



# South Carolina Climate, Energy & Commerce Advisory Committee

AFW Technical Working Group  
Meeting #1

May 29, 2007

Office of the Governor

The Center for Climate Strategies

# Welcome and Introductions

- Governor's Office
- Chairman, Honorable Senator John Courson
- State Agencies
- AFW Technical Work Group (TWG)  
Members
- Members of the Public
- Center for Climate Strategies

# Agenda

- Introductions
- Purpose and Goals
- Review of TWG Process
- Review and Discussion of the Catalog of State Actions
- Review of the SC Draft Emissions Inventory & Forecast
- Agenda, Time and Date for Next Meeting
- Public Input and Announcements

# SC CECAC Purpose & Goals

- Purpose
  - Achievement of Executive Order 2007-04
- Goals
  - Review and approval of a current and comprehensive inventory and forecast of greenhouse gas (GHG) emissions in South Carolina from 1990 to 2020;
  - Development and recommendation of a comprehensive set of specific policy recommendations and associated analyses to reduce GHG emissions and enhance energy and economic policy in South Carolina by 2020 and beyond;
  - Development and recommendation of a set of recommended statewide GHG reduction goals and targets for implementation of these actions; and
  - Issuance of recommendations in the form of a final report to the Governor by June 2008.

# Part 1

- TWG Process

# SC CECAC Roles & Responsibilities

- CECAC Process convened by Governor Sanford
- Oversight and coordination by the Chair
- CECAC makes recommendations to Governor
- **TWGs provide informal guidance to CECAC**
- Public input and review for stakeholders
- CCS provides facilitation, technical support, final report

# TWG Roles

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

# TWG Composition

- Energy Supply
  - Heat and power generation; typical locus for cap and trade or carbon tax policy
- Commercial, Industrial, and Residential
  - Energy efficiency & conservation, industrial process, waste management
- Transportation and Land-Use
  - Including vehicle efficiency, alternative fuels & demand reduction programs, development patterns
- Agriculture, Forestry and Waste
  - Land protection, forest restoration, sustainable forest management, bioenergy, sustainable wood products, waste reduction, recycling
- Cross-Cutting Issues
  - Reporting, registries, public education

# Ground Rules

- Supportive of the process
- Attendance at meetings
- Equal footing
- Stay current with information
- No backsliding
- Do not represent the CECAC or TWGs
- Make objective contributions

# Timing

Date	Action
February 16, 2007	Executive Order and Announcement
April 27, 2007	1 <sup>st</sup> Committee meeting
June 2007	2 <sup>nd</sup> Committee meeting
August 2007	3 <sup>rd</sup> Committee meeting
October 2007	4 <sup>th</sup> Committee meeting
January 2007	5 <sup>th</sup> Committee meeting
April 2007	6 <sup>th</sup> Committee meeting
June 30, 2008	Final Committee Report Due
Between Committee Meetings	TWG conference calls and meetings

# 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

# Building Consensus

- Comprehensive
- Stepwise
- Fact based
- Transparent
- Inclusive
- Collaborative
- Consensus driven



# Coverage Of Issues



- All GHG's
- All sectors
- All potential implementation mechanisms
- State and multi-state actions
- Short and long term actions

# Decision Criteria

- GHG Reduction Potential (MMTCO<sub>2</sub>e)
- Cost or Cost Saved Per Ton GHG Removed
- Co-benefits
- Feasibility Issues

# Catalog of States Actions

- Over 300 actions taken by US states
- Existing, planned and proposed state level actions
- Wide variety of US states
- All sectors
- Wide variety of implementation mechanisms
- Includes key SC actions
- CECAC will add new potential actions
- Starting place for identification of CECAC priorities

# Screening of Potential Actions - Agriculture Sample

Option No.	Climate Mitigation Option	Priority for Analysis	Potential GHG Emissions Reduction	Potential Cost or Cost Savings	Additional Impacts, Feasibility Considerations	Notes
<b>AFW-1</b>	<b>AGRICULTURE'S PRODUCTION OF FUELS AND ELECTRICITY</b>					
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					

# Policy Design Proposals

- TWGs start with Catalog of states' actions, screen options, and recommend priorities for SC
- CECAC identifies about 50 draft potential priority options for further development
- TWGs develop initial policy option designs (“straw proposals”)
  - Timing
  - Goals
  - Coverage
- CCS quantifies and presents for review
- CECAC revisits list of potential priorities, as needed

# Policy Option Template

- Policy Description (Concept)
- Policy Design (Goals, Timing, Coverage)
- Implementation Methods
- Related Programs and Policies (BAU)
- Estimated GHG Savings and Costs Per MMTCO<sub>2</sub>e
  - Data Sources, Methods and Assumptions
  - Key Uncertainties
- Additional (non-GHG) Benefits and Costs, as Needed
- Feasibility Issues, if Needed
- Status Of Group Approval
- Level of Group Support
- Barriers to Consensus, if any

