

Conducting a Greenhouse Gas Emissions Inventory at the Metropolitan Level, Allocated to Municipalities and Counties

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ABSTRACT

The Delaware Valley Regional Planning Commission (DVRPC) developed the *Regional Greenhouse Gas Emissions Inventory* to provide an accounting of greenhouse gas (GHG) emissions for the nine-county DVRPC region for 2005. This inventory was carried out in close consultation with the US EPA to assure the protocol used conforms where possible to the agency's current thinking on MPO-level inventories. DVRPC also consulted with both the Commonwealth of Pennsylvania and the State of New Jersey, as well as with ICLEI—Local Governments for Sustainability. The protocol used drew on the state inventories developed using the U.S. EPA's State Inventory Tool, as well as local data where available. This work was carried out with the consulting support of ICF International.

The inventory allocates emissions to the each of the nine counties and 352 municipalities in the region. This sub-regional allocation excludes several emissions categories which were not feasible to allocate with available data, including emissions from aircraft, through highway traffic, some industrial fuel use, and livestock. Nonetheless, 90 percent of all emissions for the region are allocated to the county level, and 84 percent to the municipal level.

DVRPC will use this inventory in its work to develop policies and programs for the region to reduce greenhouse gas emissions. DVRPC will also use this inventory to support inventory efforts at the county and municipality level, as well as to support regional analysis of where investments in energy conservation and efficiency might be most productively made.

INTRODUCTION

As the first task in its Climate Change Initiatives Program Area, DVRPC has completed an inventory of greenhouse gas (GHG) emissions in the region. Identifying and quantifying the emissions sources in the region is a key first step to developing strategies for reducing emissions. The municipal scale of this work presented different challenges than typically encountered when conducting GHG inventories on the municipal or state level. In order to maximize the utility of this inventory to DVRPC's member communities, this effort was accompanied by the allocation of the inventory to each of the region's nine counties and 353 municipalities.

BODY

The base year for the GHG emissions inventory is 2005. Greenhouse gas emissions, measured in metric tons of carbon dioxide equivalent (MTCO₂E), are calculated for energy used in the residential, commercial, and industrial sectors, as well as the transportation sector, which includes on-road transportation, passenger and freight rail, aviation, marine transportation, and off-road vehicles.

Emissions resulting from waste management (solid waste and wastewater), agriculture processes (both animal and plant related), non-energy-related emissions from industrial processes, and fugitive emissions from fuel systems (natural gas systems and petroleum systems) are also included.

Within the DVRPC region, these sectors resulted in emissions of 90.3 million metric tons of carbon dioxide equivalent (MMTCO₂E) in 2005. Over 91 percent of these emissions resulted from energy consumption, including stationary energy consumption by the residential, commercial, and industrial sectors, and mobile energy consumption from the transportation sector. Waste management and industrial processes each accounted for an additional 3 percent of total emissions. When the net change in carbon stocks in the region's trees is taken into account, the region's total emissions are slightly higher, at 90.4 MMTCO₂E. These emissions are summarized in Table 1 below.

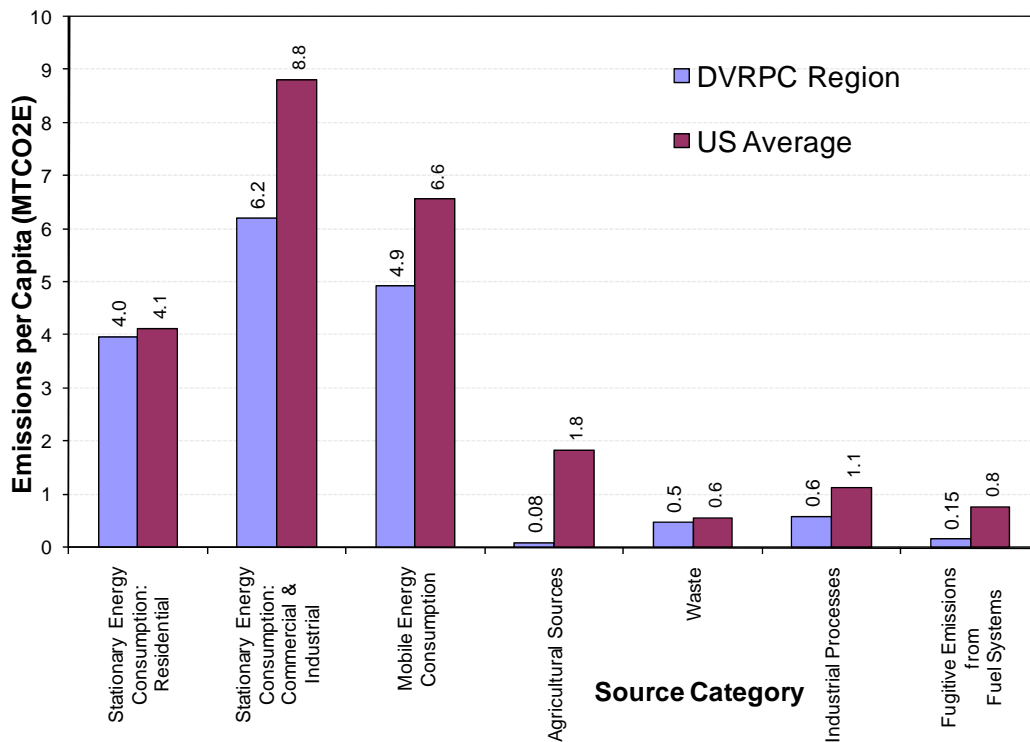
Table 1. Summary of DVRPC regional greenhouse gas emissions—2005.

