



COMMONWEALTH of VIRGINIA
Office of the
SECRETARY of TRANSPORTATION

Climate Change and Transportation

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Climate Change: Background

- **There is widespread agreement from authoritative sources that:**
 - The global climate is becoming warmer
 - Global warming is caused in large part by emissions from cars, power plants and other manmade sources
 - If left unchecked, global warming will cause severe and lasting impacts
- **Intergovernmental Panel on Climate Change (IPCC)**
 - Established in 1988 by United Nations to synthesize the latest research on climate change
 - ***“Fourth Assessment Report: Summary for Policy Makers”*** issued November 2007 concluded global warming **“unequivocal”**
 - Temperatures for 11 or 12 years between 1995 and 2006 warmest since 1850
 - Sea levels have risen
 - Arctic Sea ice has shrunk
 - **The IPCC’s conclusions are widely accepted as consensus opinion of scientific community**

Climate Change: Background

- **PEW Center on Global Climate Change - A non-profit, nonpartisan, independent organization that conducts research on issues related to climate change**
 - ***“Climate Change 101: Overview”***
 - Temperatures will rise by as much as 10 degrees Fahrenheit by the end of this century
 - To avoid the worst effects of climate change, emissions of green house gases (GHG) need to be reduced 50 to 80 percent by 2050
 - The Group of Eight (G-8) countries recently agreed to adopt 50% goal
- **Transportation Research Board (TRB) - A private, nonprofit institution that is a unit of the National Academies**
 - The greatest impact of climate change will be flooding of transportation facilities because of global rise in sea level coupled with storm surge
 - Transportation professionals should incorporate challenges of climate change into planning, design, etc. of transportation systems
 - Every mode of transportation will be affected

Climate Change: Background

- **AASTO – 2007 Publication, “A New Vision for the 21st Century”**
 - “Global climate change has become a political, economic and environmental fact of life”
 - **Transportation policies are needed to reduce dependence on oil, reduce energy consumption and reduce travel demand**
 - **Actions supported**
 - Reduce oil consumption by 20 percent in 10 years
 - Double fuel efficiency of entire fleet by 2030
 - Double transit rider-ship by 2030
 - Expand market share of passenger and freight moved by rail
 - Reduce percentage of commuters who drive to work to 1980 levels
 - Reduce VMT growth rate by 50%

Climate Change: Background

- **Mckinsey & Company, December 2007 Report, “Reducing U.S. Green House Emissions: How Much At What Cost”**
 - Acknowledges concerns by scientists, policy makers and business leaders that a concerted effort is needed to address GHG emissions
 - Objective – Develop economically sensible approach to reducing GHG
 - **GHG projected to increase 35% between 2005 and 2030, key drivers:**
 - Expansion of the U.S. economy
 - Rapid growth in buildings-an-appliances and transportation sectors
 - Increased use of coal-fired power plants
 - **Conclusions**
 - U.S. can reduce GHG emissions 7 to 28 percent below 2005 levels by 2030 by using tested approaches and emerging technologies
 - Requires national and economy wide actions

Climate Change: Background Impacts on the Transportation System

- **Increases in very hot days and heat waves**
 - Compromise pavement integrity
 - Deformation of rail lines, derailments, speed restrictions
 - Thermal expansion of bridge joints
 - Bridge operations and increased maintenance costs
- **Rising sea levels (7 to 23 inches by 2099) coupled with storm surges and land subsidence**
 - Increased flood of coastal roads and rail lines
 - Disruption of coastal waterways systems
- **Increases in intensity of strong hurricanes**

Source: TRB Report in Brief, *Potential Impacts of Climate Change on U.S. Transportation*