# Final Report

- Executive Summary
- Background, Purpose And Goals
- SC Emissions Inventory & Forecast
- CECAC Recommendations & Results
  - Agriculture
  - Forestry
  - Energy Supply
  - Residential, Commercial, Industrial
  - Transportation & Land Use
  - Waste Management
  - Cross Cutting Issues
- Appendices



# Part 2

- Potential GHG Policy 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
- Add to or revise as needed for SC

# AFW Catalog of State Actions

- *Please see separate Catalog handout.*

# Part 3

- SC draft GHG emissions inventory and forecast

# Inventory Approach

- Standard US EPA and UN methodologies, guidelines, and tools
- Emphasis on transparency, consistency, and significance
- Preference for South Carolina 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 and employment forecasts
  - US Census and Bureau of Labor & Statistics
  - US Energy Information Administration

# Coverage

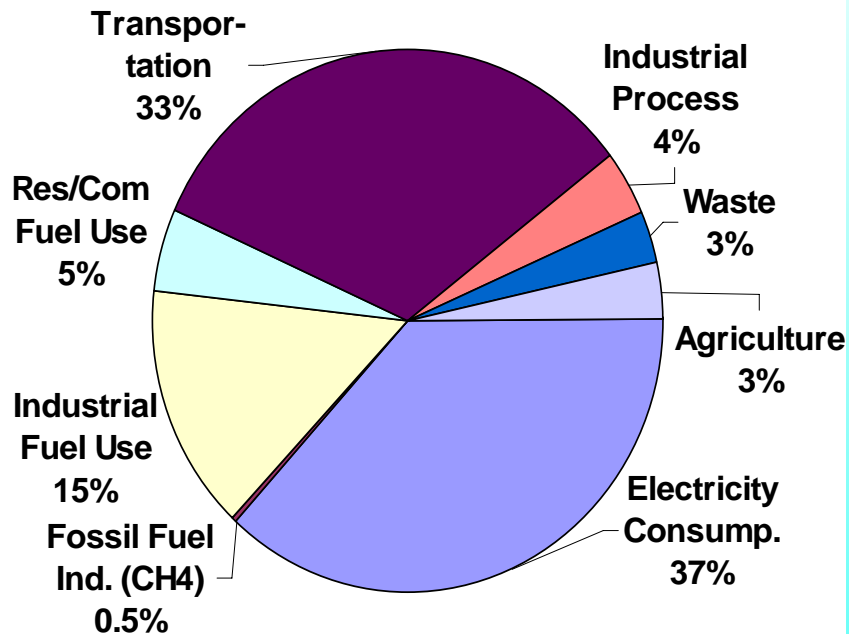
- Six gases per USEPA and UNFCCC guidelines
  - Carbon Dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>), Nitrous Oxide (N<sub>2</sub>O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulfur Hexafluoride (SF<sub>6</sub>)
- All major emitting sectors
  - Electricity Supply & Demand (Consumption Based)
  - Residential, Commercial, Industrial (RCI) Fuel Use
  - Industrial Non-Fuel Use Processes
  - Transportation (onroad and nonroad)
  - Natural gas pipeline transmission & distribution
  - Agriculture, Forestry, and Waste
- Emissions expressed as CO<sub>2</sub> equivalent
  - 100-year global warming potentials
    - CO<sub>2</sub> = 1; CH<sub>4</sub> = 21; N<sub>2</sub>O = 310; HFC-23 = 11,700; SF<sub>6</sub> = 23,900

# Key Points

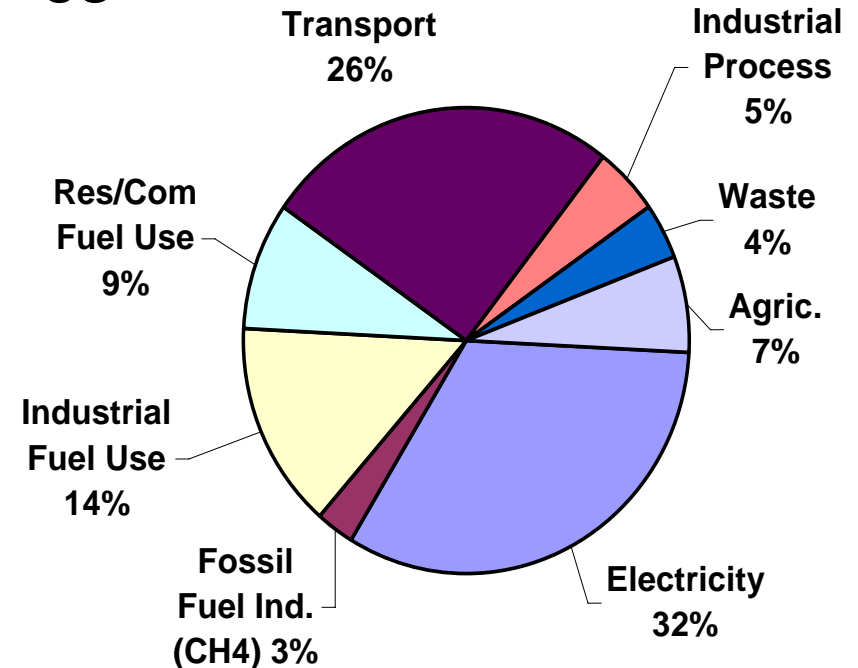
- Preliminary draft for CECAC and TWG review and revision, as needed
- Helpful for diagnosis of GHG emissions, but not a baseline for modeling or compliance for individual options
- Consumption and Production methods
- Net and Gross methods

