



Energy Supply
Technical Work Group
Teleconference Meeting #3

June 1, 2006



Today's Agenda

- Call to order
- Roll Call of Technical Work Group (TWG) members
- Review and approval of last call summary
- Discussion of prioritization of catalog of potential state actions
- Review and discussion of the draft North Carolina greenhouse gas (GHG) emissions inventory and forecast for Energy Supply
- Review and discussion of catalog of potential state actions
- Call to the public
- Proposed agenda items for next meeting
- Announcements

Catalog of State Actions

- Refer to handout
 - Note updates from TWG input
- Approach for identifying initial “priorities for analysis” by TWG voting:
 - Email ballot will be sent out by CCS to TWG members
 - One vote per person per option
 - 10 votes total per person to be cast prior to next call
 - Add comments (e.g. policy packaging) with your votes as needed
 - Return to Bill Dougherty billd@sei-us.org
 - CCS will aggregate results for discussion at next TWG call

NC GHG Emissions

- Inventory and Reference Case Projections 1990-2020 to support mitigation planning
 - Initial estimates by CCS for further discussion and revision
 - Not a baseline for reporting or compliance
 - Provided in transparent, review draft format
 - Uses best available references and assumptions
 - Results may change with modification of data sources, methods, assumptions

Coverage

- Six gases per U.S. EPA and UNFCCC guidelines
 - Carbon Dioxide (CO₂), Methane (CH₄), Nitrous Oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur Hexafluoride (SF₆)
 - Black Carbon not included at this time
- All major emitting sectors
 - Electricity Consumption (production + imports)
 - Residential, Commercial, Industrial (RCI) –
 - Fuel Use & Natural Gas Transmission / Distribution Systems
 - Industrial Processes
 - Transportation
 - Agriculture and Forestry
 - Waste Management

Inventory Approach

- Historical estimates from 1990-2000 or the most recent year possible
- Standard U.S. EPA and UN methodologies, guidelines, and tools, augmented as needed for North Carolina
- Emphasis on transparency, consistency, and significance
- Preference for North Carolina or regional data, where available
- Consumption and production-basis emissions from electricity and heat generation
- Simplified approach used for initial analysis to support general planning needs
- All units expressed as million metric tons carbon dioxide equivalent (MMTCO₂e)

Projection Approach

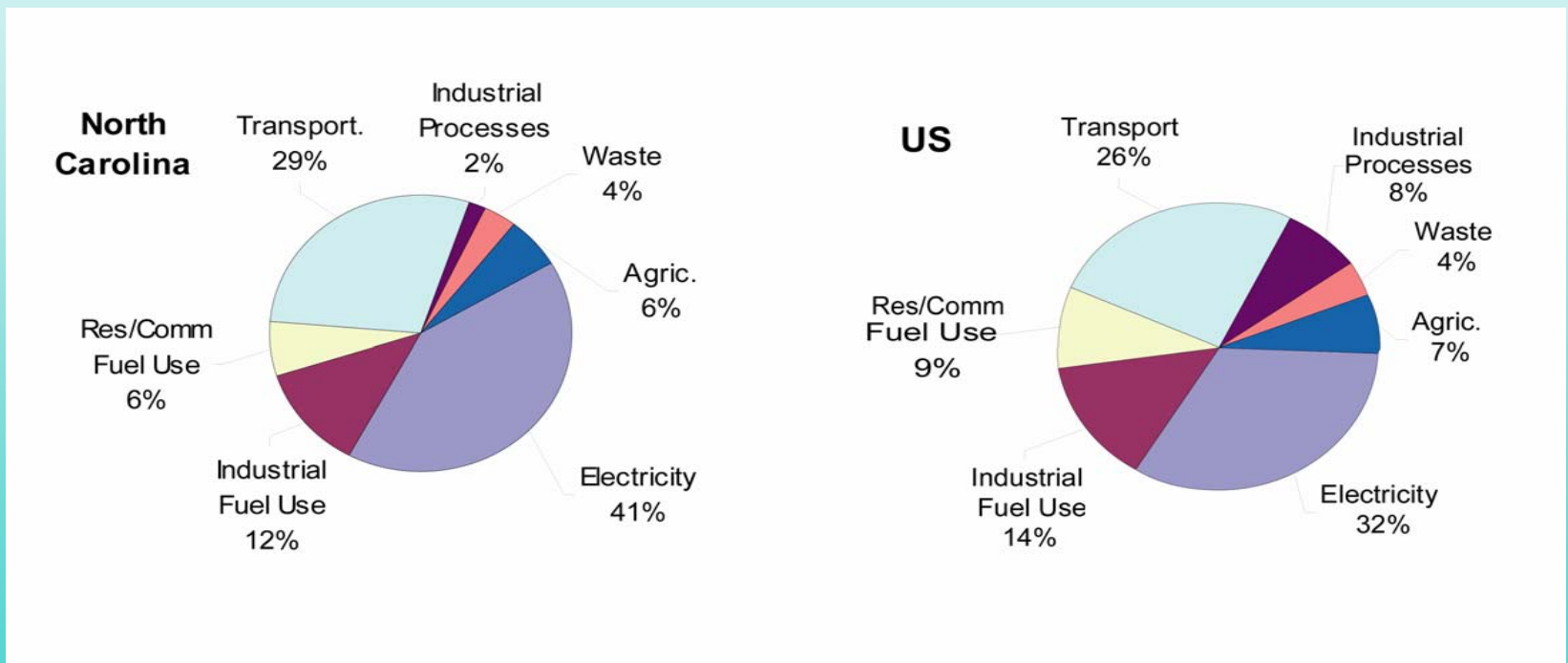
- Forecast of emissions from most recent year to years 2010 and 2020
- Reference case assumes no major changes from business-as-usual
 - Includes approved policies and actions
 - Typically assumes constant technology and market choices
 - Uses extrapolation where modeling is not available
- Emissions growth driven by many factors

