



Maryland Climate Change Commission Mitigation Working Group

Residential, Commercial & Industrial Technical Work Group

Meeting #8

January 3, 2008

Maryland Department of the Environment
Maryland Energy Administration
Center for Climate Strategies

Today's Agenda

- Call to order and roll call
- Review and approval of prior call summary
- Review of stepwise process
- Agenda, date and time for next meeting
- Review of the draft Emissions Inventory & Forecast
- Planning and next steps in process
- Public input and announcements

Stepwise Planning Process

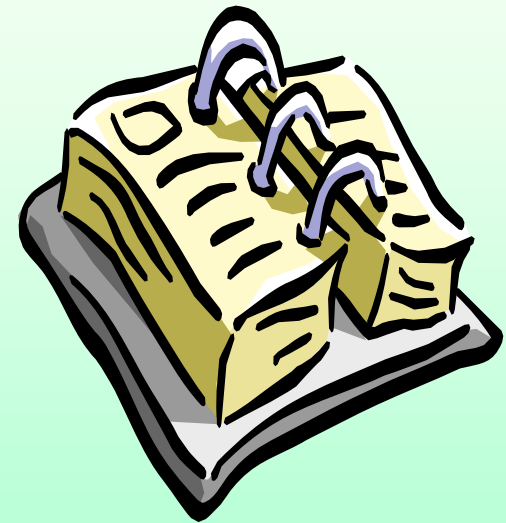
1. Develop inventory and forecast of emissions
2. Identify a full range of possible actions
3. Identify initial priorities for analysis
4. Develop straw proposals
5. Quantify GHG reductions and costs/savings
6. Evaluate externalities, feasibility issues
7. Develop alternatives to address barriers
8. Aggregate results
9. Iterate to final agreements
10. Finalize and report recommendations

TWG Roles

- Assist MWG
 - Identify potential state actions
 - Identify potential priorities for analysis
 - Identify Fast Track Options
 - Suggest straw policy designs
 - Assist with analysis and review of options
 - Assist with development of policy alternatives
 - Assist with input to and review of MWG reports
 - Review and assist with the state GHG inventory and forecast

Next TWG Meeting

- Date and Time
 - Fri., Jan. 11, 2008,
10:00 AM–12:00 PM
- Agenda
 - Review initial results of quantification of costs and benefits
 - Continue developing the implementation mechanisms section of the straw proposal



GHG Inventory & Forecast

- Full draft report with sector-specific appendices will be posted on the project website by 2nd week of January

Inventory Approach

- Standard US EPA and UN methodologies, guidelines, and tools
- Emphasis on transparency, consistency, and significance
- Preference for Maryland 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
- Growth assumptions from existing sources
 - State population forecasts
 - US Census and Bureau of Labor & Statistics
 - US Energy Information Administration