# South Carolina & US Gross Emissions By Sector, Year 2000

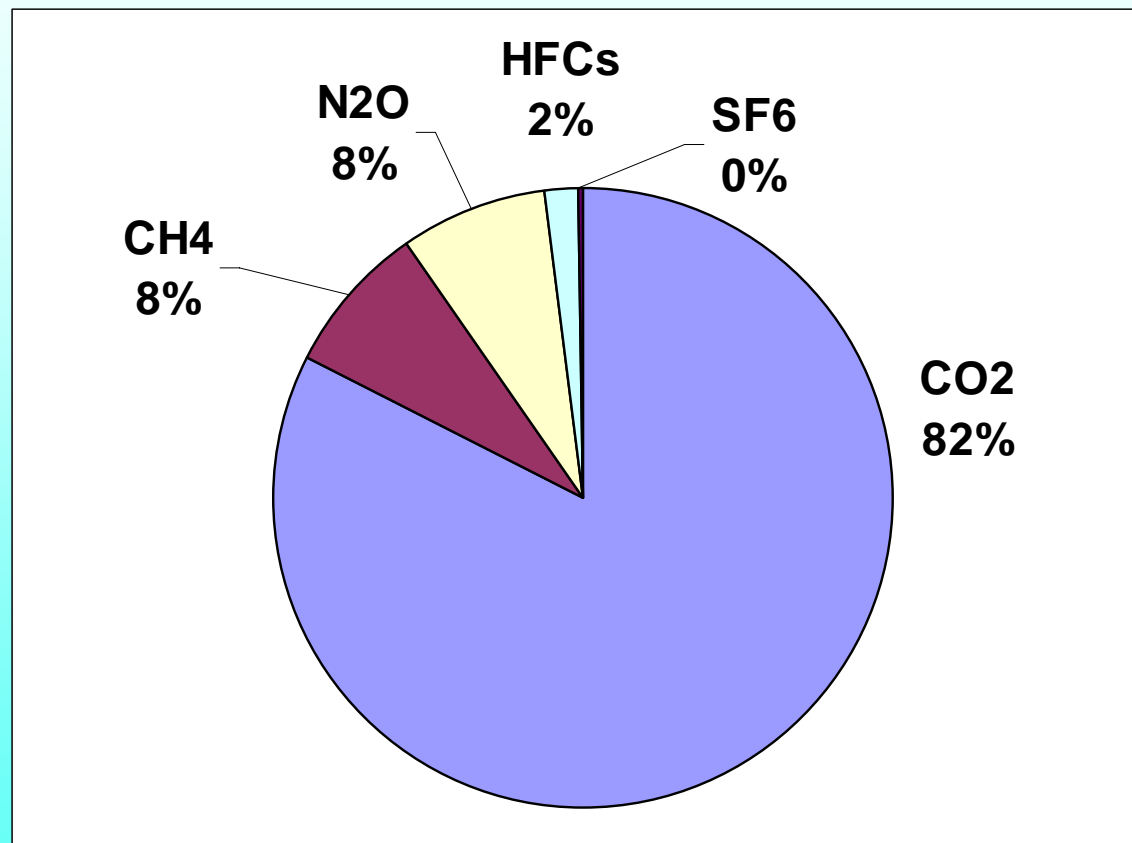
## South Carolina



