

North Carolina

Climate Action Plan Advisory Group

Transportation and Land Use Technical Work Group Teleconference Meeting #1

April 11, 2006



Today's Agenda

- Call to order
- Introduction of Technical Work Group (TWG) members
- Review of TWG organization and logistics
- Review and discussion of list of potential state actions
- Review and discussion of the draft North Carolina greenhouse gas (GHG) emissions inventory and forecast for Transportation and Land Use
- Discussion of next steps toward identification of priorities for analysis of options
- Call to the public
- Proposed agenda items for next meeting
- Announcements

Part 1 - TWG Process

- Schedule
- TWG roles
- Tasks

CAPAG Schedule

- CAPAG meetings through 2007
- TWG discussions between CAPAG meetings
- Final Work Products
 - Proposed policy recommendations
 - GHG inventory & forecast
 - Final Report to DENR

Sector Based TWGs

- Energy Supply (power generation)
- Residential, Commercial, Industrial (energy use and industrial process)
- Transportation and Land Use
- Agriculture and Forestry
- Cross Cutting Issues (reporting, registries, education)

Roles & Responsibilities

- DENR convenes CAPAG
- CAPAG makes recommendations to DENR and supports Legislative Commission
- Technical work groups advise CAPAG
- Public input to CAPAG
- CCS provides facilitation, technical analysis to CAPAG and TWGs, final report to DENR

TWG Tasks

- Identify potential mitigation options
- Identify early priority options for analysis
- Craft straw proposals for mitigation options, including policy design and implementation methods
- Approve methods for cost-benefit analysis
- Assist with data and analysis
- Assist with evaluation of additional issues, such as co-benefits, detailed cost breakdowns, as needed
- Identify and develop alternative approaches for policy options, as needed
- Contribute to drafting of language for the final report

First TWG Meetings

- Review/expand list of potential options
- Identify initial priorities for analysis
- Review emissions inventory & forecast
- Review proposed technical work plan and meeting schedule
- Prepare suggestions for next CAPAG meeting

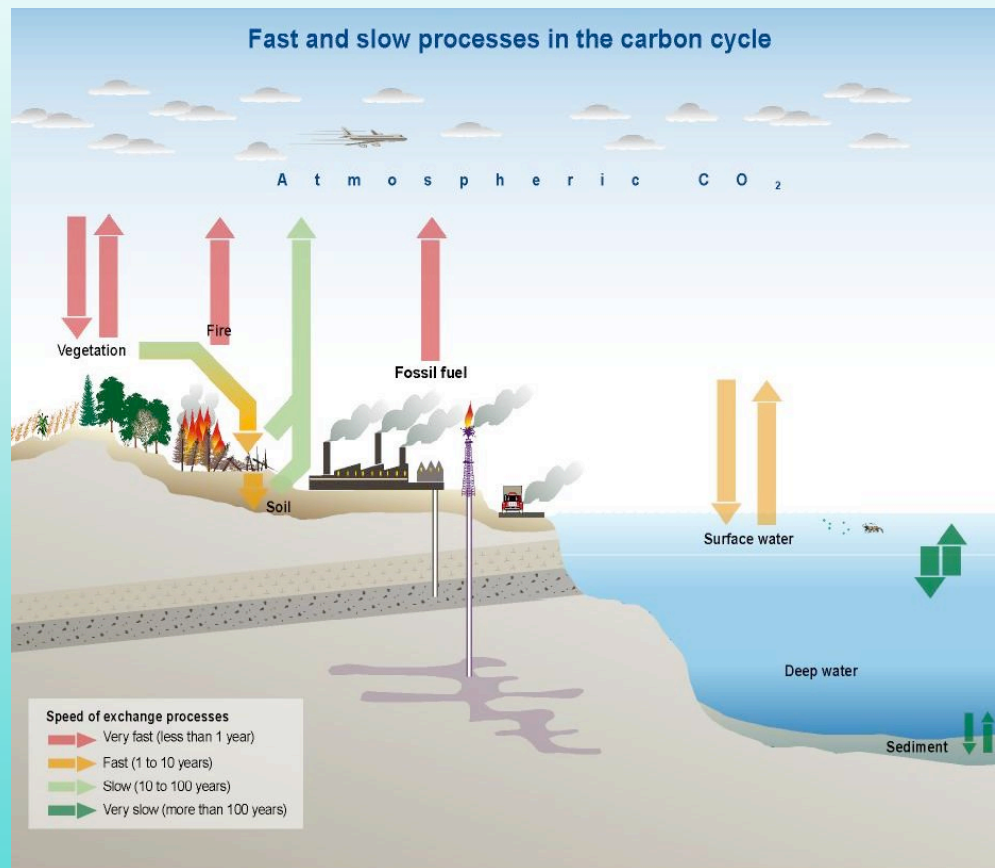
DENR/CAPAG Assistance to Study Commission