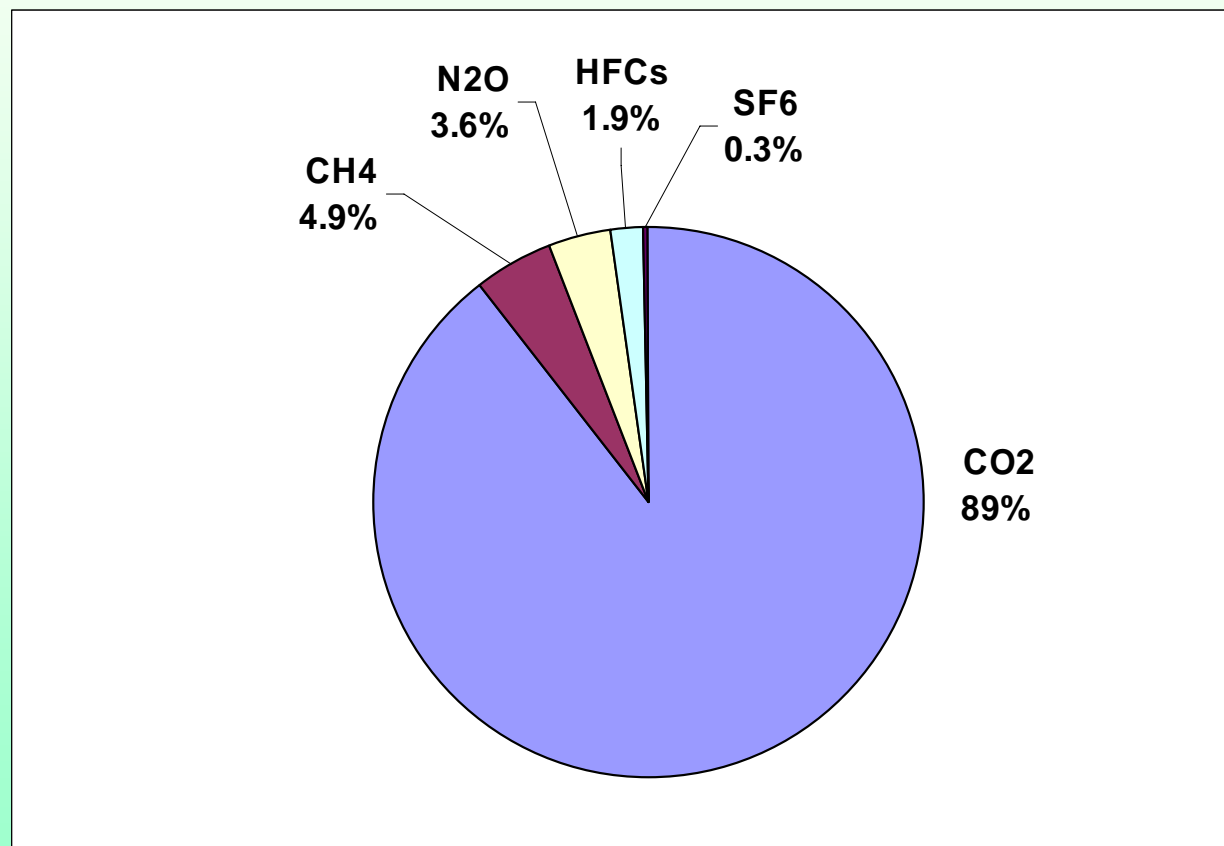
Coverage

- Six gases per USEPA and UNFCCC guidelines
 - Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur Hexafluoride (SF₆)
- All major emitting sectors
 - Electricity Supply & Demand (Consumption Based)
 - Residential, Commercial, Industrial (RCI) Fuel Use
 - Industrial Non-Fuel Use Processes
 - Transportation (onroad and nonroad)
 - Natural gas production and pipeline transmission & distribution; coal mining
 - Agriculture, Forestry, and Waste