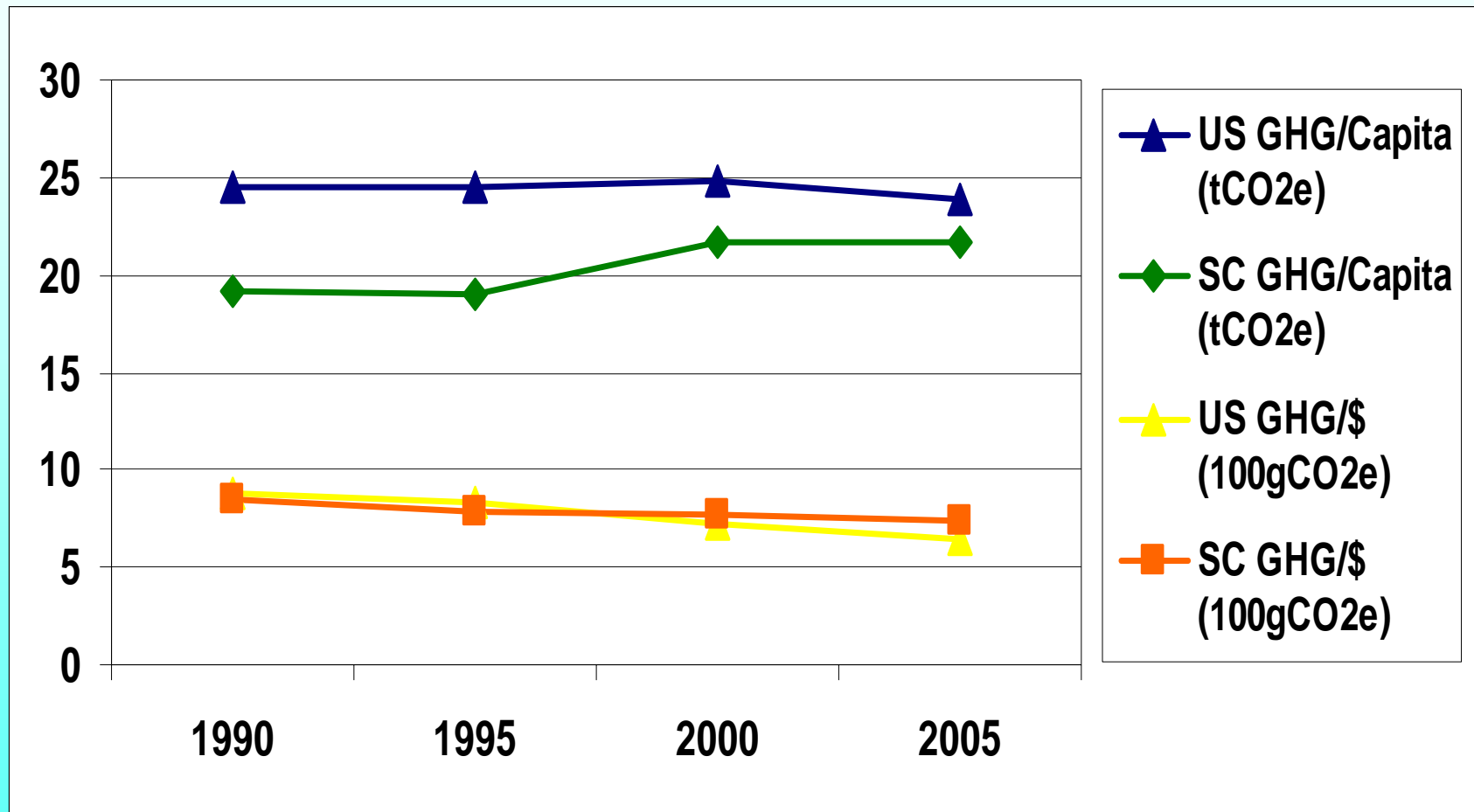
## US



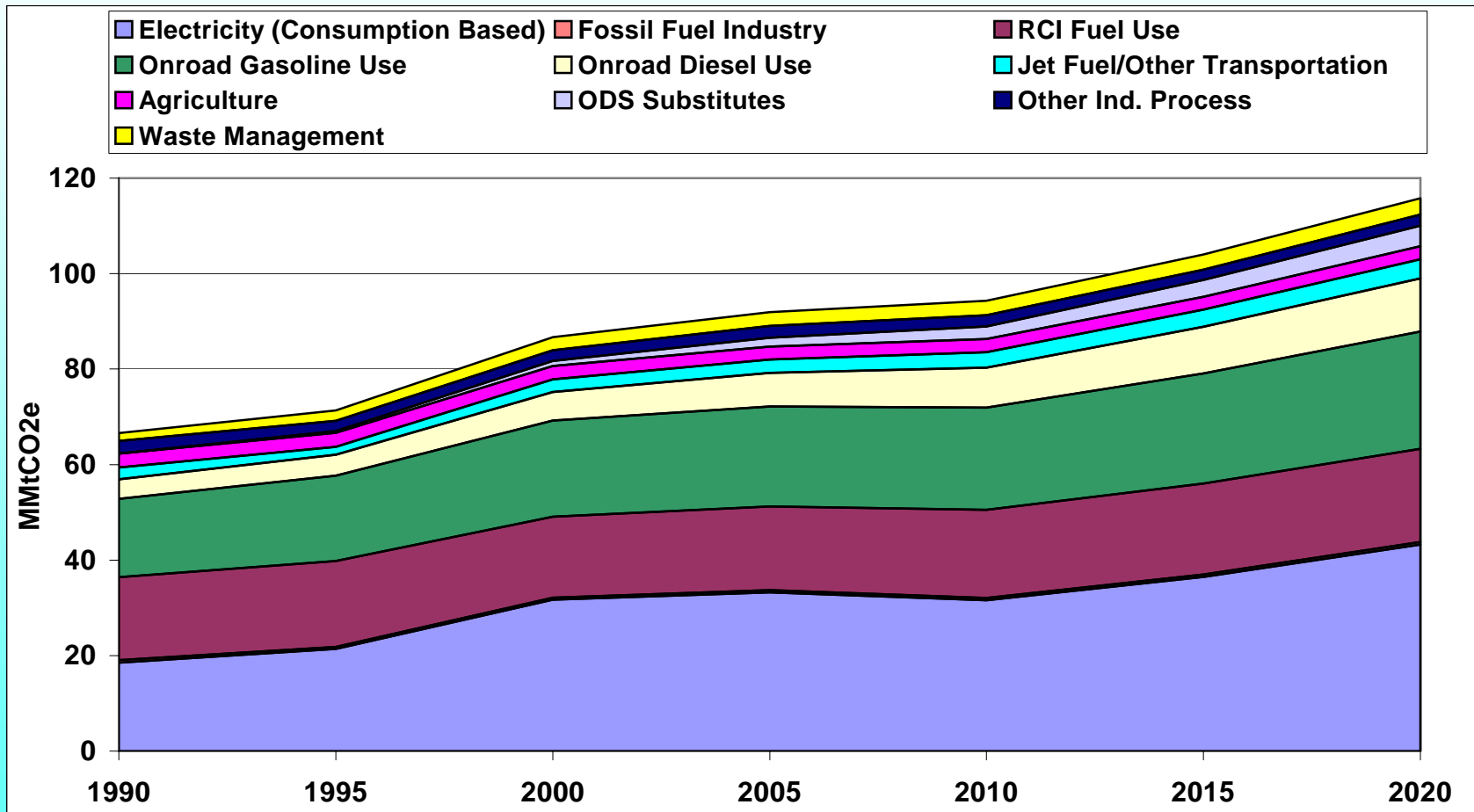
# South Carolina Gross Emissions By GHG, Year 2000 (MMtCO<sub>2</sub>e Based)



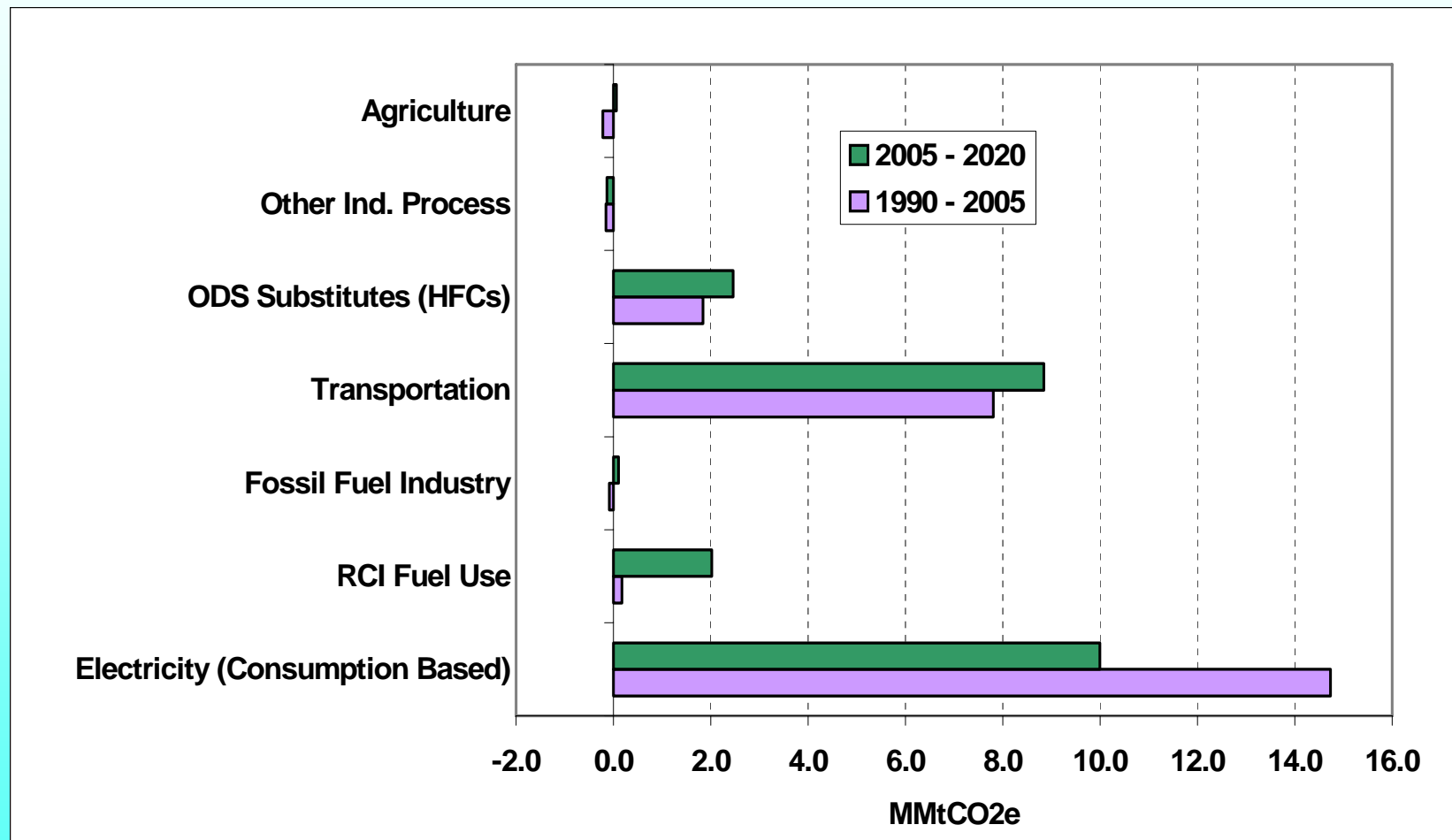
# Per Capita and GSP/GDP Gross GHG Emissions, 1990-2005