Climate Change: Background

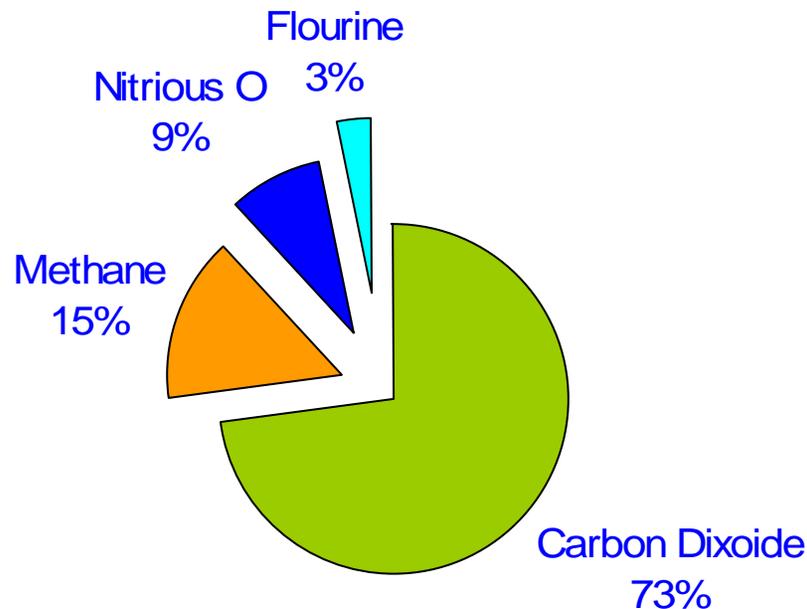
Impact on Virginia

- Carbon dioxide emissions rose 34 percent between 1990 and 2004
- The Chesapeake Bay is particularly susceptible to damage caused by climate change
- Changing rain and temperature patterns would disrupt agriculture and forestry

Source: Executive Order 59

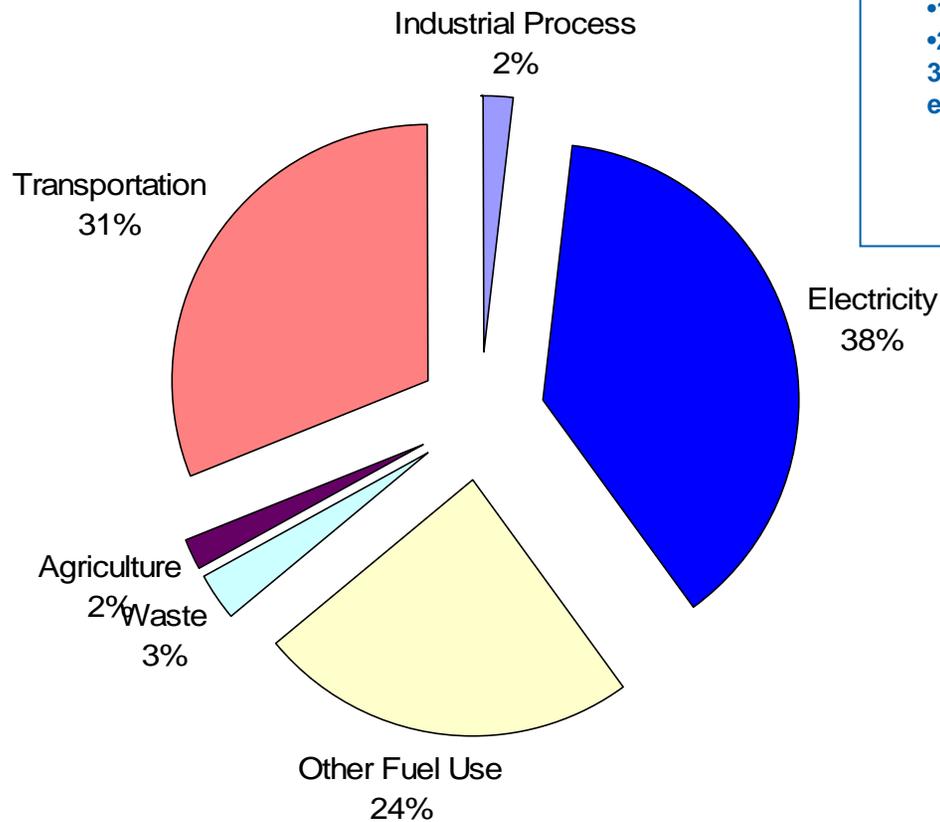
Climate Change: Background

2005 GHG Emissions by Gases for Virginia



Source: DEQ, [Emissions Inventory for Green House Gases 2002-2005 \(Draft\)](#).