- Emissions expressed as CO₂ equivalent
 - 100-year global warming potentials
 - CO₂ = 1; CH₄ = 21; N₂O = 310; HFC-23 = 11,700; SF₆ = 23,900

Key Points

- Preliminary draft for TWG review and revision, as needed
- Inventory & Forecast for diagnosis of GHG emissions and trends, not a baseline for modeling or compliance for individual options
- Consumption and Production methods
- Net and Gross methods

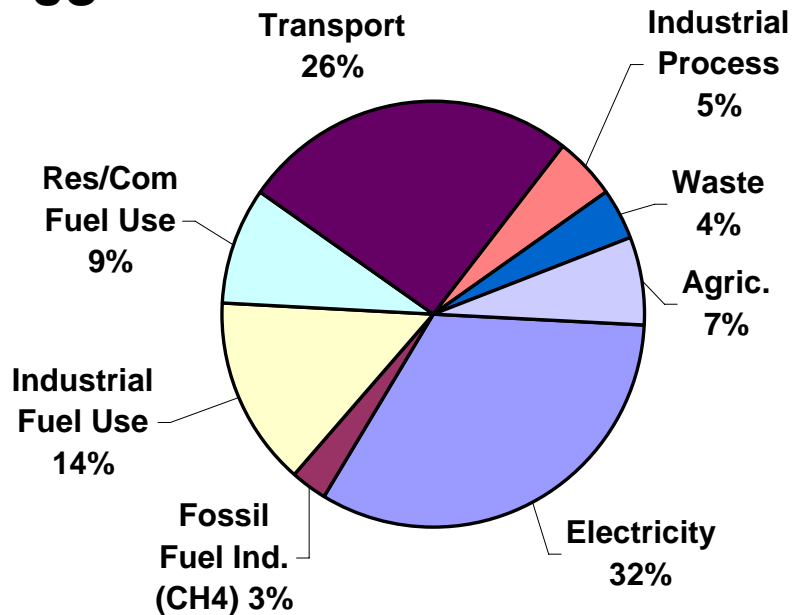
Maryland Gross Emissions by GHG Year 2000 (MMtCO₂e Based)



