



Greenhouse Gas Emissions from Energy in the Metropolitan Washington Region

October 24, 2007



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Inventory Development

- Preliminary Inventory
 - Include Major Sources
 - Combination of Top-down and Bottom-up Approaches
 - CO₂ and HFCs
 - Transportation emissions based on regional travel and air emission factor models.
- Draft Baseline Inventory in November.
 - Add other GHGs: methane, N₂O
 - Add Additional Sources: Wastewater, Solid Waste, Land Use, Land Use Change.

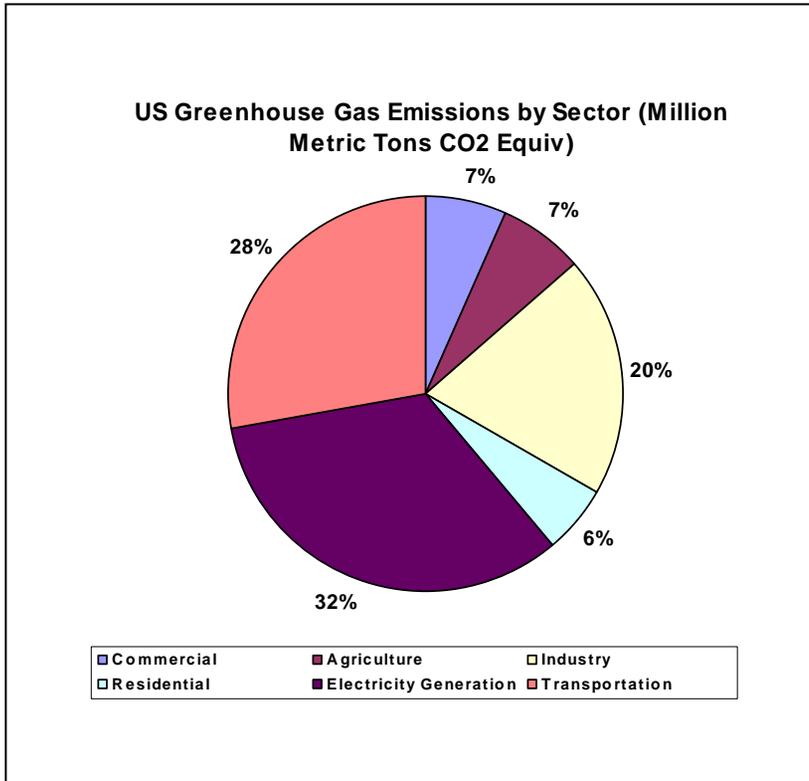


Emission Projections

- Growth Rates
 - Expected regional growth in population, households, and employment is 33%, 35%, and 39% by 2030
- Projections 2005 to 2020/2030
- Emissions by Sector

