



Greenhouse Gas Inventory for the Metropolitan Washington Region

Energy Advisory Committee
February 19, 2009



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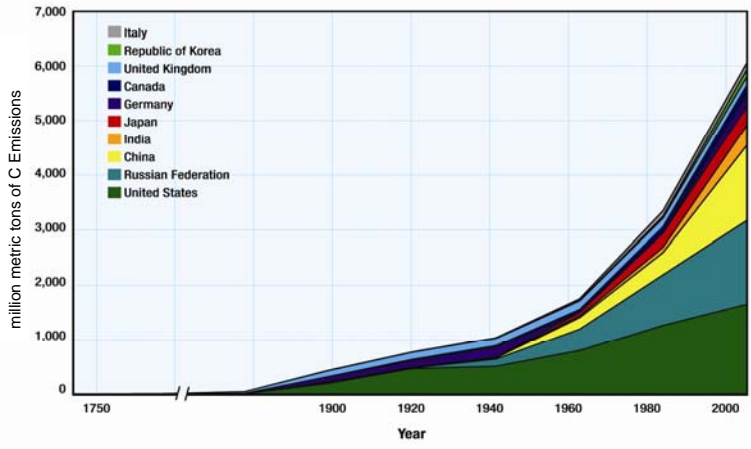
Inventory Development

- COG Board Resolution Called for Regional Greenhouse Gas Inventory
- Greenhouse Gas Emission Workgroup Formed
- Inventory Completed
 - Major Sources: Transportation, Electricity, Energy, Aviation, Landfills, Wastewater
 - 2005 Base Year
 - 2020, 2030, 2050 Projection Years
 - Growth Rates from COG Cooperative Forecasts and US Department of Energy.



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Historical CO₂ Emissions: 1750–2004



Source: Gregg Marland, Tom Boden, and Bob Andres. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory. Available at: http://cdiac.ornl.gov/trends/emis/tre_coun.html. Note: The pre-1850 data are scarce. Data after 1850 are incomplete for some countries, but this has a negligible effect.

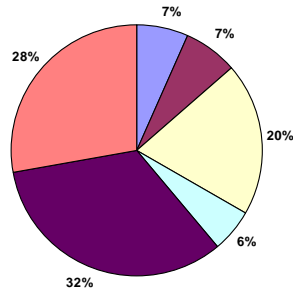


Total US Greenhouse Gas Emissions (Tg CO₂e)

2000	2001	2002	2003	2004	2005	2006
6,359	6,171	6,154	6,137	6,204	6,251	6,171

Source: EPA National GHG Inventory 2008 1 Tg = 1 Million Metric Tons

US Greenhouse Gas Emissions by Sector (Million Metric Tons CO₂ Equiv)

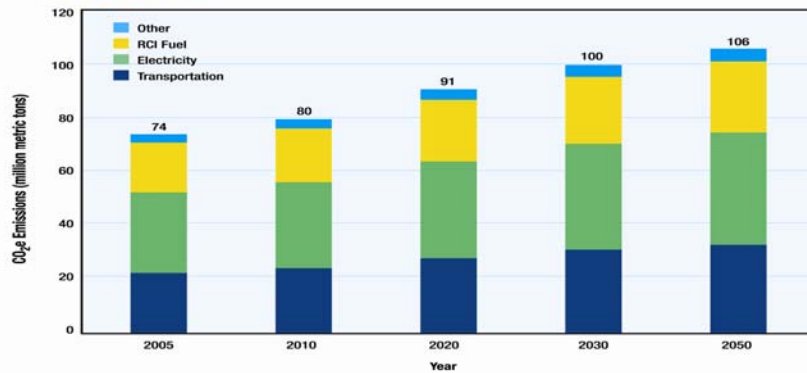


Commercial Residential Agriculture Electricity Generation Industry Transportation

Source: EPA 2004 National GHG Inventory



Projected Growth in CO₂e Emissions for the Washington Metropolitan Area Under a BAU Scenario: 2005–2050



Notes:

RCI fuel includes residential, commercial, and industrial natural gas, home heating oil, nonroad diesel, and aviation fuel. Equivalent CO₂ (CO₂e) is the concentration of CO₂ that would cause the same level of radiative forcing as a given type and concentration of greenhouse gas, such as methane, perfluorocarbons, and nitrous oxide. Other sources include methane from wastewater treatment and landfills, as well as high global-warming-potential gases used as refrigerants and solvents. The inventory does not account for the 4.1 million metric tons of CO₂ emissions that are absorbed (or “sequestered”) by the Washington metropolitan area’s 1.3 million acres of undeveloped forests and grassland. The business-as-usual projections do not account for new federal energy efficiency and corporate average fuel economy (CAFE) standards. The benefits of the new lower CAFE standards are 4.2 and 7.5 million tons of CO₂ in 2020 and 2030, respectively.