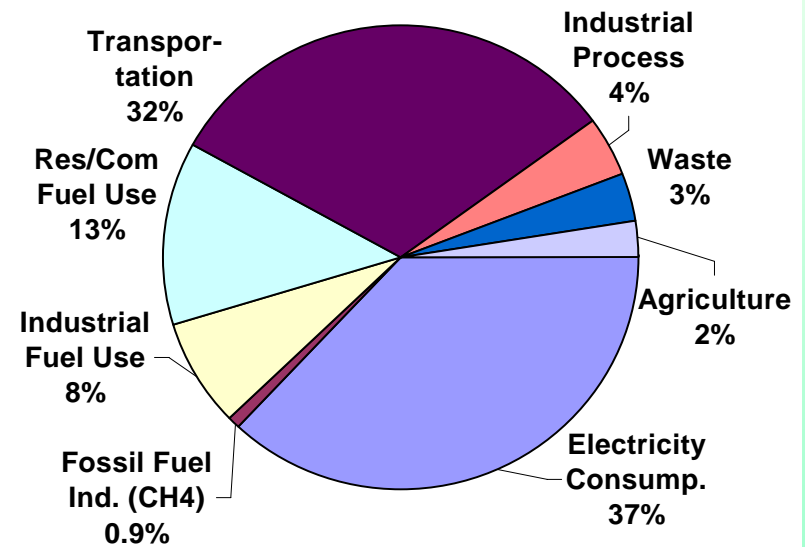
Draft Maryland Inventory

Gross GHG Emissions By Sector

US

