National Capital Region Greenhouse Gas Emissions Inventory

Climate, Energy & Environment Policy Committee

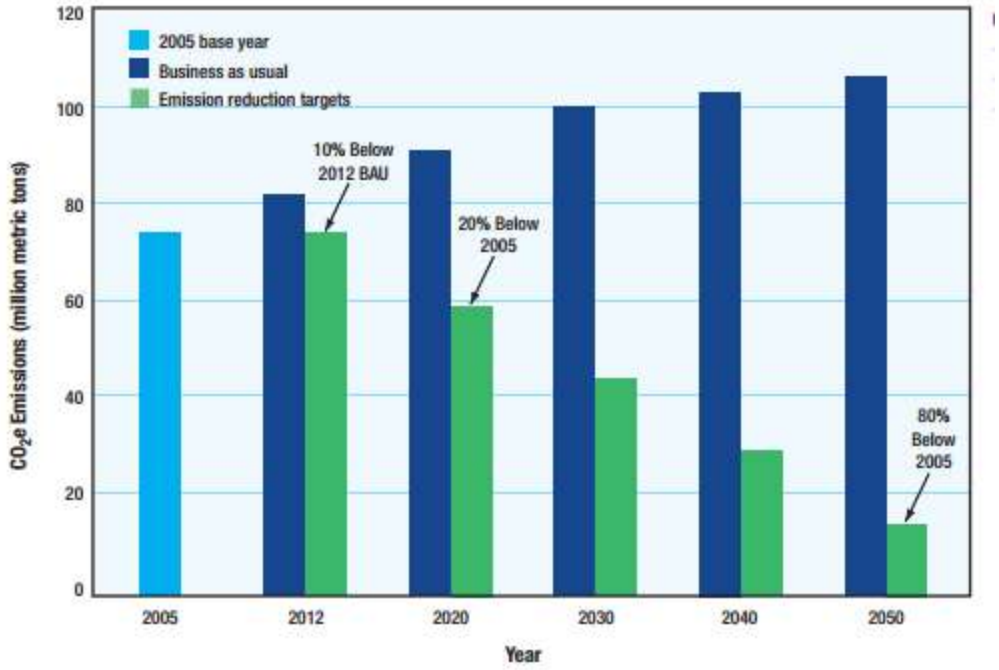
October 28, 2015

Background

- Goals
  - Create a standardized regional approach to tracking GHG emissions
  - Track progress toward regional GHG goals
- Continues NVRC work
- Updates COG 2008 Climate Change Report

Metropolitan Washington Council of Governments

Context and Approach



- Measures status of 2012 goal
  - 10% below business-as-usual levels by 2012
- Adopts a consistent methodology for future tracking
  - Enables tracking at regional and local levels

Process

- Move to latest ICLEI methodology for 2012 GHG inventory
  - Use ClearPath tool
  - Replaces ICLEI Community Protocol beta spreadsheet tool
- Back-cast 2005 inventory using 2012 methodology and ClearPath
- Pilot the region's GHG inventory with the CDP platform
- Next step
  - 2005 and 2012 community inventories using ClearPath
  - All local government receive access to ICLEI for local government operations inventories

Methodology

Source	Methodology
Electricity	Annual sales data from utilities Use eGRID emissions and grid loss factors
Natural Gas	Annual sales data from utilities Use ICLEI emissions factors
Stationary Fuel Combustion	Annual fuel use data from EIA, scaled to jurisdiction and region using population & household numbers Use ICLEI emissions factors
Mobile Transportation	On-road emissions data from MOVES 2010a, 2014 CLRP, and TPB Travel Demand Model v 2.3.57 Airline passenger and flight data from US DOT and COG's Airline Passenger Survey & aviation emissions from US GHG Inventory
Non-Road Transportation	Emissions data from off-road equipment & vehicles from NMIM
Non-Fuel Sources	Landfill and waste combustion data from regional waste reports Emissions calculated using EPA WARM tool HFC data from US GHG Inventory, scaled to region by population Wastewater data from regional wastewater utilities, allocated to localities using COG's Cooperative Forecast 8.3