- Provides inputs and responses to fact finding requirements of Section 5 - b, c, d, f...
 - Emissions assessments
 - Potential policy actions
 - Potential implementation mechanisms
 - Economic analysis of policy options
 - Alternatives to address potential conflicts
- Responds to questions of the LCCC as they relate to state policy actions

Part 2 - GHG Mitigation Options

- Sector based actions
- Implementation mechanisms

Carbon Cycle



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GHG Pathways

- CO₂
 - Photosynthesis > carbon pools > combustion > dispersion
- CH₄
 - Plant/animal organic matter > anaerobic decomposition > dispersion
 - Carbon pools > carbon combustion & fugitive release > dispersion
- N₂O
 - Carbon combustion > dispersion
 - Nitrogen deposition > decomposition > dispersion
 - Nitrogen fixing plants > nitrification > dispersion
- HFC's, SFC's, PFC's (ODS)
 - Chemical manufacturing > fugitive release, process dispersion
- Black Carbon
 - Carbon pools > combustion > dispersion

Mitigation Sectors

- Agriculture
- Forestry
- Electricity and Fuel Production
- Residential, Commercial, Industrial (Energy Use and Industrial Process)
- Transportation and Land Use
- Waste Management - Bio Waste

Implementation Mechanisms

- Voluntary Agreements
- Technical Assistance
- Information and Education
- Financial Incentives
- Codes and Standards
- Market Based Approaches
- Reporting and Registries
- Others...

Key Actions... Transportation

- Reduce travel demand for passengers and freight
- Reduce vehicle emissions for cars and trucks
- Expand use of low emitting (renewable) fuels
- Remove fine particulates (black carbon or soot)
- Reduce emissions from service equipment