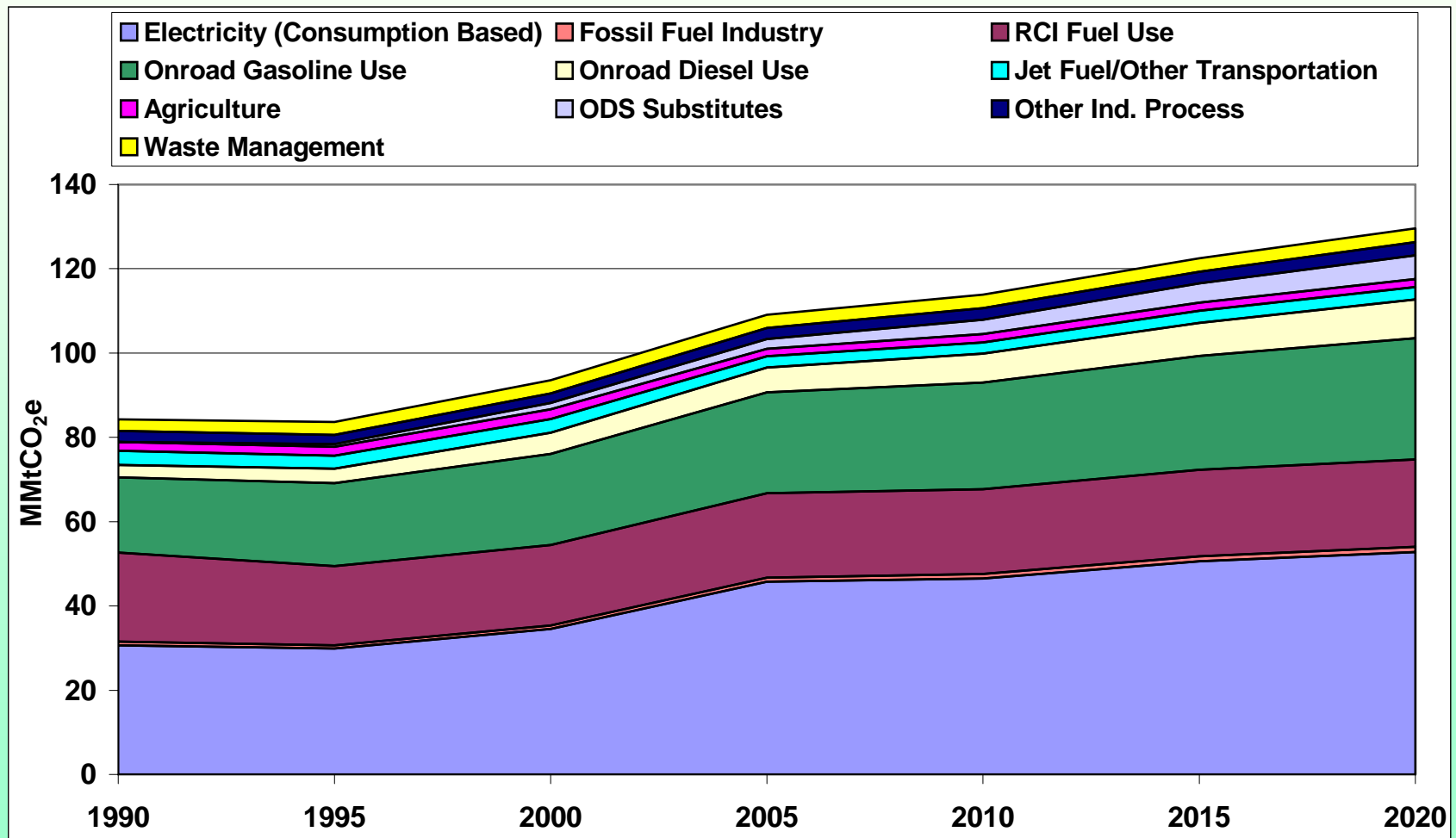


Maryland

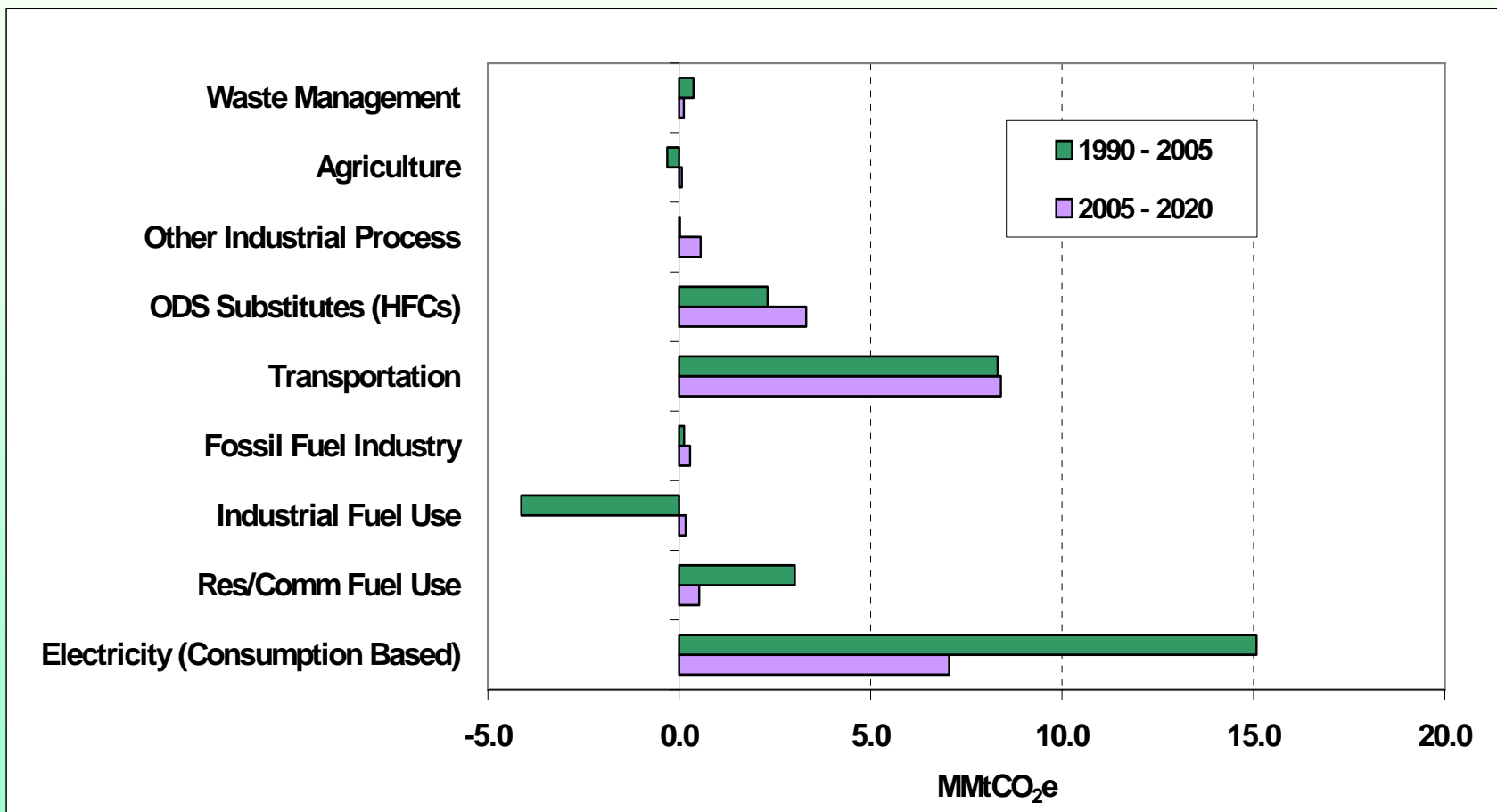