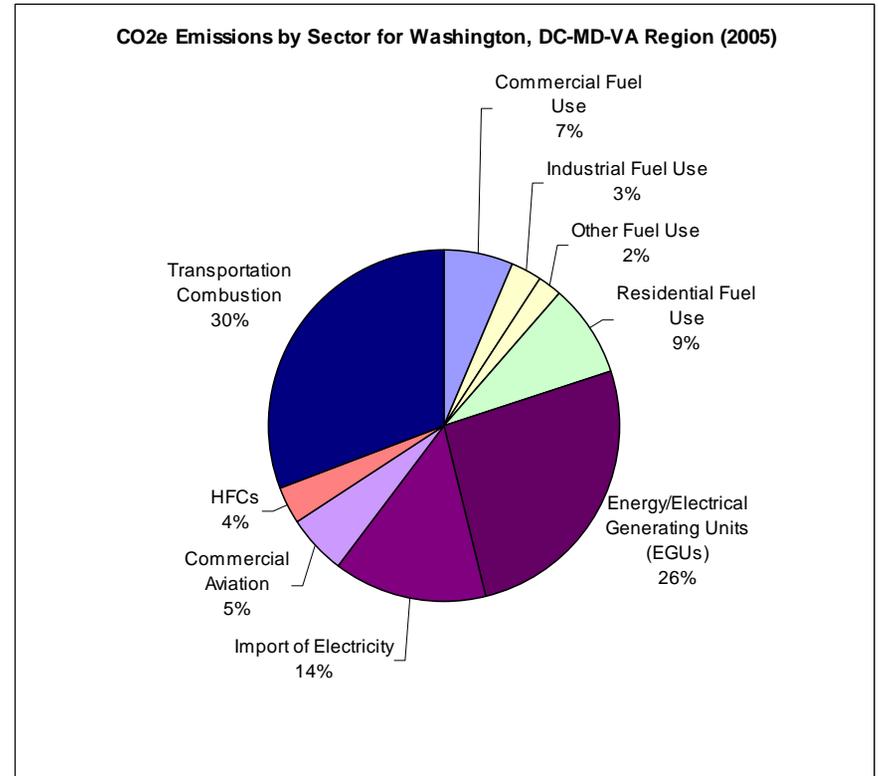


National (2004)



Source: EPA 2004 National GHG Inventory

Regional (2005)



Source: MWCOG estimates.

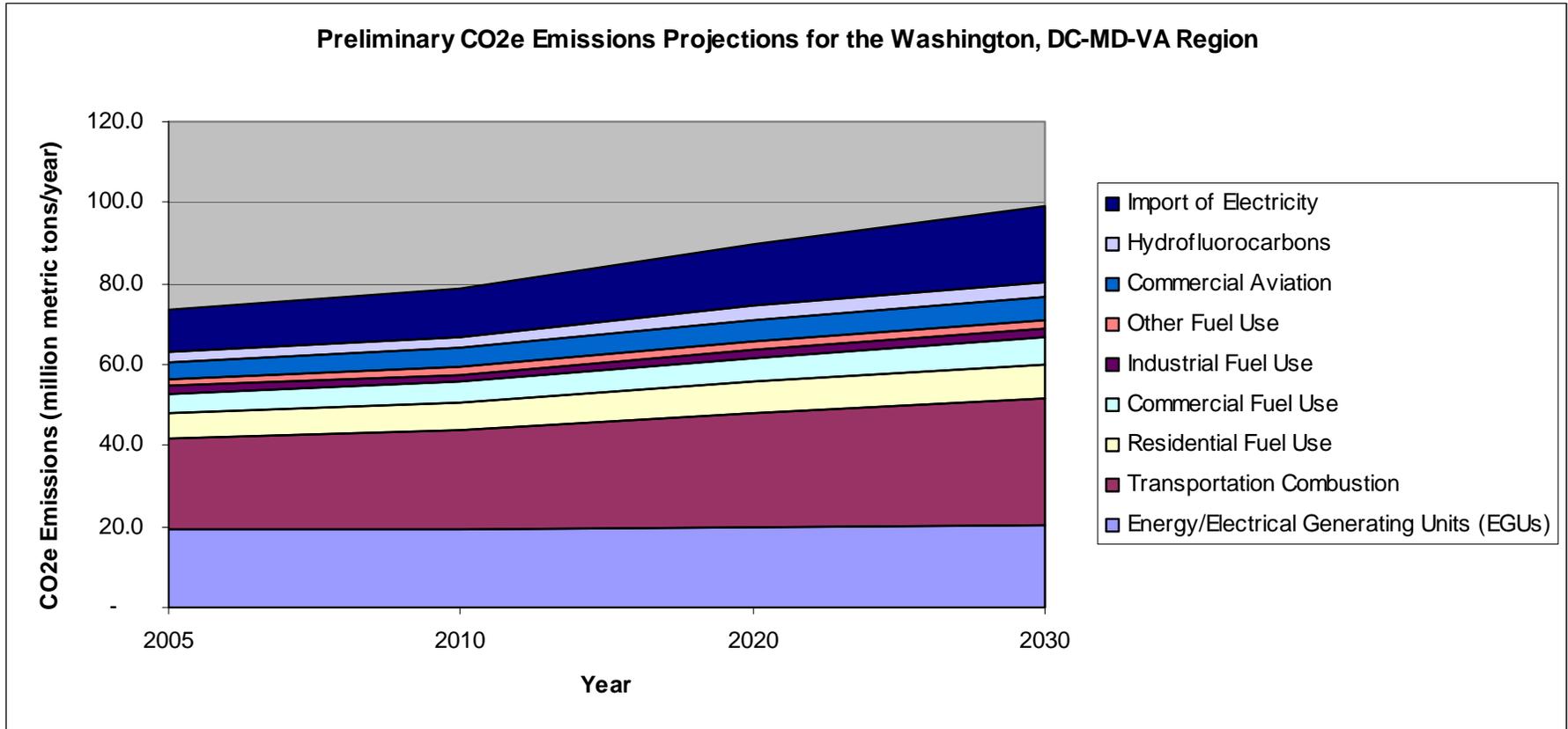
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PRELIMINARY CO2 Emissions Projections for the Washington, DC-MD-VA Region