Part 3 - NC GHG Inventory & Forecast

- Overview
- Preliminary findings for the Transportation and Land Use sector

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

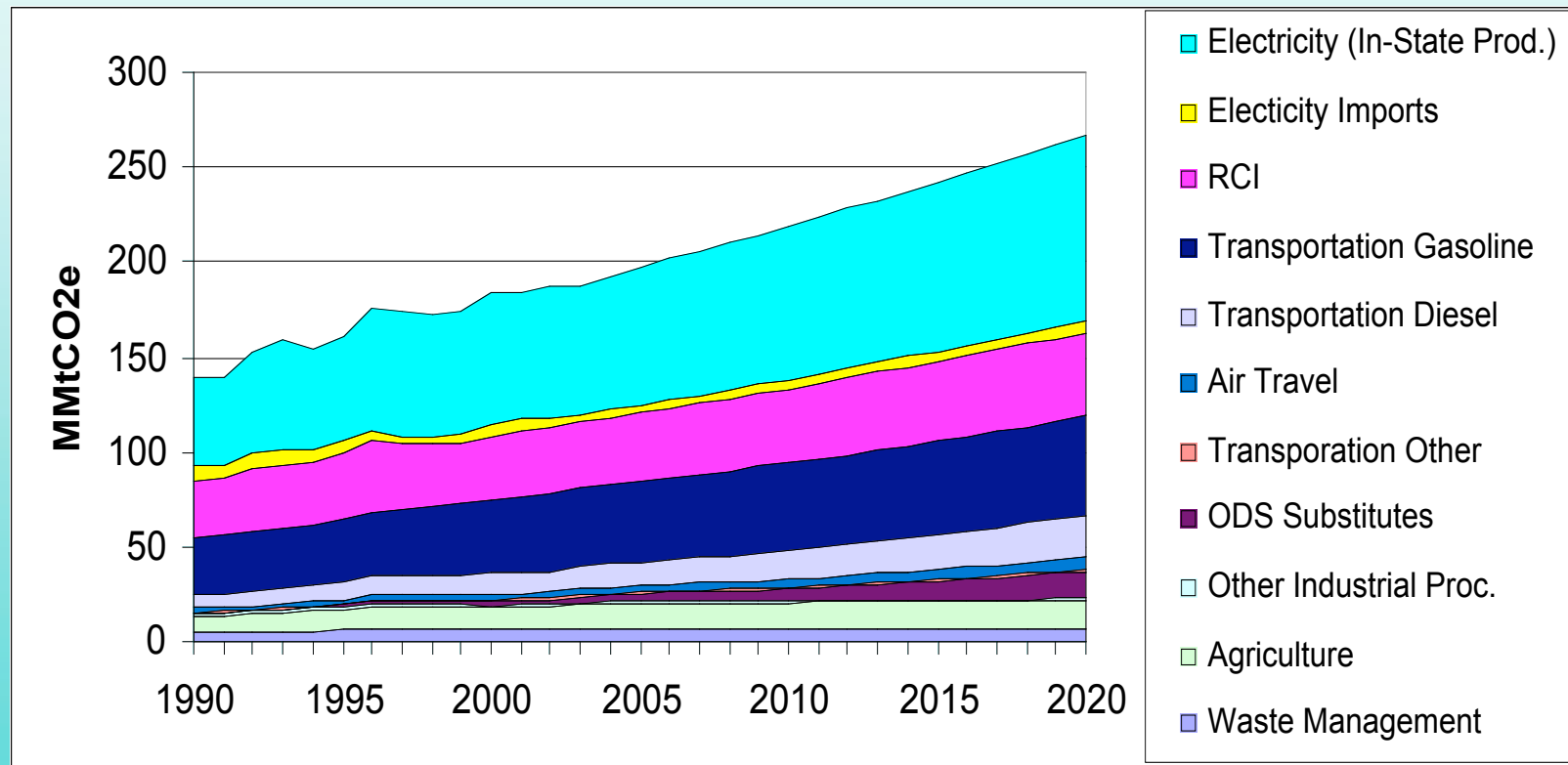
Inventory Approach

- 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

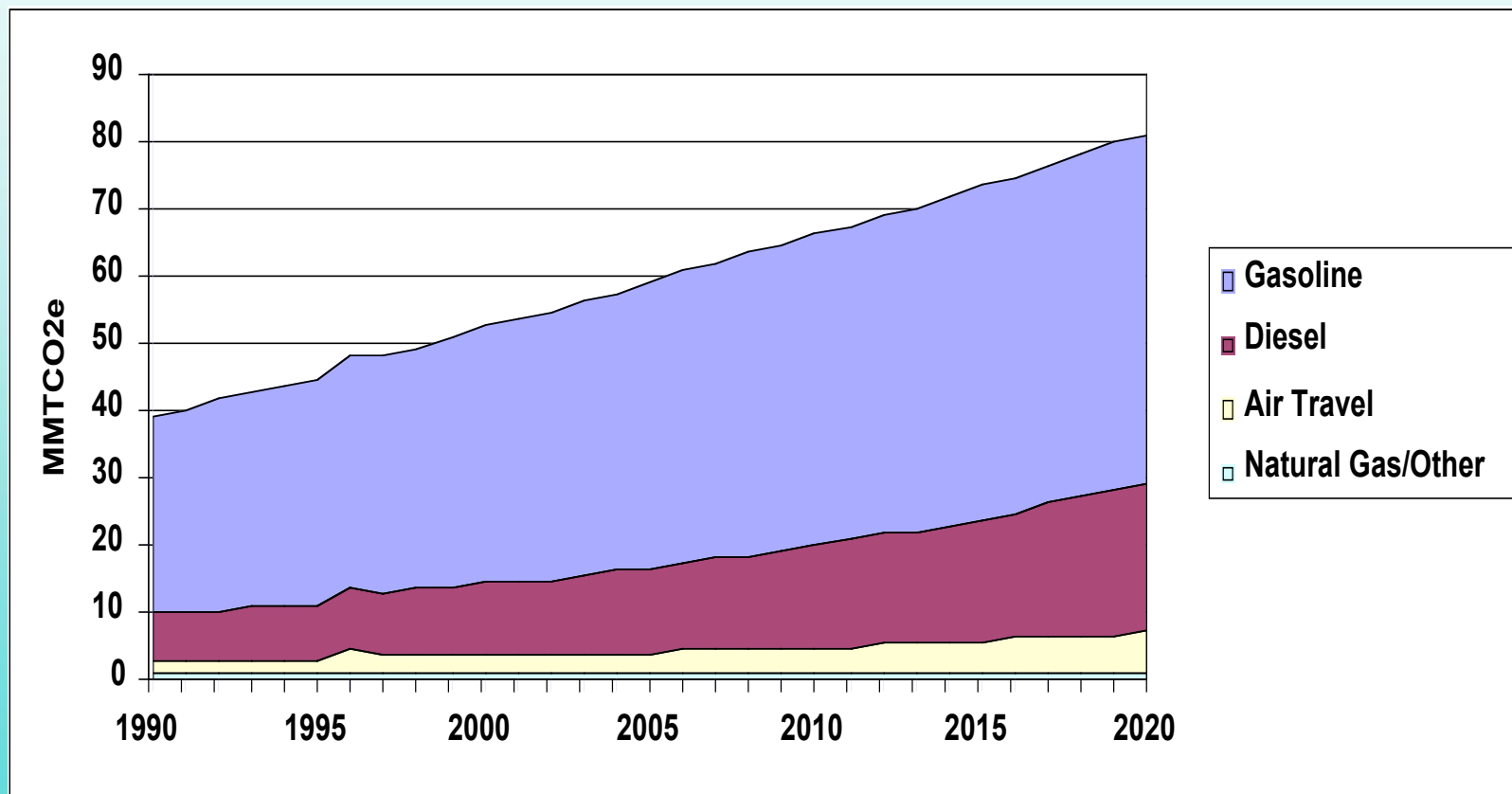
NC GHG Emissions 1990-2020



Transportation

- Emission Sources:
 - On-road gasoline and diesel vehicles
 - Non-road gasoline and diesel vehicles
 - Jet and gasoline-fueled piston aircraft
 - Agricultural and construction equipment
 - Locomotives
 - Boats and ships

Transportation



Transportation

- Inventory (1990–2001):
 - Data Sources for On-road Vehicles
 - SGIT – updated emission factors to latest used by EPA
 - CO2
 - Fuel consumption from *North Carolina Energy Outlook 2003*
 - CH4 & N2O
 - Federal Highway’s Highway Performance Monitoring System (HPMS) VMT for 1990 – 2001
 - NCDENR Data:
 - » 2002 VMT, and vehicle age distributions by geographic area
 - » 2002 & 2009 VMT mix by vehicle type & geographic area

Transportation

- Inventory (1990–2001):
 - Methods for On-road Vehicles
 - CO₂
 - Conversion of fuel usage to CO₂ using standard coefficients
 - CH₄ and N₂O
 - Adjusted HPMS VMT for each year using ratio of NCDENR 2002 VMT to 2002 HPMS VMT
 - Statewide weighted-average VMT mix – calculated using NCDENR VMT mix by vehicle type for 2002 & 2009 by geographic area