Year 2000 Data

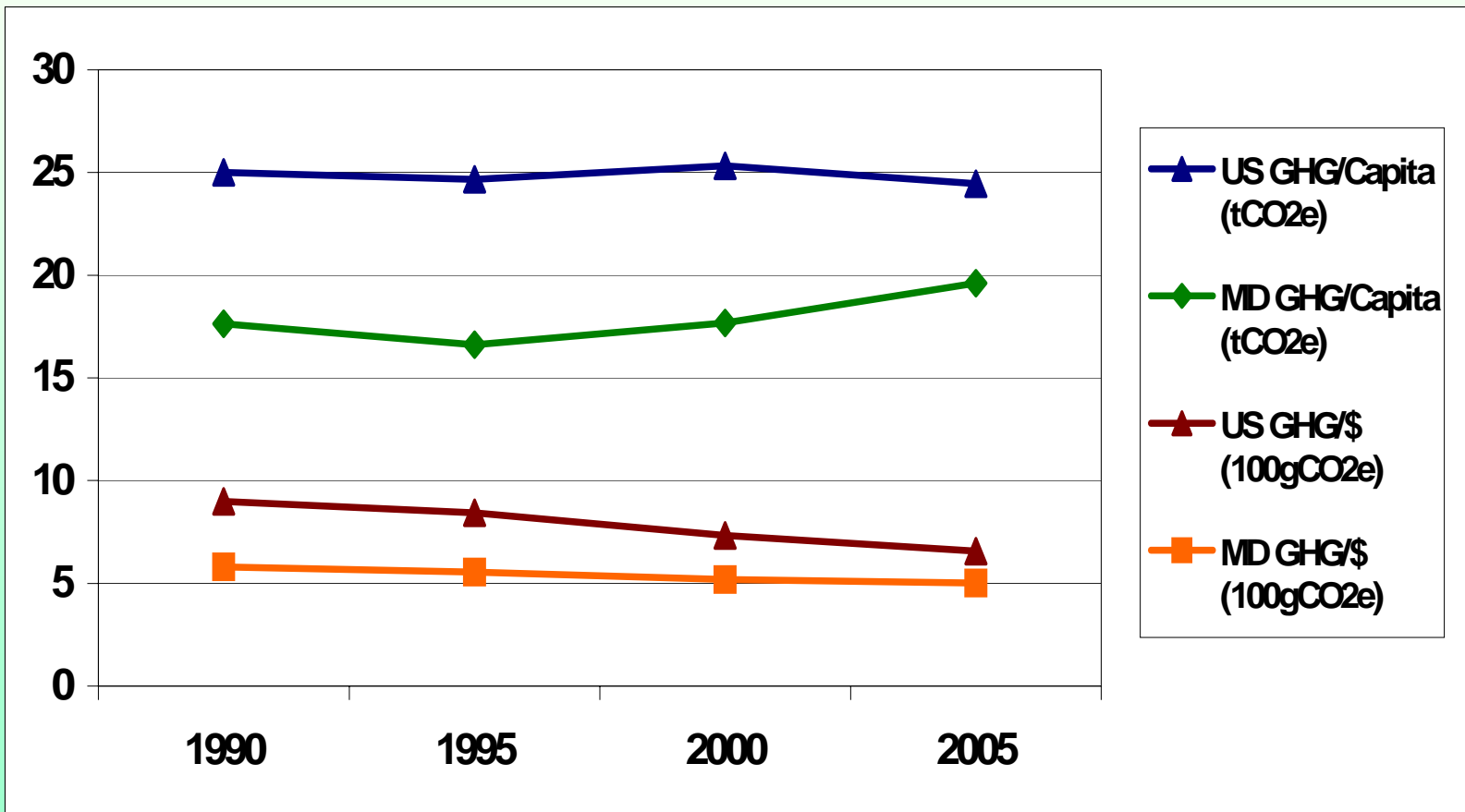
Maryland Gross GHG Emissions by Sector, 1990-2020



