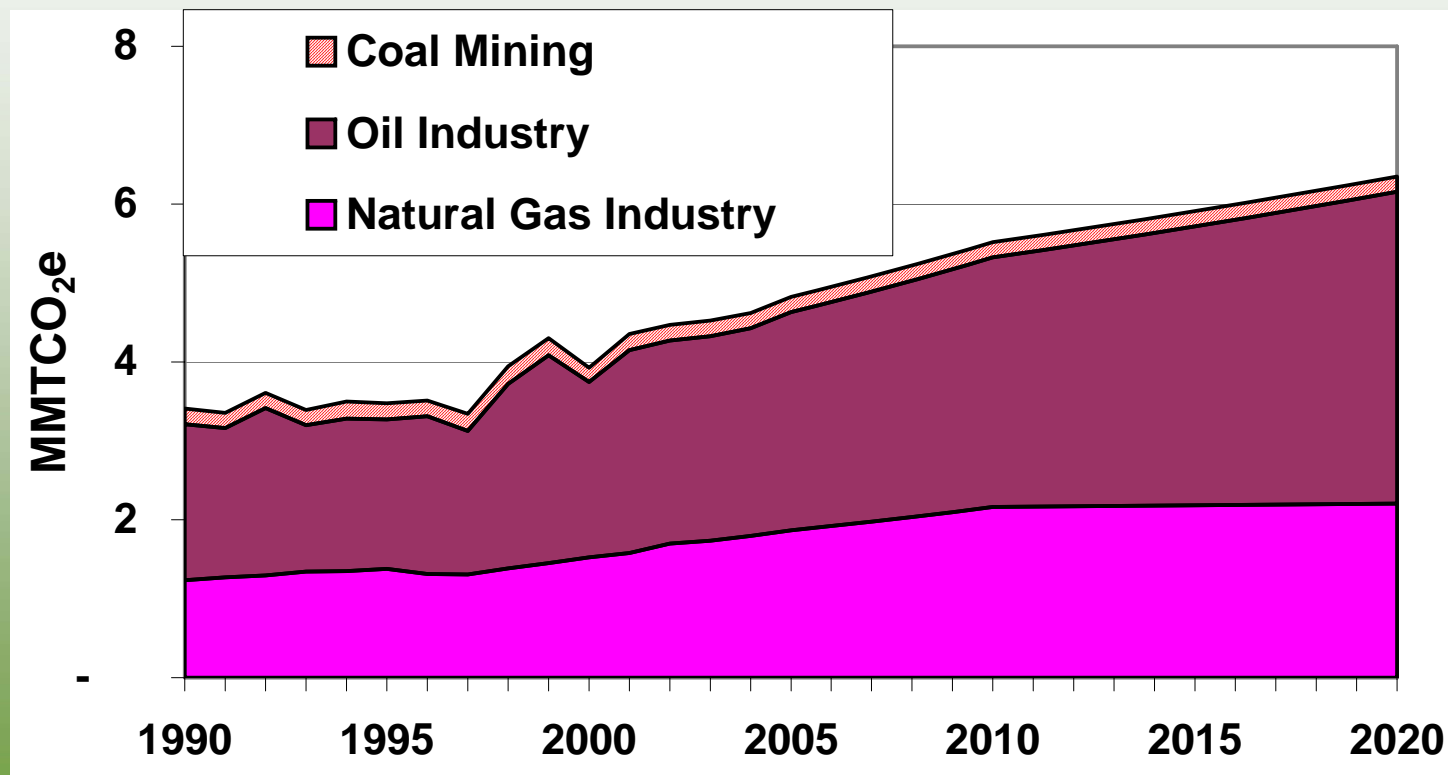
# Electricity

- Data Sources
  - Energize Montana
    - Historic energy consumption and electricity sales
  - US DOE
    - Projected electricity sales
    - Projected generation, amount and type
  - WECC 10-year Co-ordinated Plan
    - New plants, mix of fossil fuels for future plants
- 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
  - 2% annual growth in generation from 2004-2010, 1% annual growth from 2010 to 2020
  - In-state renewables (wind) to meet MT RPS (10% by 2010, 15% by 2015)
  - New non-renewables – 80% coal/20% NG
- Key Uncertainties
  - Growth rate and mix of new generation

# Fossil Fuel Production (Methane Emissions)



# Fossil Fuel Production (Methane Emissions)

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

# Fossil Fuel Production

- Key Assumptions
  - Growth Rates
    - Natural gas and oil production – follows trend of increasing production to 2010 (4.5% per year), no increases following 2010
    - Coal Mining – constant emissions at 2004 level
- Key Uncertainties
  - Industrial growth/decline
  - Coal Bed Methane
  - Other fossil fuel industry activity

# Part 3

- Draft Potential GHG Mitigation Options

# CCS Catalog of State Actions

- Actions undertaken or considered by a wide variety of US states
- Many actions provide GHG reductions coincidentally or as a co-benefit
- Cover all economic sectors
- Cover many implementation mechanisms

# Categories of Electricity Generation Actions

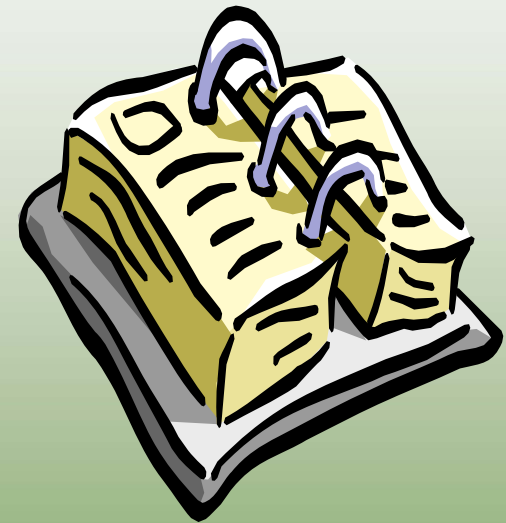
- Expand low emitting and renewable sources
- Reduce fuel extraction and process emissions
- Reduce delivery related emissions
- Capture and store carbon (sequestration)
- Remove particulates (black carbon)

# Categories of Fossil Fuel Production Actions

- Reduce fugitive methane emissions, e.g.
  - Reduce leakage in natural gas transmission and distribution pipelines
  - Capture and combust coal mine methane
  - Manage venting and flashing in oil and gas production)
- Improve energy efficiency of operations (compressors, etc.)
- Capture and re-inject CO<sub>2</sub> (e.g. enhanced oil recovery)

# Next TWG Call

- Agenda:
  - Discuss potential priorities for analysis of policy options
  - Review the Montana emissions inventory and projection if/as needed
- [insert date and time]



# Public Input, Announcements