 - Statewide weighted-average vehicle age distribution – calculated using NCDENR 2002 vehicle age distributions by geographic area

Transportation

- Inventory (1990–2001):
 - Data Sources and Methods for Non-Road Vehicles
 - SGIT and fuel consumption from North Carolina Energy Outlook 2003
 - CO₂, CH₄ and N₂O

Transportation

- Ref. Case Projections (2002–2020):
 - Data Sources and Methods for On-road Vehicles
 - CO₂
 - Fuel consumption projections from North Carolina Energy Outlook 2003
 - Growth rate in VMT corresponds reasonably well with the expected growth rate in on-road gasoline fuel consumption
 - CH₄ and N₂O
 - NCDENR prepared 2002 and 2009 VMT data files from detailed VMT modeling work
 - Calculated average annual VMT growth rate from NCDENR data – assumed to be 2.4% per year from 2002 to 2020

Transportation

- Ref. Case Projections (2002–2020):
 - Data Sources and Methods for Non-Road Vehicles
 - Fuel consumption projections from North Carolina Energy Outlook 2003
 - CO₂, CH₄ and N₂O

Transportation

- Key Assumptions
 - Inventory
 - NC VMT is 15% more than HPMS VMT
 - Reference Case Projections
 - VMT growth assumed to be 2.4% per year for 2002 – 2020

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

Public Input, Announcements

Next TWG Call

- Agenda
 - Further review of mitigation options list
 - Further review of inventory and forecast
- Time and date