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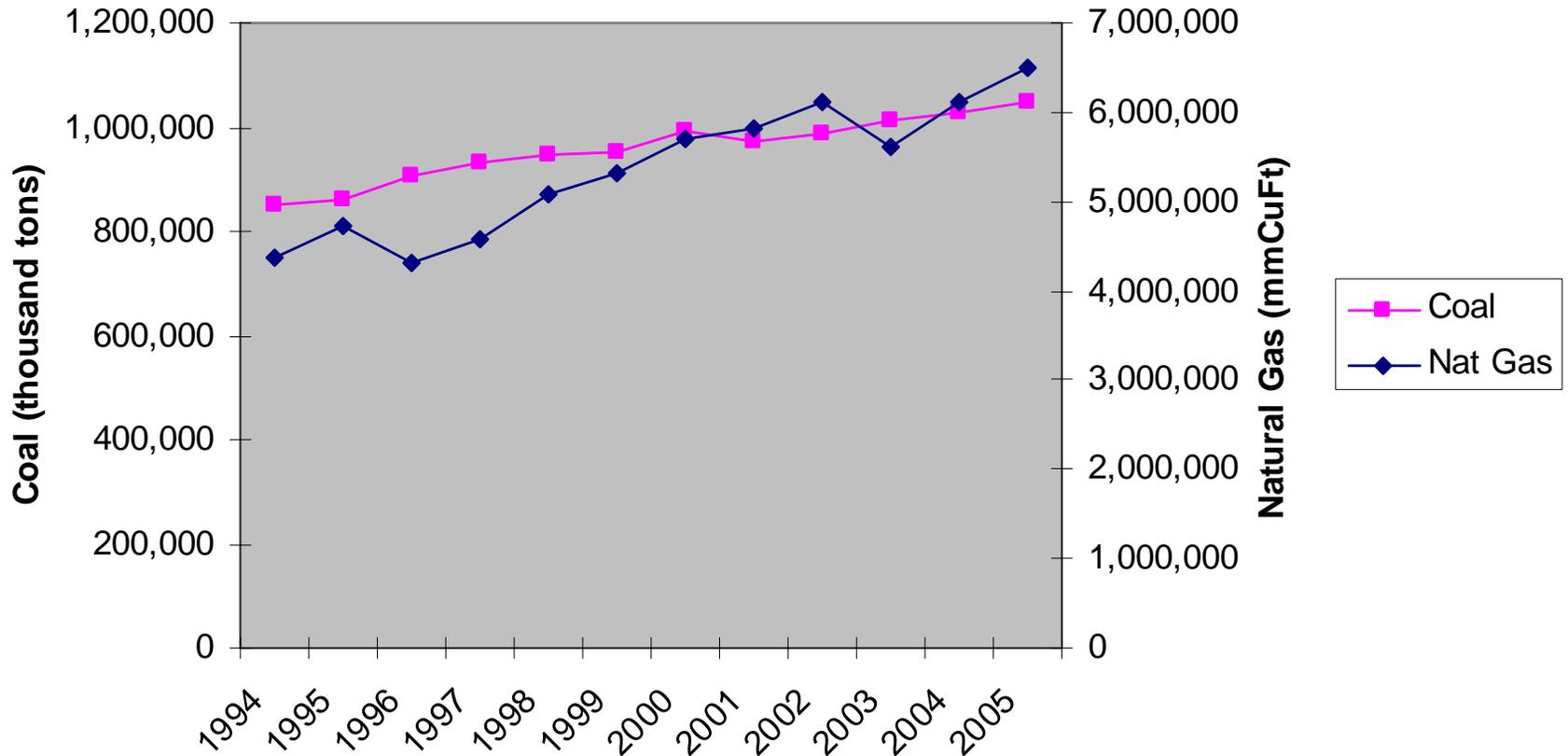
Focus on Energy

- Electricity Production and Consumption.
- Residential, Commercial, and Industrial Fuel Consumption.
- Combined: 60 percent of total regional greenhouse gas emissions.
- Historical and future growth.
- Does not include jet fuel, or on-road highway fuel combustion.