Regional Data

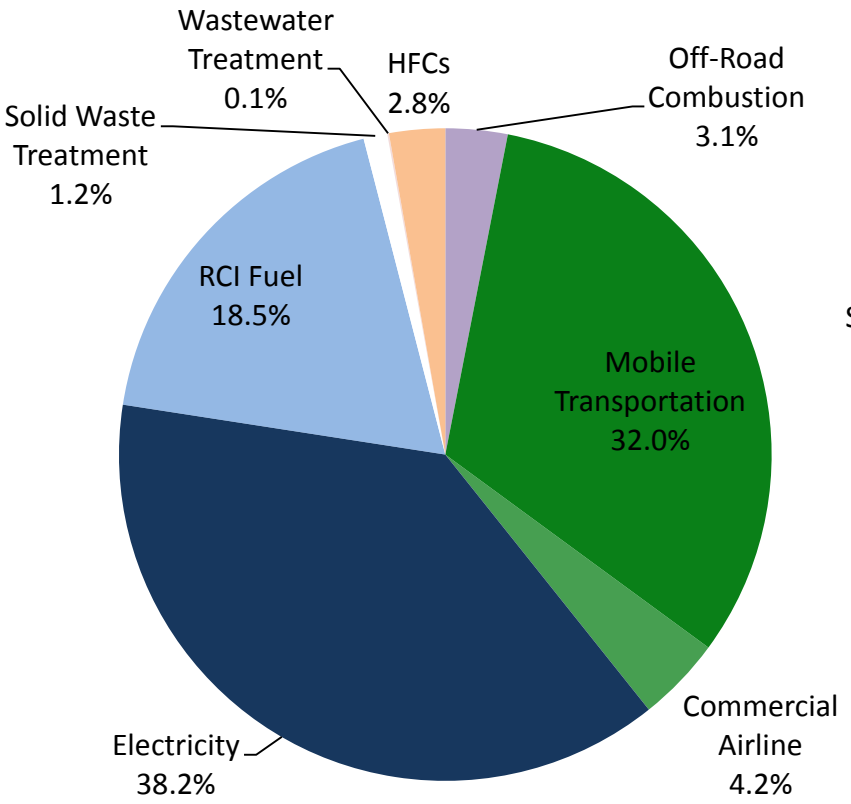
Indicator	2005	2012	Percent Change
Population	4,738,900	5,261,974	+9.9%
Households	1,879,016	2,010,575	+6.5%
Employment	2,693,401	2,789,269	+3.4%
Electricity Use	58,924,515,193 kWh	60,175,521,843 kWh	+2.1%
Stationary Fuel Use	471,798,890 gallons	319,917,118 gallons	-32.2%
Natural Gas Use	1,589,317,362 therms	1,453,056,576 therms	-8.6%
Annual VMT	41,833,286,780 miles	43,945,174,893 miles	+4.8%

Regional Results

National Capital Region Greenhouse Gas Emissions			
	2005	2012	Percent Change
NCR $MTCO_2e$	69,171,422	68,857,146	-0.5%
NCR Population	4,738,900	5,261,974	+9.9%
NCR $MTCO_2e$ per Capita	14.60	13.09	-10.3%