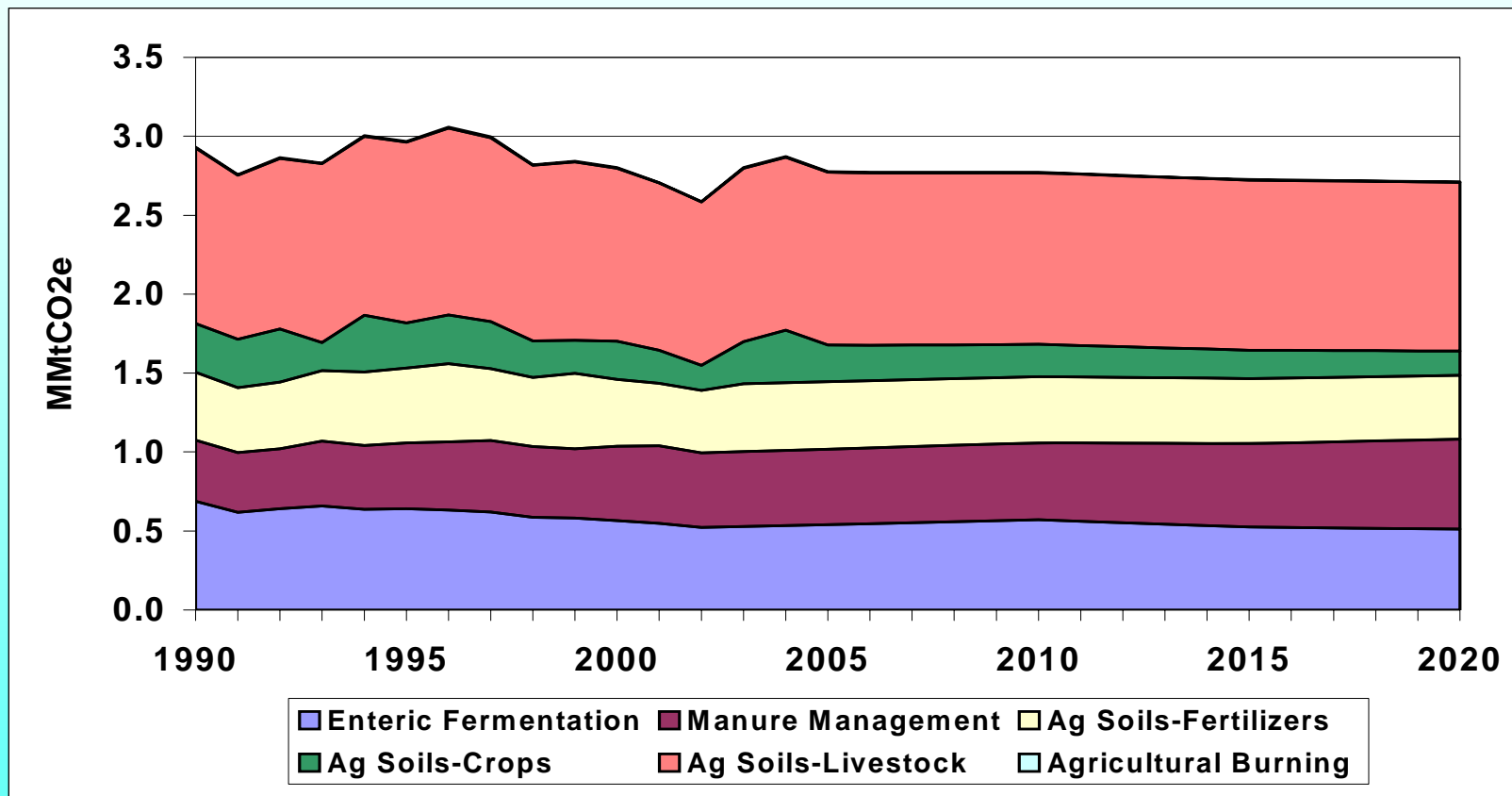
# South Carolina Gross GHG Emissions By Sector, 1990-2020