Maryland Gross Emissions Growth (MMtCO₂e Basis)

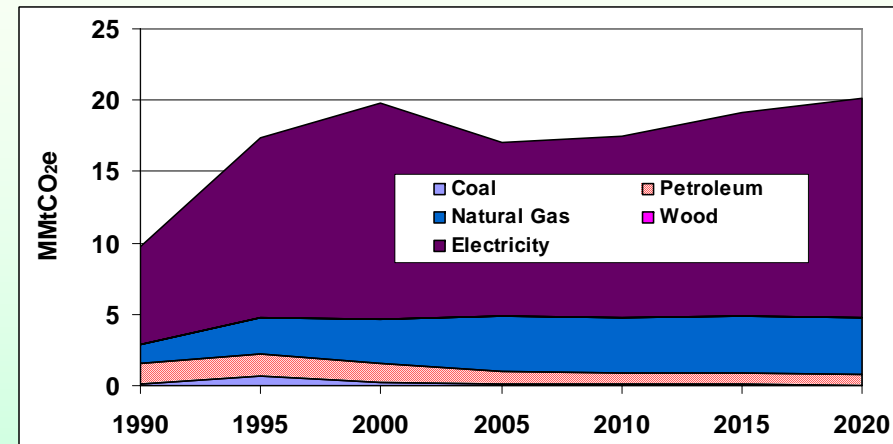


Per Capita and GSP/GDP Gross GHG Emissions, 1990-2005

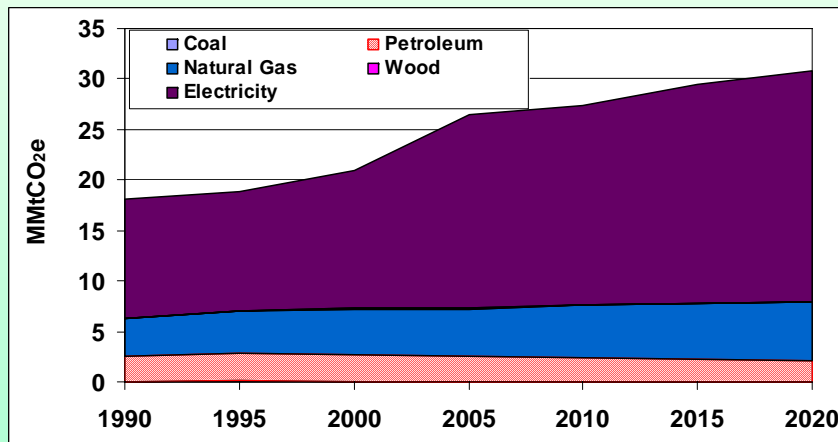


RCI

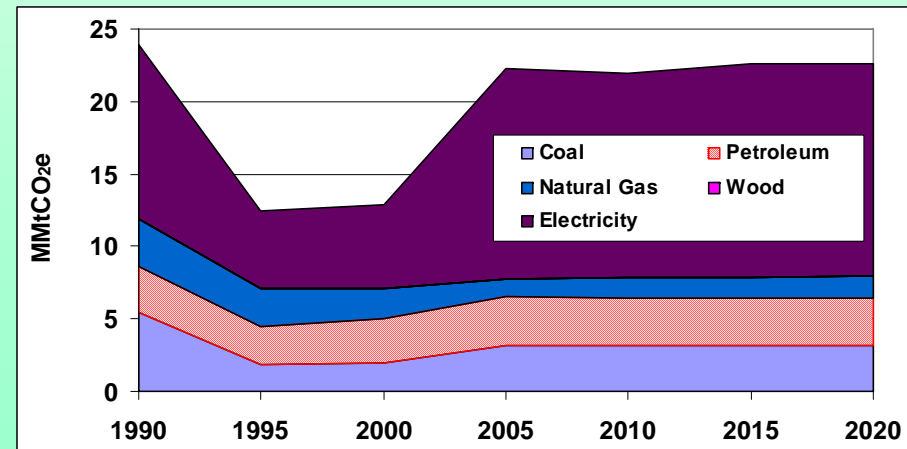
Commercial Sector



Residential Sector



Industrial Sector



RCI

- Data Sources
 - Historical
 - EIA State Energy Data (SED) through 2005
 - Except for Commercial Wood (through 2003)
 - Forecast
 - MD population annual growth rate (2005 – 2020) = 0.86%
 - EIA Annual Energy Outlook 2006 (AEO2006)
 - Projected consumption by RCI sector and fuel type
 - MD employment annual growth rates were not available