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Consumption of Coal and Natural Gas for Electricity in the United States



Source: US Department of Energy, Energy Information Administration



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Focus on Energy Activity Data

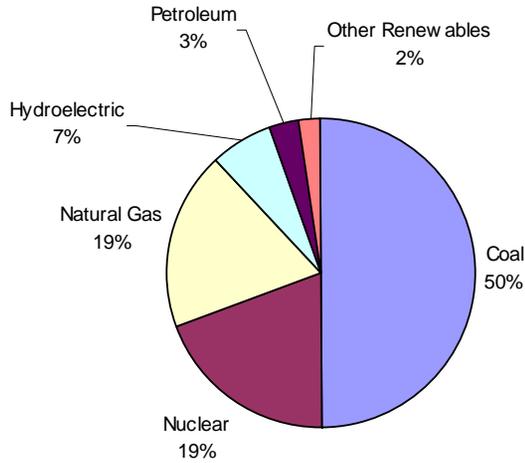
- **Direct Emissions from Power Plants**
 - Emission data for each facility provided by EPA Clean Air Markets Division (CAMD)
- **Indirect Emissions from Electricity Import**
 - Preliminary assessment of supply, demand, and imports.
 - Regional consumption estimate needs refinement.
 - Apply regional emission factor.
- **Direct Emission from Residential, Commercial, and Industrial Fuel Consumption**
 - Activity data scaled from state level to region using population.
 - Apply fuel-specific emission factor.



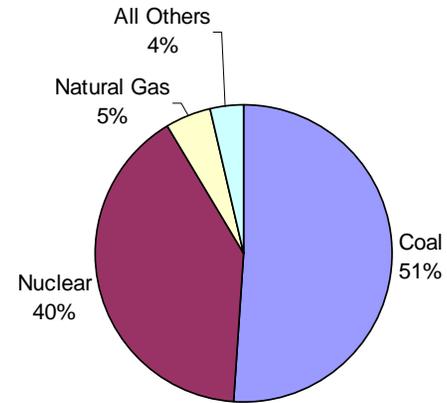
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PRELIMINARY CO2 Emissions Projections for the Washington, DC-MD-VA Region

Sources of Electricity in the United States (2005)



Electrical Generation By Type for Washington Region (2004)



Prepared by COG DEP, 10/22/07.