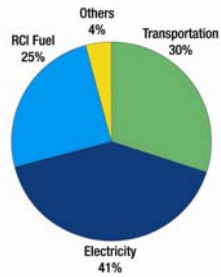


Source of Information for Regional Inventory

- Electricity: EPA Clean Air Markets Division, EPA eGrid, Utility Consumption Data, US DOE Emission Rate
- Transportation: COG TPB Travel Demand Model, EPA Mobile6 Emission Factor
- RCI Fuels: U.S. DOE Statewide data scaled using population
- HFCs: U.S. EPA national emissions scaled to region using population
- Aviation: U.S. EPA national emissions scaled to region using US DOT air miles flown (divided by 2)
- Landfills: Estimates from the Maryland Department of the Environment.
- Wastewater: Default inputs to EPA State and Local Inventory Tools.
- Forest Sink: COG estimates of undeveloped land and EPA sequestration rate.

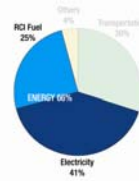


**Metropolitan Washington
Greenhouse Gas Emissions: 2005**



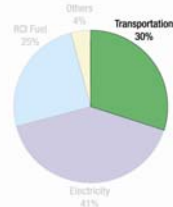
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RCI fuel includes residential, commercial, and industrial natural gas, home heating oil, nonroad diesel, and aviation fuel. Other sources include methane from wastewater treatment and landfills, as well as high global-warming-potential gases used as refrigerants and solvents.

**Energy Sector Share of
Regional Greenhouse Gas
Emissions: 2005**

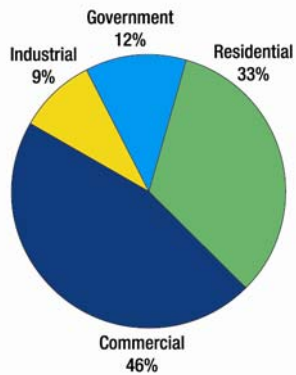


Note: RCI fuel includes residential, commercial, and industrial natural gas, home heating oil, nonroad diesel, and aviation fuel.