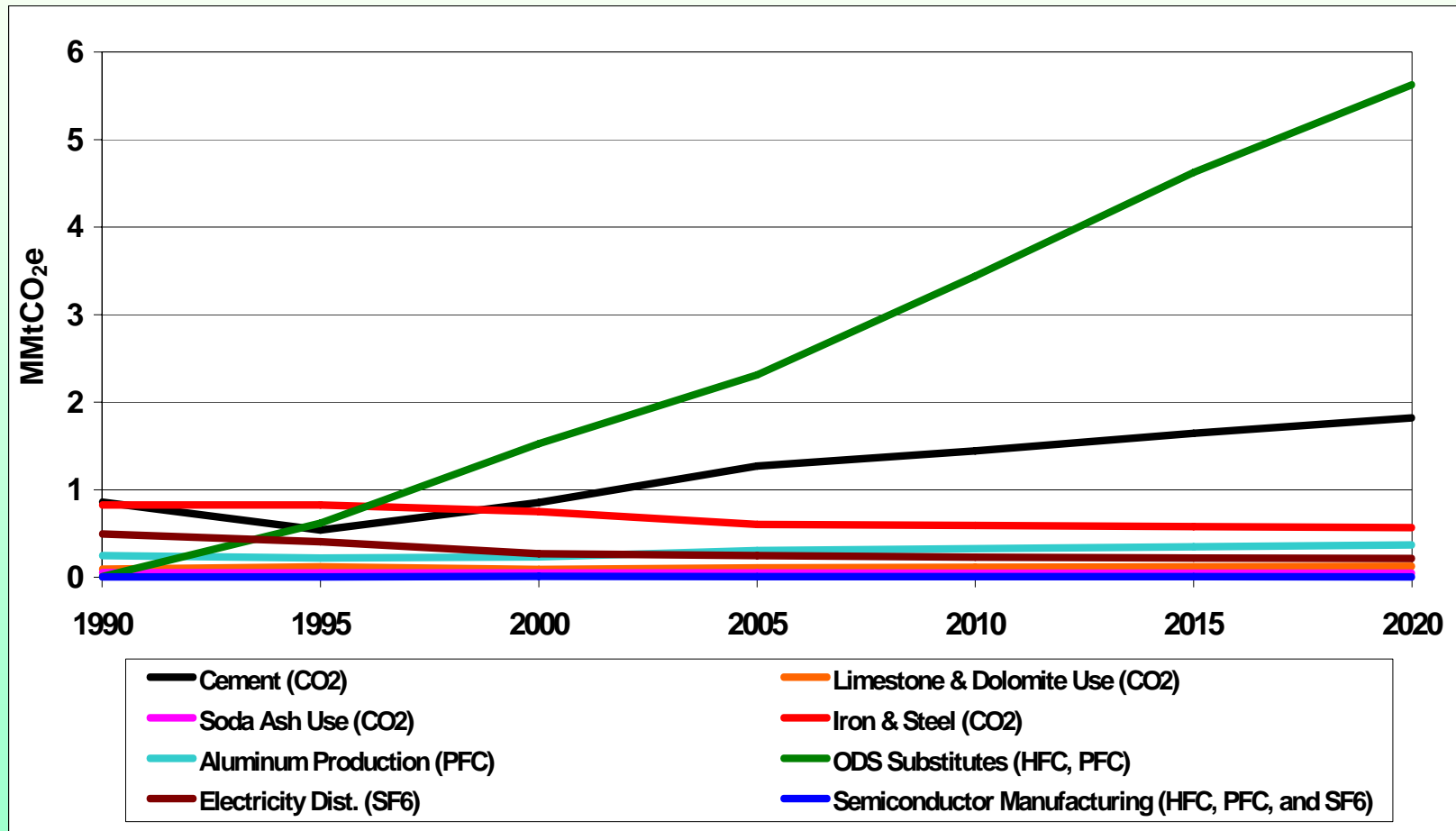
RCI

- Methods
 - Historic
 - US EPA State Greenhouse Gas Inventory Tool (SIT)
 - Energy consumption multiplied by emission factors
 - Forecast
 - Fossil fuels
 - Annual growth rate applied to latest year of emissions (2005)
 - Residential Sector - Normalized regional growth projections scaled for MD population
 - Electricity emissions attribution
 - Annual growth rates based on AEO2007 regional, sector-level forecasts for MAAC region were used to forecast electricity sales from 2005 to 2020 for each sector
 - Emissions associated with the electricity supply sector were allocated using the proportion of each RCI sector's sales to total sales

RCI

- Key Uncertainties
 - Regional projections
 - Industrial sector growth and mix

Industrial Process



Industrial Process

- Data Sources
 - Historic
 - US EPA national emissions allocated to MD
 - ODS substitutes, semiconductor, and electric distribution
 - US EPA SIT default production / consumption
 - USGS data for soda ash and limestone/dolomite use, cement manufacture (clinker and masonry cement), and aluminum production
 - American Iron and Steel Institute / Annual Statistics Report for iron and steel
 - Forecast (annual growth rates from 2005 to 2020)
 - Historical trends in production or consumption
 - Cement, aluminum, iron and steel, and limestone/dolomite use
 - US EPA national emissions trends
 - ODS substitutes, semiconductor, and electric distribution

Industrial Process

- Key Assumptions
 - Growth Rates
 - ODS subs, Semiconductor, and Elec. Dist. –
 - US EPA national growth rates
 - Semiconductor and Elec. Dist. –
 - Growth assumes industries are making voluntary efforts to reduce SF6, HFC, PFC (Based on EPA “technology adoption” scenario forecast)
 - Cement, aluminum, iron and steel, and limestone/dolomite use
 - Historical trends
- Key Uncertainties
 - Industry activities to reduce GHG emissions

Public Input, Announcements