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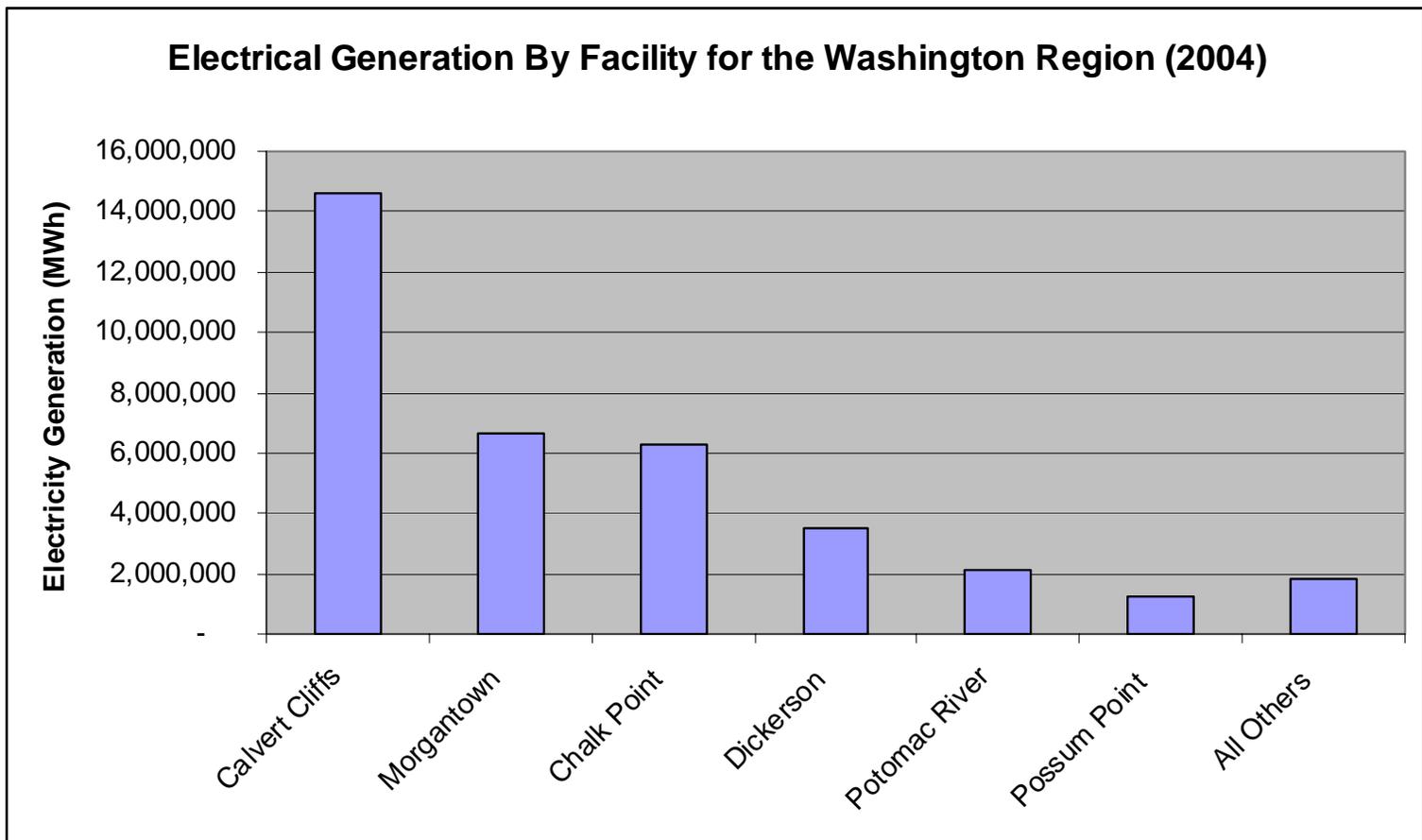
CO2 Emissions from Power Plants in the Washington Region (2005)

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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Electricity Production in the Washington Region –
Facilities