Projection Approach

Variable	1990-2000	2000-2020	Growth Rate Data Sources and Uses
Population	2.0%	1.5%	NC Office of State Budget & Management
Gross State Product (GSP)	4.8%	3.9%	<i>North Carolina Energy Outlook, 2003</i> (not used for projections)
Employment	2.6%	1.3%	<i>North Carolina Energy Outlook, 2003</i>
Electricity Sales	2.9%	1.5% to 1.7%	U.S. DOE Energy Information Administration (EIA) State Energy Data (SED) for historic, Annual Report of the NC Utilities Commission and <i>North Carolina Energy Outlook, 2003</i> for Projections
Vehicle Miles Traveled	n/a	2.4%	Federal Highway's Highway Performance Monitoring System (HPMS) and NCDENR

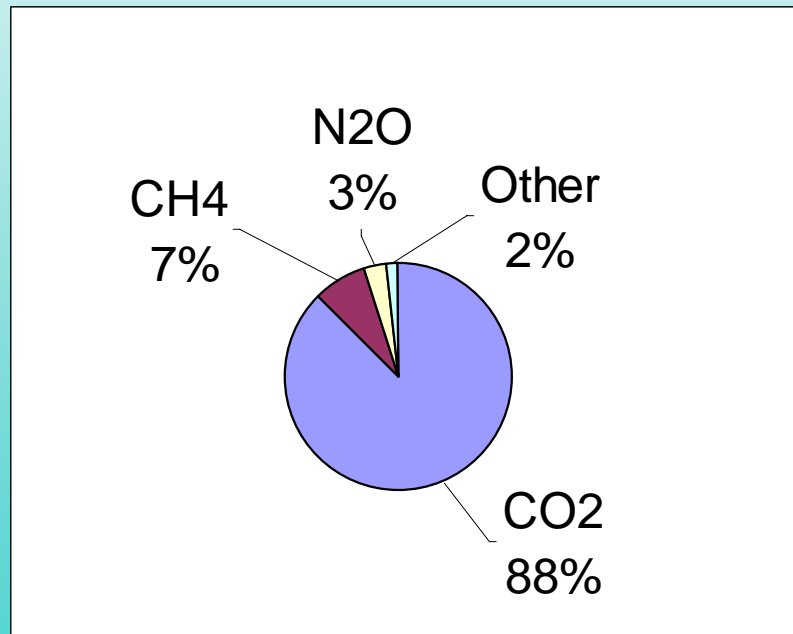
NC, U.S. Emissions by Sector

- Electricity use and transportation are principal GHG emissions sources:
 - NC = 70% of state total; U.S. = 58% of national total