# South Carolina Gross Emissions Growth (MMtCO<sub>2</sub>e Basis)



# Agriculture



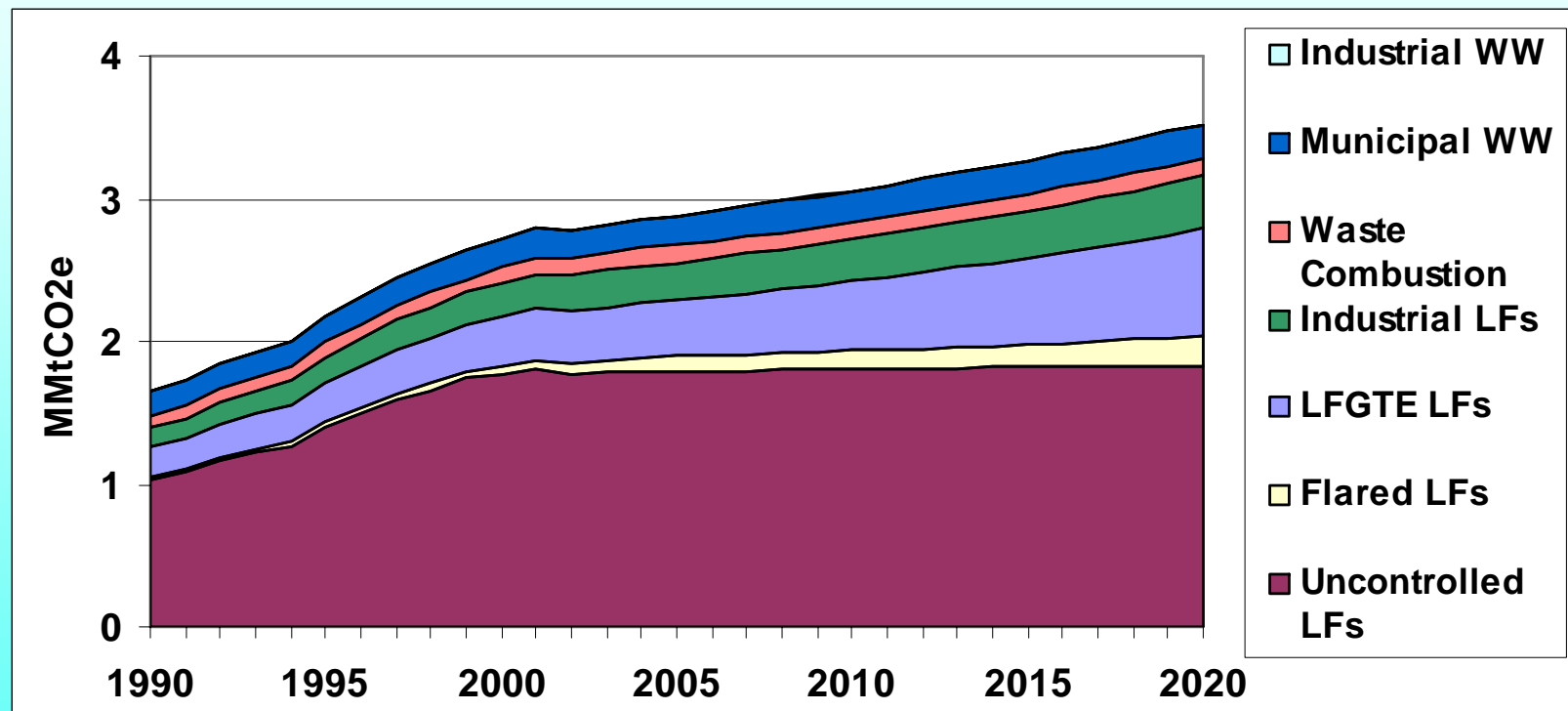
# Agriculture

- Data Sources
  - Crop Production: USDA/NASS
  - Livestock: USDA/NASS
  - Fertilizer: Fertilizer Institute
- Methods
  - Crops: SGIT emission factors and crop production data
  - Livestock: SGIT emission factors and livestock populations
  - Fertilizer: SGIT fertilizer consumption
  - Livestock population projections based on methods from VISTAS Regional Planning Organization inventory
  - Projections for other categories based on historical growth trends