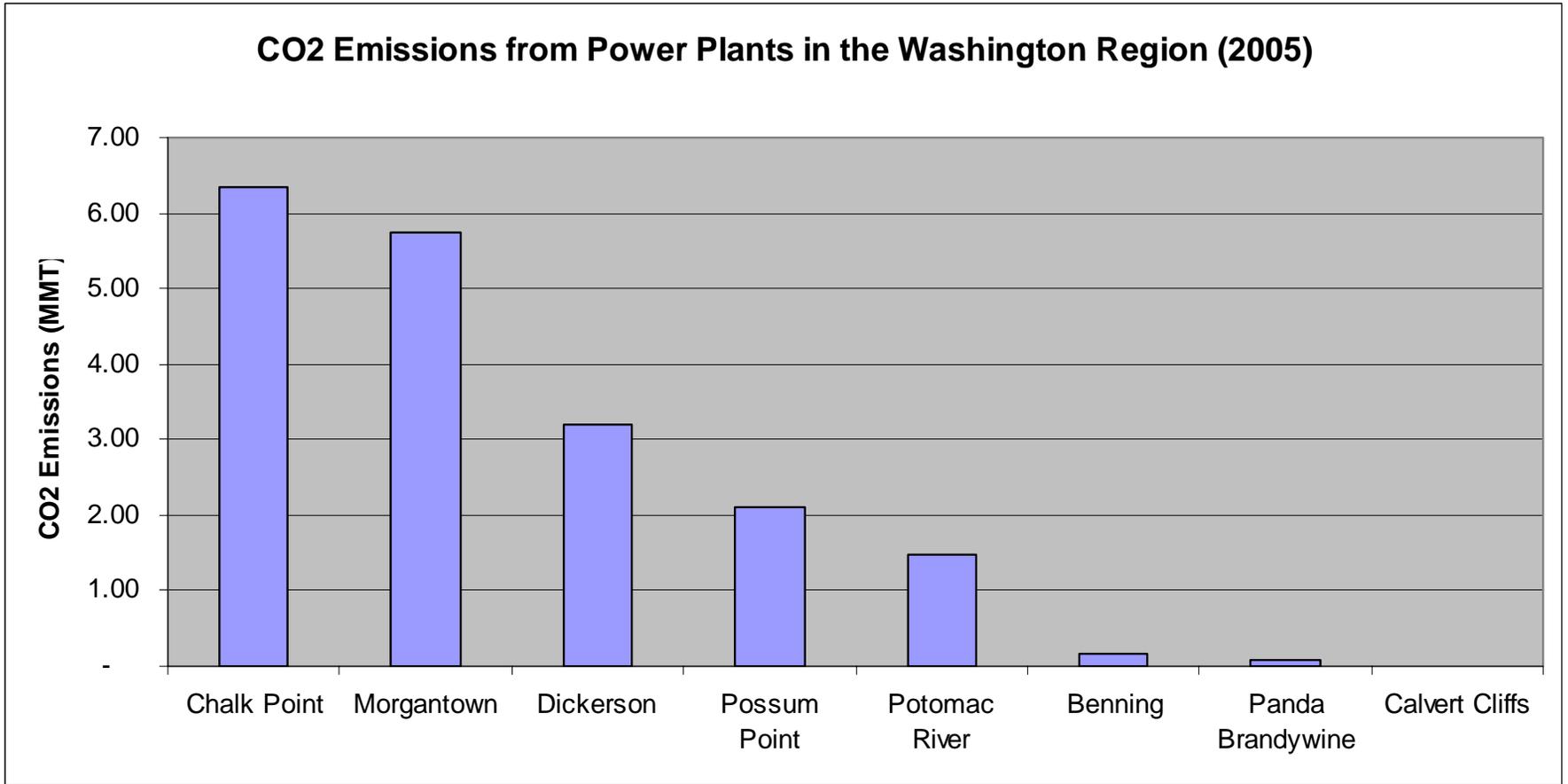


Source: EPA eGrid 2006.



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CO₂ Emissions by Power Plant



Source: EPA CAMD.