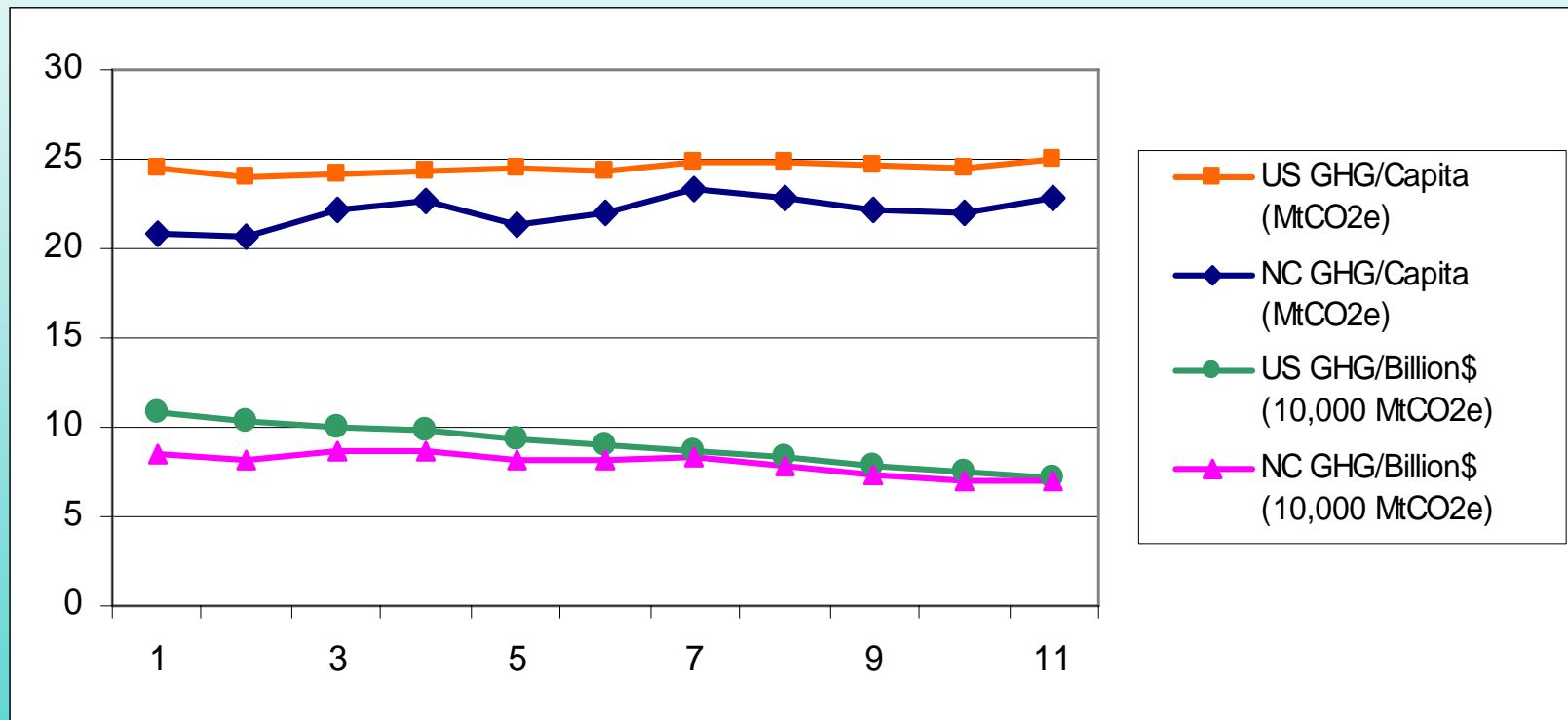


NC Emissions by GHG, 2000

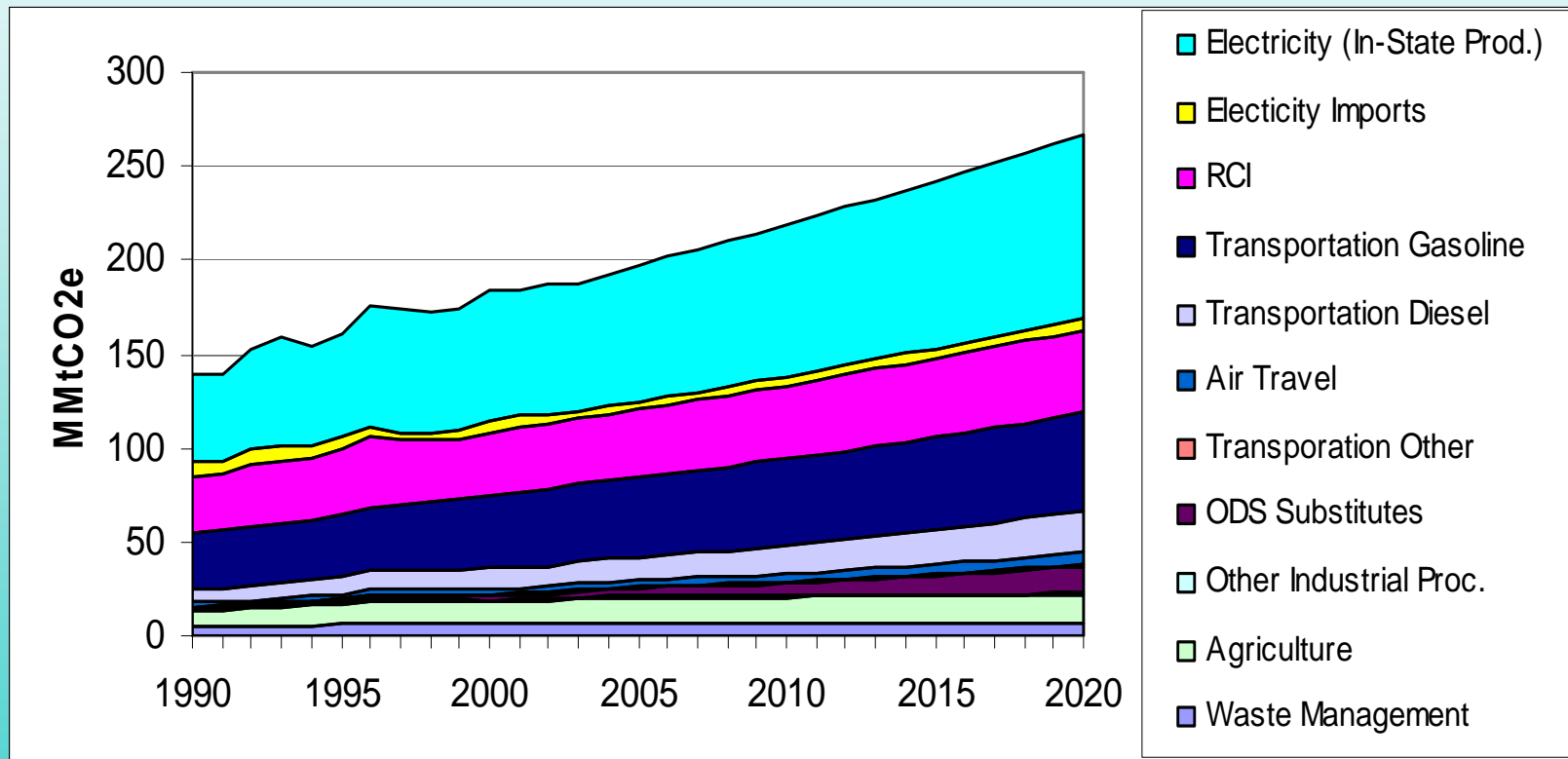
- CO₂ = 88% of GHG emissions in 2000
- CH₄, N₂O, and other GHGs = 12% of emissions in 2000