Transportation's Role: 2005 GHG Emissions by Sector for Virginia



Total Emissions

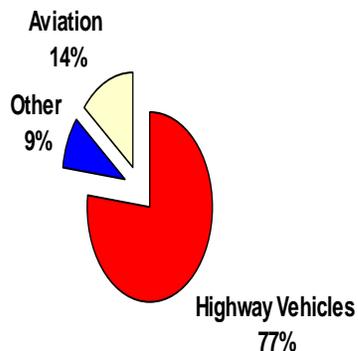
- 175 million metric tons, 2005
- 230 million metric tons by 2025;
- 35% transportation, 40% electricity

Source: DEQ, [Emissions Inventory for Green House Gases 2002-2005 \(Draft\)](#).

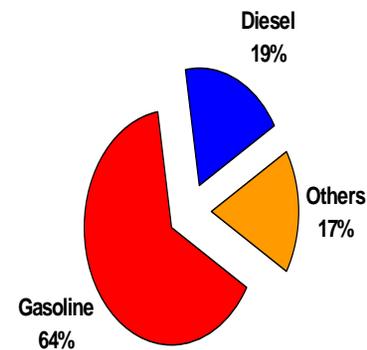
Transportation's Role:

Emissions by Vehicle and Fuel Types for Virginia

Vehicle Type



Fuel Type



Notable Regional Initiatives

- **Midwestern Regional Greenhouse Gas Reduction Accord (November 2007)**
 - Illinois, Iowa, Kansas, Michigan, Minnesota, Wisconsin, Canadian Province of Manitoba
 - Established targets, including 60 to 80 percent below current levels by 2050
- **Western Climate Initiative (February 2007)**
 - Arizona, California, New Mexico, Oregon, Washington, Utah, Montana, several Canadian provinces
 - Established regional target of 15 percent reduction below 2005 by 2020
- **Regional Green House Gas Initiative (December 2005)**
 - Delaware, Connecticut, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont
 - Cap emissions at current levels in 2009, reduce 10 percent by 2019
- **The Climate Registry (May 2007)**
 - 39 member states including Virginia
 - Develop common system for reporting emissions

Source: *Learning from State Action on Climate Change*, December 2007 Update, Pew Center for Climate Change

Notable State Initiatives

- **Thirty-seven states have climate action plans completed or in development**
- **Seventeen have state-wide emission targets, including:¹**
 - California, Global Warming Solutions Act, caps emissions at 1990 levels by 2020
 - Washington, SB 6001, 1990 levels by 2020
 - New Mexico, Executive Order, 2000 emissions by 2012, 10% below 2002 by 2020
 - Oregon, HB 3543, 10% below 1990 by 2020
 - Minnesota's Next Generation Energy Act, 15% reduction below by 2015, 30% by 2025, and 80% by 2050, based on 2005 levels
 - Florida, Executive Order, 2000 levels by 2017, 1990 levels by 2025
- **Transportation specific initiatives limited**
 - California has adopted emissions standards stricter than federal CAFE standards, several other states have adopted same, EPA has not granted required waiver
 - California has also adopted low-carbon fuel standards

1 - Source: *Learning from State Action on Climate Change*, December 2007 Update, Pew Center for Climate Change

Virginia's Initiatives

- **Executive Order 48 (2007)**
 - Establishes goal for state agencies to reduce energy costs by 20% below 2006 levels by 2010
 - Requires progress reports through Management Scorecard
- **SJR 385 (2007) – Fuel Efficient Vehicles and Transportation Funding**
 - Charge:
 - Study long-term solutions to transportation funding
 - Consider ways to promote the use of hybrid and fuel efficient vehicles
 - Conclusions:
 - Current funding methods will not keep pace with new energy technologies used in vehicles
 - The Commonwealth will see a decrease in motor fuel tax revenues