Chalk Point



Mirant Potomac River



Morgantown



Dickerson



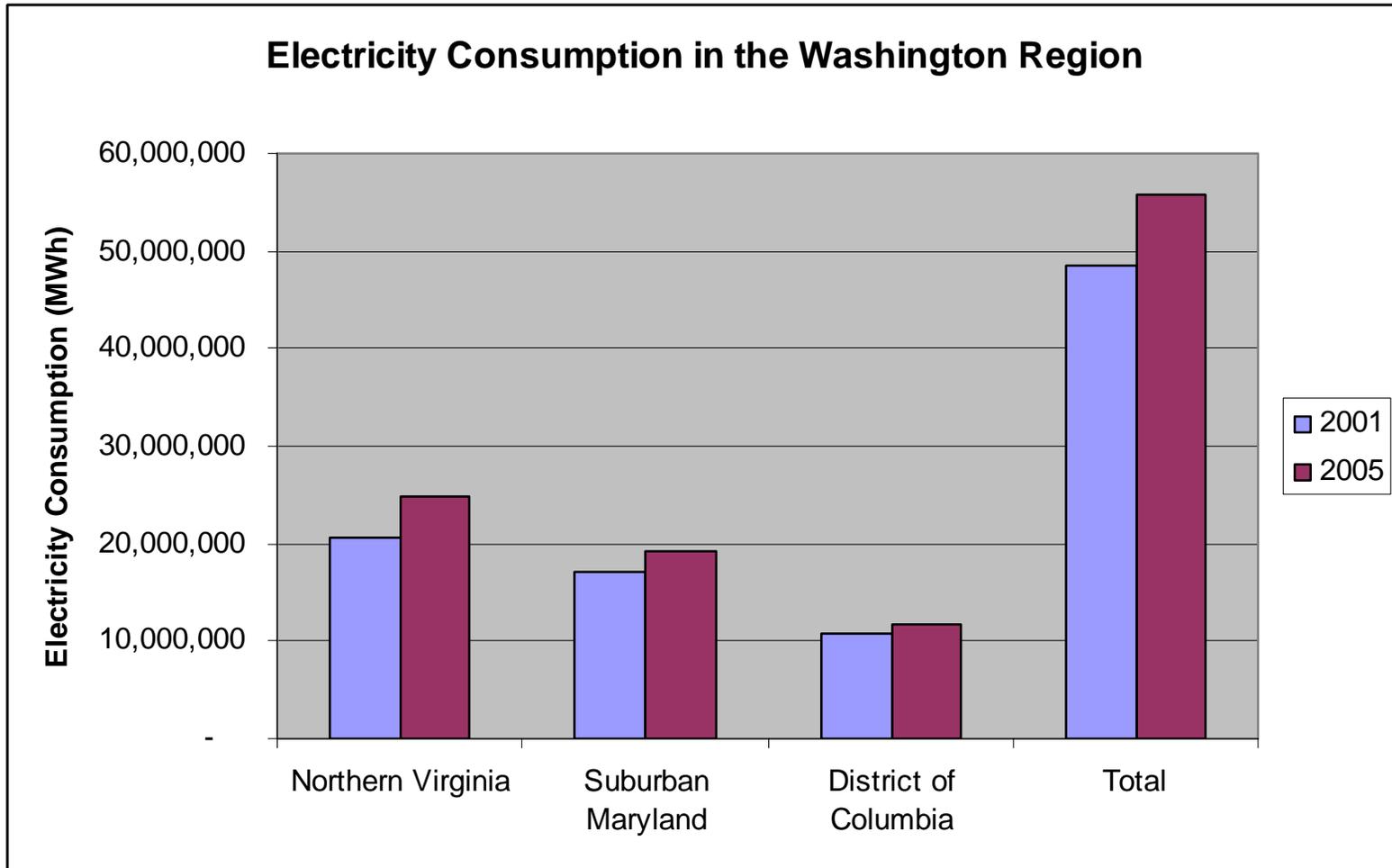
Carbon Footprint – Electricity Imports

- Region consumes more electricity than it produces.
- Include carbon footprint associated with electricity imports.
- Need better data on electricity markets, consumption, net imports, source of imports.
- Currently, rough estimate of supply/demand balance based on staff estimates.



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Electricity Consumption in the Washington Region



Source: Utility-provided Consumption Data.



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Estimating Net Imports of Electricity

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	Regional Consumption (2005)	Regional Generation (2004)	Deduced Import without Maryland Supply	Deduced Import with Maryland Supply
Northern Virginia	24,801,812,630	4,196,265,870	20,605,546,760	14,274,111,850
Suburban Maryland	19,266,956,819	31,929,826,640	(12,662,869,821)	-
District of Columbia	11,735,691,057	36,487,000	11,699,204,057	5,367,769,147
Total Area (Electricity)	55,804,460,506	36,162,579,510		

Source: EPA eGrid and Utility-Provided Consumption Data.

Note: Assumes disposition of Maryland surplus is 50 percent each for the District and Northern Virginia.



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Projected CO2 Emissions from Electricity Production and Imports (MMT CO2)