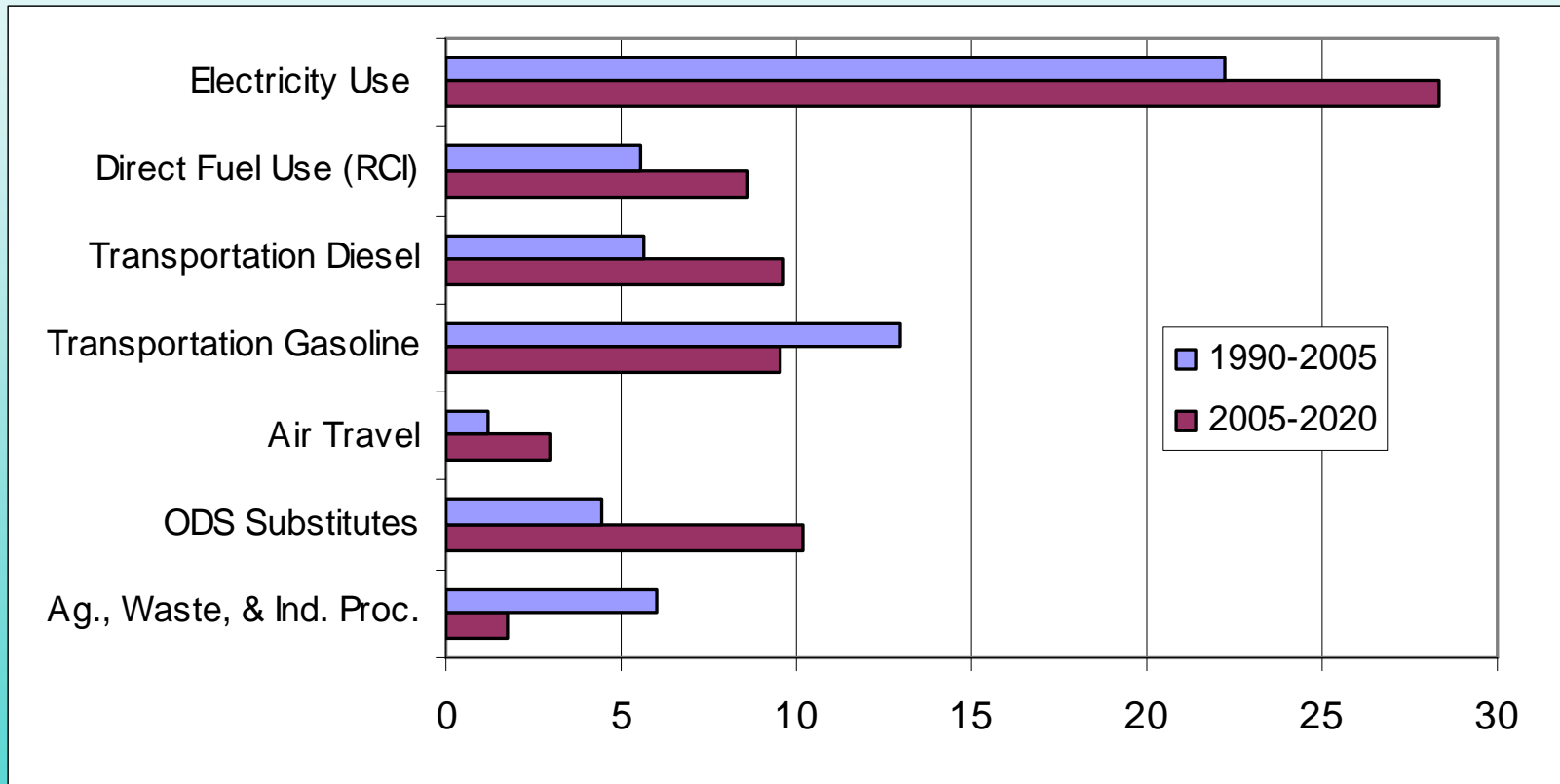
Per Capita and GSP/GDP GHG



NC GHG Emissions 1990-2020



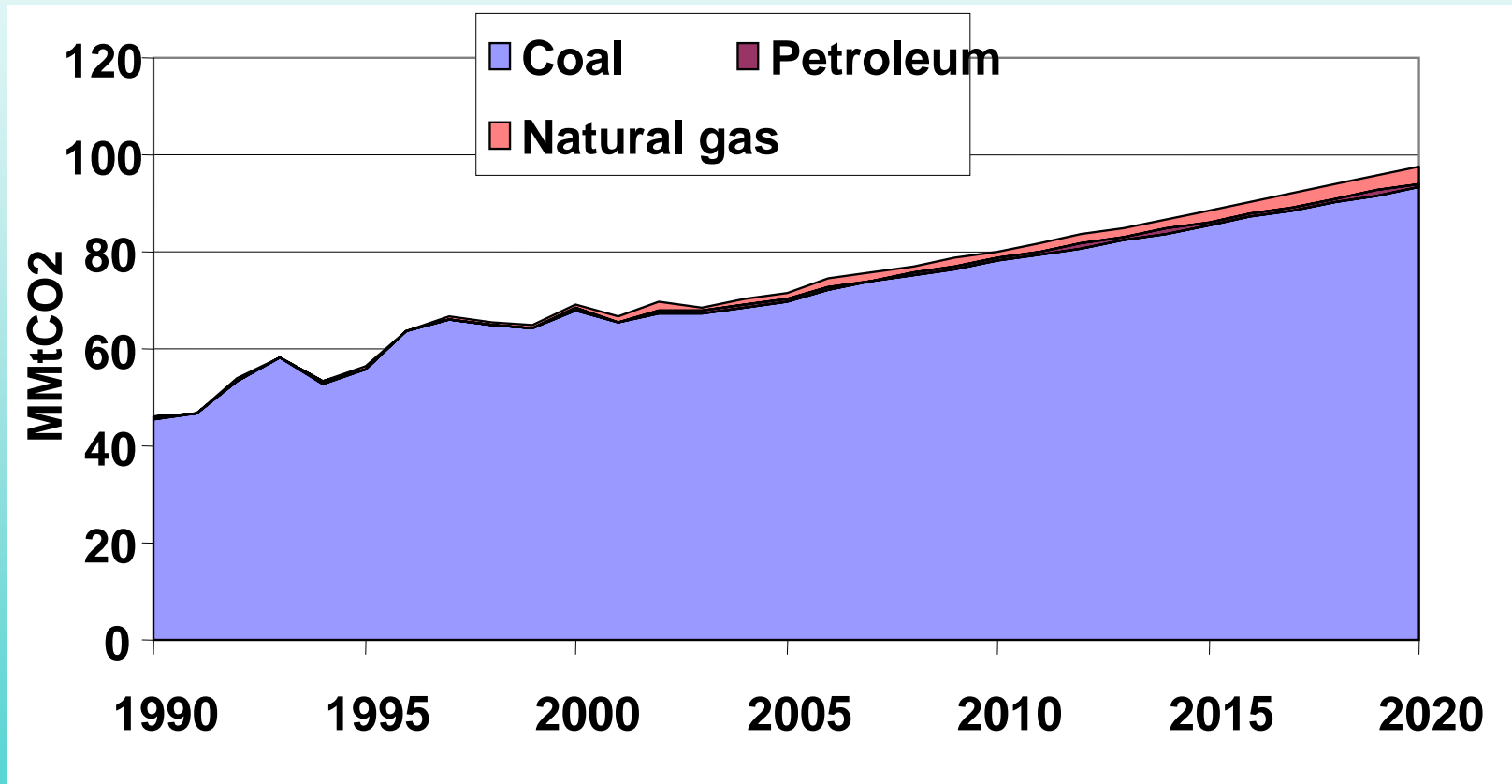
Emissions Growth



Key Points

- Overall state emissions rates are projected to increase 112% above 1990 levels by 2020
- Majority of growth related to electricity consumption, ODS substitutes, and transportation
- Electricity consumption driven by demand and assumption that natural gas prices increases will shift to higher reliance on coal

Electricity Consumption



Electricity

- Data Sources
 - EIA's State Energy Data System
 - EPA SGIT
 - *North Carolina Energy Outlook 2003*
 - Annual Report of the North Carolina Utilities Commission Regarding Long Range Needs for Expansion of Electric Generation Facilities for Service in North Carolina, July 2005
- Methods
 - Apply growth assumptions in following slides to current electricity generation and consumption data

Electricity

- Key Assumptions and Uncertainties
 - 1.5% to 1.7% growth in generation
 - Mix of generation from new non-renewables (or from uprates or plant improvements at existing plants):
 - 81% coal
 - 14% natural gas
 - 4% nuclear (from uprates)
 - 1% petroleum

Electricity Forecast Assumptions and Data Sources

Variable	Assumption	Source
Electricity sales	1.5% - 1.7%	Annual Report of the North Carolina Utilities Commission Regarding Long Range Needs for Expansion of Electric Generation Facilities for Service in North Carolina, July 2005