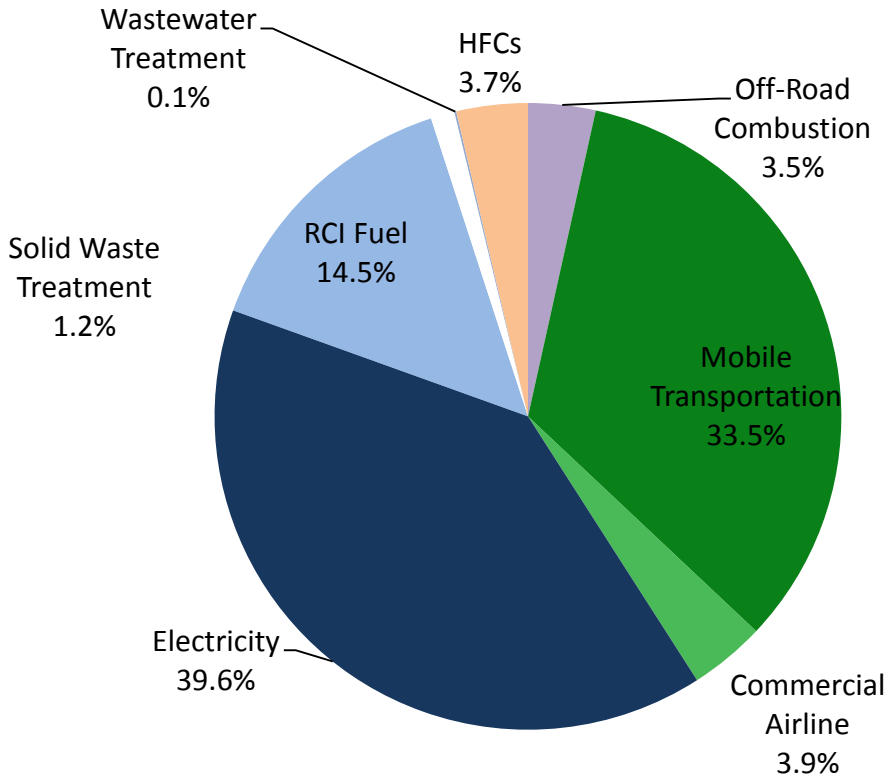
Emissions by Activity

2005 NCR Greenhouse Gas Emissions by Activity



2005: 69,171,422 $MTCO_2e$

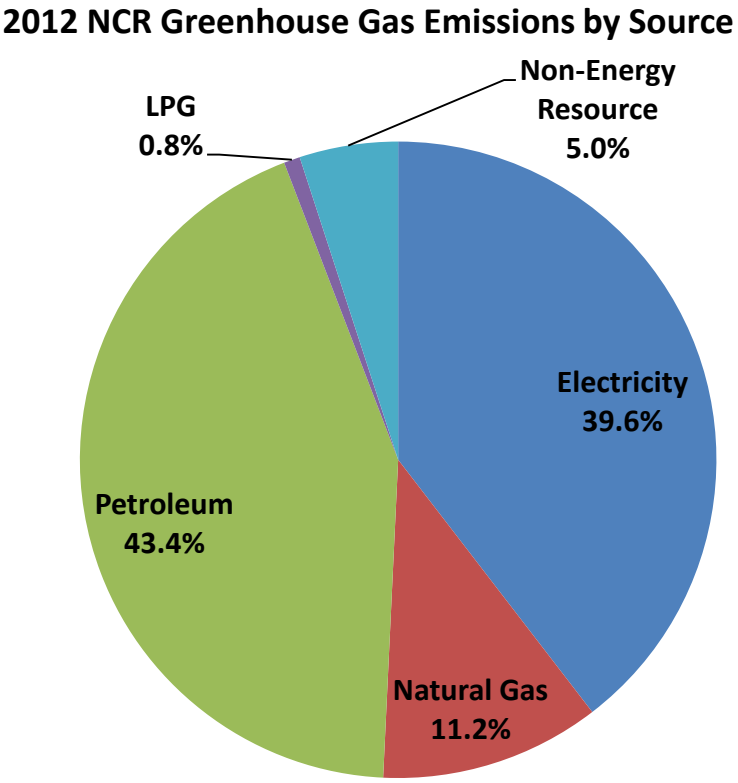
2012 NCR Greenhouse Gas Emissions by Activity



2012: 68,857,146 $MTCO_2e$

Emissions by Source

Emissions by Source (MT CO_2e)		
Type	**Total**	**Percent**
Electricity	27,240,147	39.6%
Natural Gas	7,706,865	11.2%
Petroleum*	29,892,748	43.4%
LPG	568,531	0.8%
Non-Energy Resource	3,448,855	5.0%
Total	**68,857,146**	**100%**