Emissions Source Category	Emissions (MMTCO₂E)	Percent of Total
Stationary Energy Consumption—Residential	21.9	24.2%
Stationary Energy Consumption—Commercial & Industrial	34.2	37.9%
Mobile Energy Consumption	27.1	30.1%
Agriculture	0.5	0.5%
Waste Management	2.6	2.8%
Industrial Processes	3.2	3.6%
Fugitive Emissions from Fuel Systems	0.8	0.9%
Gross Emissions	90.3	100%
Land Use, Land Use Change, and Forestry	0.2	
Net Emissions	90.4	

Together, regional emissions accounted for about 1.2 percent of gross national emissions. With 1.9 percent of the nation's population in 2005, per capita emissions in the DVRPC region were about one third lower than in the nation as a whole. This is largely due to the region's lower per capita commercial and industrial energy consumption, on-road mobile emissions, and agricultural emissions. The results from allocation of emissions to the municipal level clearly demonstrate that municipalities with higher density tend to produce lower per capita emissions.

Figure 1 presents the per capita emissions by source category for both the region and the nation. The region's per capita gross emissions of 16.5 MTCO₂E per person are one third lower than the national average of 24.5 MTCO₂E per capita. This difference is driven largely by the region's lower per capita transportation, commercial/industrial, and agricultural emissions.

Figure 1. Comparison of 2005 DVRPC and national per capita emissions, by source category (MTCO₂E).



To provide the DVRPC’s member communities with assistance in their GHG planning activities, the 2005 GHG inventory was allocated both to the region’s nine counties and to the region’s 352 municipalities, referred to here as using the census term “Minor Civil Divisions”, or MCDs. These MCDs include the region’s cities, townships, and boroughs.

Electricity and natural gas use information was collected at either the municipal or ZIP code level by customer class (residential, commercial, industrial) from each of the dozen or so utilities that serve the region. Vehicle miles traveled (VMT) in the region was allocated to municipalities by assigning half of each trip to the municipality of origin and half to the destination municipality. Because of the large number of MCDs, it was necessary that the methods used be simple and replicable on a large scale, since completing 352 individual inventory efforts was beyond the scope of this effort. Because of this, it is important that municipalities and counties using the allocated inventory values understand where they came from, what their limitations are, and where efforts to improve them at the local level might best be directed.

Despite these limitations, this effort provides MCDs with an excellent starting point, and for some emissions categories provides information that DVRPC believes is as good as is feasible to acquire for municipal efforts to inventory community-wide emissions. DVRPC encourages municipalities and counties to use this inventory to support their inventory efforts, as well as to support analysis of where investments in energy conservation and efficiency might be most productively made.

CONCLUSIONS

DVRPC will use this inventory in its work to develop policies and programs for the region to reduce greenhouse gas emissions. DVRPC will also use this inventory to support inventory efforts at the county and municipality level, as well as to support regional analysis of where investments in energy conservation and efficiency might be most productively made. The full document is available online at www.dvrpc.org/climate.htm.

KEY WORDS

Greenhouse gas, regional, metropolitan, local, Philadelphia, inventory