

COMMONWEALTH *of* VIRGINIA

Office of the

SECRETARY *of* TRANSPORTATION

Climate Change and Transportation

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VIRGINIA DEPARTMENT OF AVIATION

DRPT Virginia Department of Rail and Public Transportation

MVDB Motor Vehicle Dealer Board COMMONWEALTH OF VIRGINIA

VIRGINIA PORT AUTHORITY Jamestown Landing 1607 1952

VDOT Virginia Department of Transportation

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*

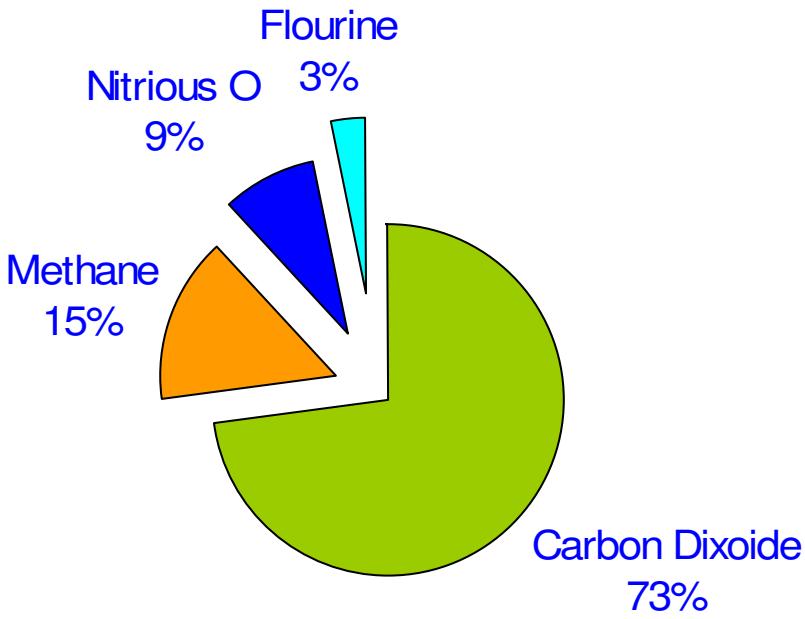
Climate Change: Background
Impact on Virginia