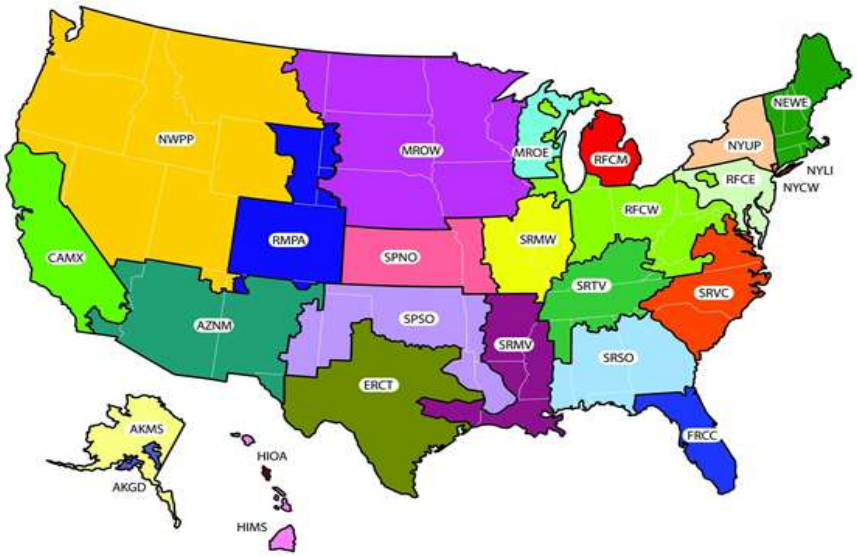
*Petroleum includes gasoline and diesel from the transportation sector, home heating oil, and fuel oil use

Emissions Changes (2005-2012)

Change in Greenhouse Gas Emissions from 2005 to 2012				
Emission Source	2005 $MTCO_2e$	2012 $MTCO_2e$	Difference	Percent Change
Built Environment Electricity	**26,409,633**	**27,240,147**	**+830,514**	**+3.1%**
Built Environment Natural Gas	**8,429,579**	**7,706,865**	**-722,714**	**-8.6%**
Built Environment Fuels	**4,359,014**	**2,277,911**	**-2,081,103**	**-47.7%**
Mobile	**27,183,340**	**28,183,368**	**+1,000,028**	**+3.7%**
Non-Energy Resources	**2,789,856**	**3,448,855**	**+658,999**	**+23.6%**
Total	**69,171,422**	**68,857,146**	**-314,276**	

eGRID Factors

eGRID Factors (lbs CO_2e/MWh)			
Sub-region	**2005**	**2012**	**Percent Change**
RFCE	1,101.39	952.64	-13.5%
SRVC	1,152.89	1,041.60	-9.7%



This is a representational map; many of the boundaries shown on this map are approximate because they are based on companies, not on strictly geographical boundaries.
USEPA eGRID2010 Version 1.0 December 2010

Electric Emission Change Contributing Factors

- Coal to natural gas shift
- Increased generating plant efficiency

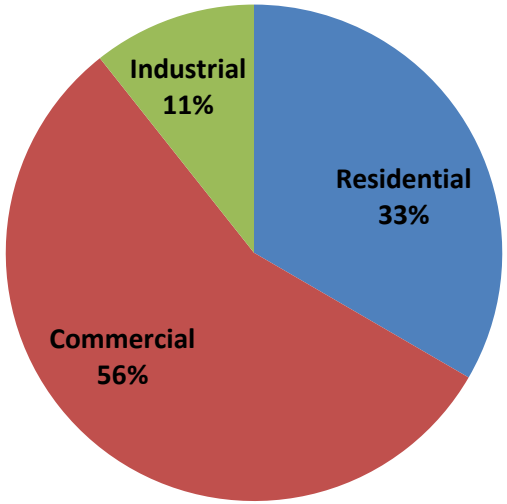
Regional Electricity Factor Emissions ($MTCO_2e$)	
2005	26,409,633
2012	27,240,147
2012 with 2005 factors	30,856,148

Illustrative example of emissions with 2005 factors to demonstrate absolute reductions