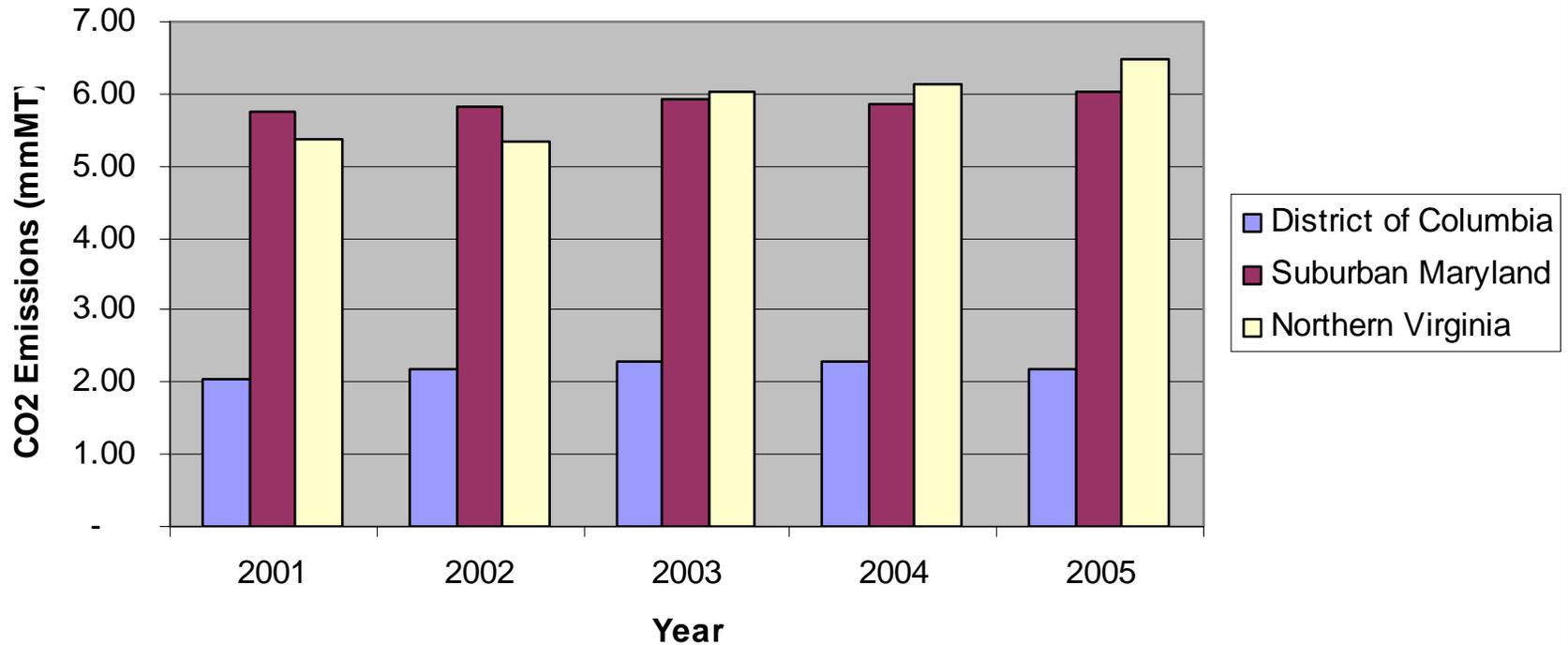
	2005	2020	2030
<i>Production</i>			
Suburban Maryland	15.35	15.35	15.35
Northern Virginia	3.58	4.30	4.77
District of Columbia	0.17	0.20	0.23
	19.11	19.86	20.35
<i>Imports</i>			
Suburban Maryland	-	3.07	5.07
Northern Virginia	7.54	9.04	10.02
District of Columbia	2.83	3.40	3.77
	10.37	15.52	18.86
Regional Production + Import	29.48	35.37	39.21

Prepared by COG DEP, 10/22/07.



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CO2 Emissions from Natural Gas, Distillate and Residual Fuel Oil Consumption in the Washington, DC-MD-VA Region



Source: Energy consumption from U.S. Department of Energy, Energy Information Administration.
Scaled to region using COG Cooperative Forecasts and state-level population Data.



Next Steps

- Refine estimates of electricity consumption
 - Joint Meeting of GHG Emission Workgroup and Energy Advisory Committee
 - Utility Request Letter
- Incorporate estimates of land use, land use change, and forestry, and wastewater/solid waste.
- Schedule:
 - Draft Inventory to CCSC on November 28, 2007
 - Final Inventory to CCSC on February 27, 2008



For More Information

- EPA Clean Air Markets Division (annual emissions)
 - <http://camddataandmaps.epa.gov/gdm/index.cfm?fuseaction=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/pprp/factbook/plantlocations.htm#map>
- Regional Greenhouse Gas Initiative
 - <http://www.rggi.org/>