- 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

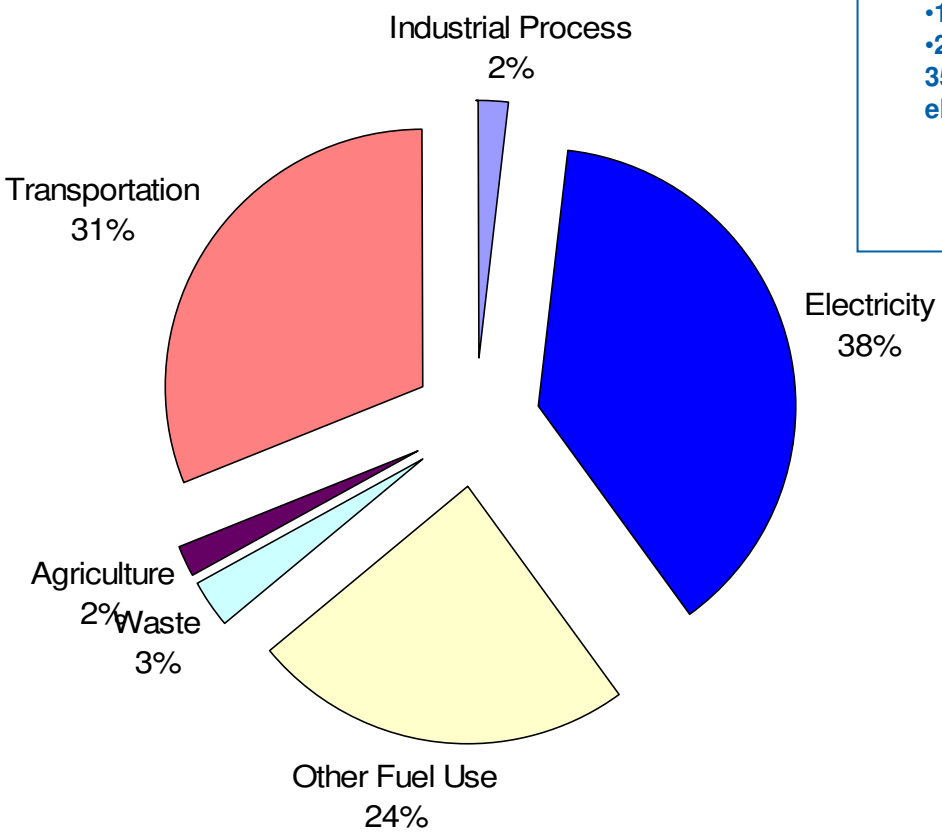
Climate Change: Background

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

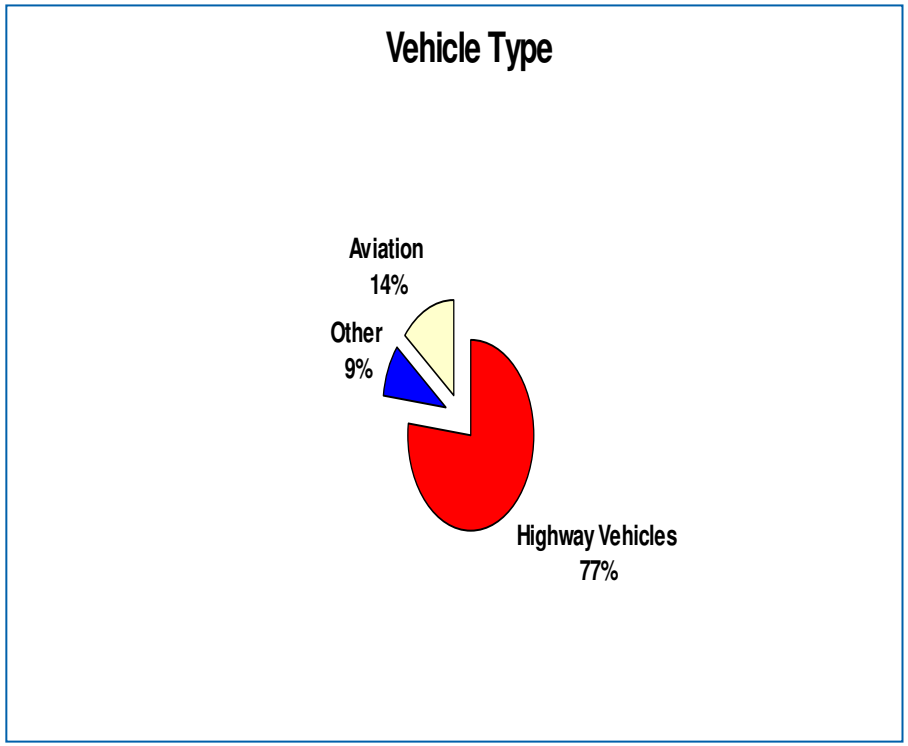


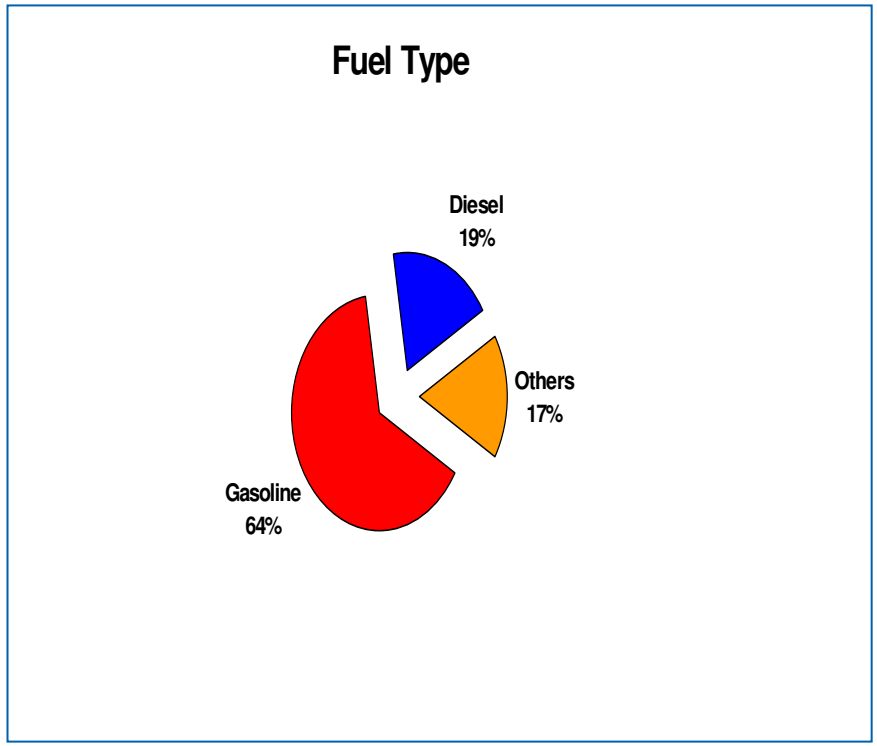
Total Emissions

- 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





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?