Electricity generation	1.4% - 1.6%, based on reported growth in new capacity (as a proxy for growth in generation)	Ibid
Transmission and Distribution losses	10% losses are assumed, based on average statewide losses, 1994-2000	US EPA Emission & Generation Resource Integrated Database
New Renewable Generation Sources	0.33% annual growth in renewables. New renewables assumed to be either biomass or wind split according to the following: 75%/25% biomass/wind for 2004 to 2010, 50%/50% for 2010 to 2020.	<i>North Carolina Energy Outlook 2003</i>

Electricity Forecast Assumptions and Data Sources

Variable	Assumption	Source
New Non-Renewable Generation Sources (2004-2010)	Average over the period 2004 – 2020 (varies somewhat by year): 81% coal 14% natural gas 4% nuclear (from uprates) 1 % petroleum.	<i>North Carolina Energy Outlook 2006</i>
Heat Rates	The assumed heat rates for new gas and coal generation are 7000 Btu/kWh and 9000 Btu/kWh, respectively	Based on estimates used in similar analyses. For example, the Oregon Governor’s Advisory Group on Global Warming
Operation of Existing Facilities	Existing facilities are assumed to continue to operate as they were in 2003. Assume small improvements in existing facilities that lead to higher capacity factors are included in the generation.	<i>North Carolina Energy Outlook 2006</i>

Public Input, Announcements

Next TWG Call

- Agenda
 - Further review of mitigation options list
 - Review of technical work group plans
- Time and date