# Agriculture

- Key Assumptions
  - Future growth for agricultural soils will follow historical trends
  - Livestock population growth will follow national trends (VISTAS inventory uses USDA projections for most livestock categories)
- Key Uncertainties
  - Manure management emission factors derived from limited data sets
  - Livestock numbers based on point estimates for each year to represent populations that fluctuate throughout the year
  - Projection assumptions

# Waste Management



# Waste Management

- Data sources
  - EPA Landfill Methane Outreach Program Database
  - Additional landfill data provided by SCDHEC
  - SCDHEC data on waste combustion and wastewater (WW) flows for fruit/vegetable processing
  - State population and SGIT default data for municipal WW treatment
- Methods
  - SGIT with data sources above
  - CCS post-processing to account for controls and growth

# Waste Management

- Key Assumptions
  - Growth Rates
    - Landfills – based on historic emissions growth (2000-2005)
    - Industrial WW – based on historic emissions growth (1990-2005)
    - Municipal WW – SC population projections
- Key Uncertainties
  - Future controls applied to uncontrolled landfills
  - Industrial landfills
    - SGIT default of 7% of municipal landfills
  - Industrial WW
    - Growth for food/vegetable processing

# Forestry

<b>Forest Pool</b>	<b>Carbon Flux (MMtC)</b>	<b>Carbon Flux (MMtCO<sub>2</sub>) (negative number = net sink)</b>
Live Tree	-4.7	-17
Understory	-0.2	-0.8
Standing Dead & Down Dead	-0.4	-1.5
Forest Floor	-0.04	-0.15
Soil Carbon* (data subject to change)	7.6	28
Harvested Wood Products	-2.5	-9.0
<b>Totals</b>	<b>-0.3</b>	<b>-1.0</b>
<b>*Totals (excluding soil carbon)</b>	<b>-7.8</b>	<b>-28.5</b>
<p>Totals may not sum exactly due to independent rounding.            Data source: Jim Smith, USFS, personal communications with S. Roe, CCS, November 2006 and February 2007.</p>		

# Forestry

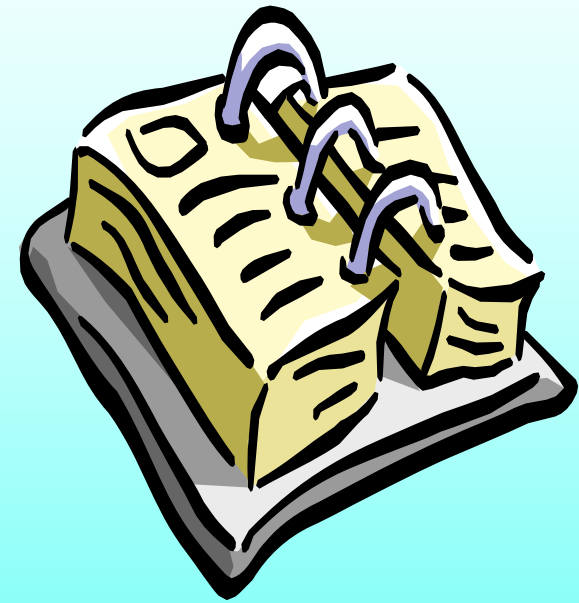
- Data Sources
  - USFS carbon stock data for 2001-2005 based on FORCARB2 model
  - USFS also provides modeled estimates for harvested wood products
- Methods
  - Forestry: USFS FORCARB2 carbon stock change model provides carbon pools for each inventory cycle
  - Flux calculated for each pool based on difference in time between inventory cycles
  - Carbon pool data for the 2001-2005 time-period

# Forestry

- Key Assumptions
  - 2001-2005 carbon stock change representative of current and historical conditions
  - No significant change in sequestration from 2006-2020
- Key Uncertainties
  - Effects of future development on forested acreage
  - Effects of near-term climate change on forest sequestration levels

# Next CECAC Meeting

- Agenda:
  - Add missing actions to catalog
  - Review TWG suggested updates to the South Carolina emissions inventory and projection
  - Prepare to identify initial priorities for analysis
- Time and Date: June 12, 2007; 2:00-3:30 PM



# Public Input, Announcements