Electricity

NCR Electricity Use (kWh)			
Source	**2005**	**2012**	**Percent Change**
Residential Electricity	19,734,181,996	20,083,333,241	+1.7%
Commercial Electricity	34,724,253,637	33,677,438,426	-3.1%
Industrial Electricity	4,466,079,560	6,414,750,176	+30.4%
Total	**58,924,515,193**	**60,175,521,843**	**+2.1%**

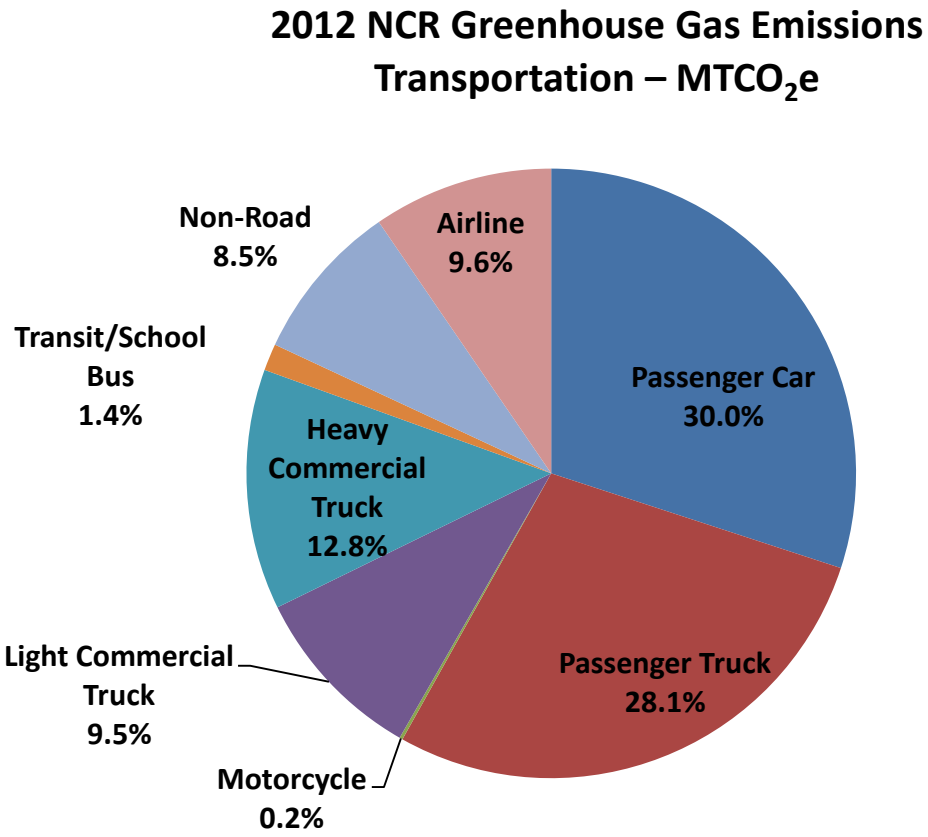
NCR 2012 Electricity Use by Sector



Mobile Emissions Changes

NCR Mobile Source Greenhouse Gas Emissions (MT CO2e)			
Vehicle Type	**2005**	**2012**	**Percent Change**
Passenger Car	8,640,922	8,455,821	-2.1%
Passenger Truck	7,203,063	7,909,408	+8.9%
Motorcycle	45,312	46,711	+3.0%
Light Commercial Truck	2,412,177	2,667,113	+9.6%
Heavy Commercial Truck	3,460,021	3,592,360	+3.7%
Transit/School Bus	360,599	401,338	+10.2%
Non-Road	2,125,495	2,391,368	+11.1%
Airline	2,913,889	2,694,262	-7.5%
Total	**27,161,476**	**28,158,380**	**+3.5%**

Mobile Transportation



Findings

- The National Capital Region met its 2012 target
- Electricity generation emission rates and stationary fuel combustion switches were primary contributors
- Passenger vehicles and commercial electricity will be important future reduction targets

Next Steps

- Jurisdictional reporting through ClearPath
- CDP reporting platform link
- Results will inform Climate and Energy Action Plan
- Local government operations data

Community-Scale Track

Within this track you will find the resources you need to perform a US Community Protocol compliant greenhouse gas emissions inventory and forecast.