**Transportation Sector Share of
Regional Greenhouse Gas
Emissions: 2005**



**Sectoral Shares of Energy Use
in the Metropolitan Washington
Region: 2005**

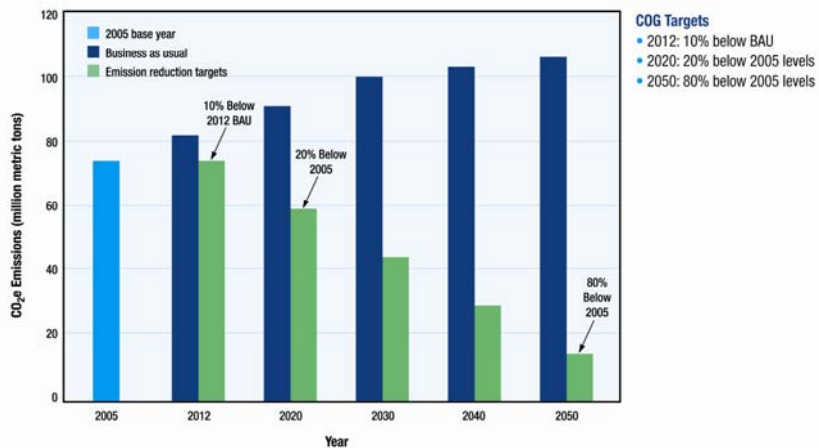


Emission Projections

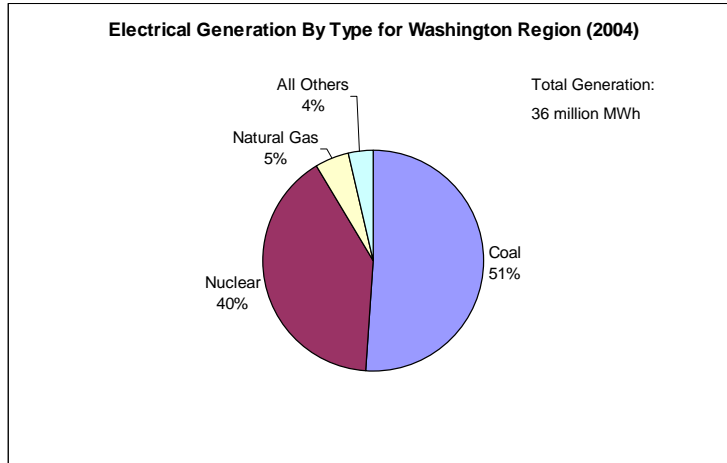
- Growth Rates 2005-2030
 - Population 33%
 - Households 35%
 - Employment 39%
 - VMT 38%
 - Electricity 31%



Recommended Regional Greenhouse Gas Emission Reduction Targets Compared to Regional Greenhouse Gas Emissions Under BAU: 2005–2050



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Source: EPA eGrid.



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CO2 Emissions from Power Plants in the Washington Region (2005)

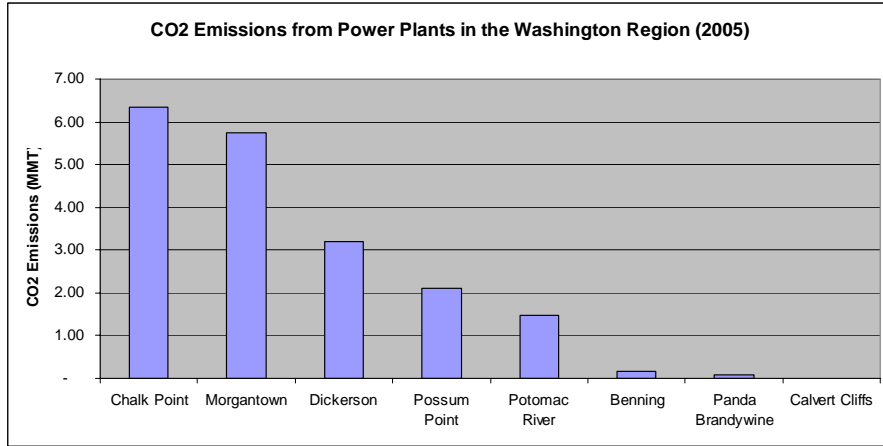
State	Plant	CO2 Emissions (MMT)	Percent of Total
MD	Chalk Point	6.35	0.33
MD	Morgantown	5.73	0.30
MD	Dickerson	3.20	0.17
VA	Possum Point	2.11	0.11
VA	Potomac River	1.47	0.08
DC	Benning	0.17	0.01
MD	Panda Brandywine	0.07	0.00
TOTAL		19.11	

Source: EPA CAMD.



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CO₂ Emissions by Power Plant



Source: EPA CAMD.



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Resources Available

- COG Climate Program
 - <http://www.mwcog.org/environment/climate/about.asp>
- COG Transportation Emissions
 - <http://www.mwcog.org/uploads/committee-documents/vFdXX1w20070614164532.pdf>
- Maryland Climate Plan
 - <http://www.mdclimatechange.us/>
- Virginia Climate Plan
 - <http://www.deq.virginia.gov/info/climatechange.html>
- Regional Greenhouse Gas Initiative
 - <http://www.rggi.org/>



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Resources Available

- EPA Clean Air Markets Division (annual emissions)
 - http://camddataandmaps.epa.gov/gdm/index.cfm?useaction=emissions_wizard
- EPA Egrid (periodic information on generation and emissions)
 - <http://www.epa.gov/cleanenergy/egrid/index.htm>
- Maryland Power Plants (data on MD plants)
 - <http://esm.versar.com/pprfactbook/plantlocations.htm#map>
- ICLEI
 - <http://www.iclei.org/>
- Climate Registry
 - <http://www.theclimateregistry.org/>
- Cool Counties
 - <http://www.kingcounty.gov/exec/coolcounties.aspx>
- Intergovernmental Panel on Climate Change
 - <http://www.ipcc.ch/>
- EPA State and Local Climate Program
 - <http://www.epa.gov/climatechange/wycd/stateandlocalgov/index.html>
- EPA Greenhouse Gas Emissions
 - <http://www.epa.gov/climatechange/emissions/index.html>
- U.S. Climate Technology Cooperation Gateway
 - <http://www.usctcgateway.gov/tool/>
- DOE Emission Factors
 - <http://www.eia.doe.gov/oiaf/1605/ee-factors.html>