Virginia's Initiatives

- **Virginia Energy Plan (September 2007)**
 - Covers all aspects of energy demand supply, infrastructure, etc.
 - Acknowledges that climate change will affect Virginia, population, wildlife and economy
 - **Goals**
 - Reduce energy growth by 40%
 - Reduce greenhouse gases by 30% by 2025, back to 2000 levels
 - Increase energy production by 20%
 - **Recommended establishment of a Climate Change Commission**
- **Governor's Climate Change Commission (December 2007)**
 - Comprised of representatives from the General Assembly, state government, local government and private sector

Virginia's Initiatives

- **Governor's Climate Change Commission (December 2007)**
 - Goals
 - Inventory amount and contributors to Virginia's greenhouse gases
 - Evaluate impacts on citizens, natural resources and economy
 - Identify what Virginia needs to do to prepare for likely consequences
 - Identify climate change approaches being pursued by other states, regions and the federal government
 - Identify actions needed to meet 30 percent reduction goal
 - Commission has met on five occasions and heard testimony from numerous federal, state, local, private sector experts and the public
 - Commission has been divided into four workgroups, including Transportation and Land-Use
 - Final Report due December 2008

Virginia's Initiatives

- **VTrans2035**
 - Identify the most cost-effective transportation strategies to reduce GHG
 - Recommend strategies to reduce the carbon footprint of the department and its activities
 - Climate Change Performance Goals and Measures
 - Environmental Stewardship - Tons of transportation emissions, Fuel Usage Per Capita
 - Coordination of Land Use and Transportation - VMT Per Capita
- **VDOT Internal Team**
 - Other state actions on transportation and climate change
 - Reduce energy use in activities, e.g. lighting standards
 - Greening of VDOT facilities, e.g. rest areas, building, reshaping of fleet
 - Change in design standards for coastal areas and concern
 - Workforce and Transportation issues
 - Land use and transportation

Virginia's Initiatives

- **National Capital Region Climate Change Report (July 2008 Review Draft)**
 - Initiated in 2007 by the Metropolitan Washington Council of Government (COG) with goals to:
 - Develop a greenhouse gas inventory
 - Set regional goals and identify best practices for reducing emissions,
 - Make recommendations on regional climate change policy, and governance structure to guide COG's efforts
 - Identify the most cost-effective transportation strategies to reduce GHG
 - Report presented to COG Board on July 9, 2008, currently under review
 - Recommendations include:
 - GHG reduction goals of 80% below 2005 levels by 2050
 - 30% reduction in transportation emissions by reducing VMT, increasing fuel efficiency, and reducing the carbon content of fuel

Carbon Emission Reduction Strategies

Transportation

- **Increase fuel economy**
 - 2007 CAFÉ standards require new vehicles to achieve 35 mpg by 2020
 - Average today for entire fleet is 20 mpg (Europe averages 40 mpg)
- **Promote use of hybrid and alternative fuel vehicles**
 - Gas/electric, plug-in hybrids, biofuels, hydrogen fuel-cell
- **Reduce growth in VMT**
 - Expand use of transit
 - Promote alternatives to single vehicle travel including: walking, biking, ridesharing, telecommuting
 - Promote transit-oriented, compact development

Concluding Observations

- **The Commonwealth Has Made Good Progress in Cleaning the Air**
 - Since 1990, transportation related emissions (VOX, NOx and CO) have decreased
 - In 2007, 17 days exceeded the ozone standards, down from 45 in 2002
- **Most of the GHG Reduction Goals are Aspirational**
- **Transportation Policy Makers Need to Understand and Assess the Risks to Transportation Systems of Climate Change**

Concluding Observations

- **Rising Sea Levels Most Often Cited as Major Concern by Governor's Climate Change Commission Members**
- **The Commission's Recommendations Will Likely Include Strategies to Reduce Fuel Use and VMT**
- **Tensions Exist Between GHG Reduction Strategies and Other Goals**
 - Stable and reliable revenues
 - Economic Vitality

Climate Change and Transportation

QUESTIONS?