A map of the District of Columbia, showing the Potomac River to the west and south, and the Annapolis River to the east. The map is color-coded, with orange representing land and blue representing water. The title is centered over the map.

**DISTRICT OF COLUMBIA  
GREENHOUSE GAS EMISSIONS INVENTORIES  
AND PRELIMINARY PROJECTIONS**

**Prepared by**

**Air Quality Division  
Bureau of Environmental Quality  
Environmental Health Administration  
District of Columbia Department of Health**

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## SUMMARY

The District of Columbia Air Quality Division has compiled greenhouse gas emissions inventories for the District of Columbia for the years 1990 and 2000. The Division has also prepared projected inventories for 2005 and the future year 2012. The Division chose the future year 2012 to coincide with the Kyoto Protocol's milestone year for setting greenhouse gas emissions targets for developed countries, including the United States of America. If the United States were to ratify the Kyoto Protocol, the national target for the year 2012 would be to maintain emissions seven percent below that of the 1990 emissions levels.

The main purpose of the future year inventory is for planning application: to help identify and possibly evaluate opportunities for a greenhouse gas (GHG) emissions stabilization and reduction action plan for the District. This greenhouse gas inventory report primarily focuses on emissions of the three gases most commonly associated with the greenhouse effect and global warming; that is, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O).

The inventories focus on emissions that are related both to the District's governmental activities and to the larger District-wide community that may be influenced by the District's policies and programs. To capture both of these aspects independently, greenhouse gas emissions are estimated and discussed separately for the activities "*District-wide*" in the District of Columbia, and for the District's "*City Operations*" elements. Neither of these inventories provides a precise picture of the GHG emissions that the District can directly or indirectly influence. But together, they can provide a preliminary database from which to identify emission reduction opportunities and to develop preliminary action plan recommendations.

The *District-wide* greenhouse gas emissions:

- Show a gradual increasing trend that is consistent with the trend at the national level;
- Are estimated at 10.761 Million Metric Tonnes Carbon Dioxide (CO<sub>2</sub>) Equivalent (MTCO<sub>2</sub>E) for the year 1990;
- The 2012 inventory is projected to increase to 12.427 Million MTCO<sub>2</sub>E, a 15 percent increase from the 1990 levels;
- The *District-wide* 2012 greenhouse gas emissions target under the Kyoto Protocol agreement would have been 10.024 Million MTCO<sub>2</sub>E;
- The year 2012 projections show emissions nearly 24 percent above the Kyoto target; and
- Preliminary projections indicate that there will be 2.402 Million MTCO<sub>2</sub>E of shortfall *District-wide* for meeting the Kyoto Protocol goal.

The District's *City Operations* greenhouse gas inventory:

- Ranges between 0.411 Million and 0.458 Million MTCO<sub>2</sub>E for the reporting period, 1990-2012;

- Government operations account for approximately nine percent of the District-wide emissions (without the electricity purchase emissions);
- Government operations account for about four percent of the District-wide emissions with the electricity purchase related emissions;
- The Kyoto target for the year 2012 is estimated at 0.436 Million MTCO<sub>2</sub>E; and
- The preliminary projections indicate no shortfall for this sub-component.

The District of Columbia's Mayor, Anthony A. Williams, endorsed the U.S. Mayors Climate Protection Agreement, in which the mayors signing the agreement pledged to strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking action in their own local operations and communities. The District should to identify *District-wide* mitigation measures and programs for addressing the 2012 shortfall, and for maintaining the emissions below the target levels beyond 2012.

The subsequent sections of this report discuss the GHG emissions inventories for the District of Columbia. Also included is a section on potential measures and programs for reducing GHG emissions. A detailed evaluation of GHG emission reduction programs may be needed for developing mitigating measures to address the District's GHG emissions and GHG reduction goals.

## 1. INTRODUCTION

The presence of certain naturally occurring gases in the atmosphere - water vapor, carbon dioxide, methane, nitrous oxide, and ozone - results in a natural phenomenon known as the greenhouse effect. This is the process that keeps our planet warm. However, the greenhouse gas (GHG) concentrations in the atmosphere are increasing globally. According to the Intergovernmental Panel on Climate Change (IPCC 1996), the atmospheric concentration of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) have increased approximately 30 percent, 145 percent, and 15 percent respectively since the Year 1800. Over the past two decades, numerical models and data have strongly suggested that human activity has contributed significantly to the increase in greenhouse gases in the atmosphere.

Scientific consensus is building on the prevailing belief that increased levels of greenhouse gases in the atmosphere may cause global warming or other forms of climate change. Some of the long-term implications of the global warming phenomenon could be the melting of the polar ice caps contributing to the rise in sea level resulting in loss of coastal property, wetlands, and shellfish beds; the loss of biodiversity and changes in forest composition; changes in precipitation distribution and increased storm frequency and intensity; and shifts in agricultural production patterns. These are just a few of many potential consequences of global warming.

This report is intended to provide a comprehensive preliminary GHG inventory for the District of Columbia, and uses available data and methodologies. The preliminary results are presented for the inventory years 1990, 2000, and projections for the future year 2012. The methodologies for estimating the District's GHG emissions inventory are consistent with the United States Environmental Protection Agency (EPA)'s *Emission Inventory Improvement Program Volume VIII: Estimating Greenhouse Gas Emissions*, a revised guidance document for states conducting greenhouse gas emission inventories. Also, EPA's State and Local Capacity Building Branch recently made available a state GHG inventory software tool. Both the revised state guidance and the accompanying inventory software tool reflect the most recent information on data sources, emission factors, and methods that are consistent with the Intergovernmental Panel on Climate Change Good Practice Guidance and the Inventory of U.S. Greenhouse Gas Emissions and Sinks. Some minor modifications have been made in methodologies, mainly for projection inventories, where data availability warranted. To the degree possible, this inventory will be compatible with standards that may be applied nationally or internationally in the future.

*The inventories presented in this report are prepared mostly by using the EPA approved guidance and methodology tools which in turn use approaches recommended by the IPCC. However, due to funding and time constraints, the inventory development process did not include source surveys, and did not undergo actual record checks, or thorough quality checks. Consequently, these inventories can be used as a valuable planning tool, but they are **not** intended for use as a regulatory baseline.*

The District of Columbia cannot solve the potential problem of increased global greenhouse gas emissions on its own. However, the District can act in conjunction with other cities and

states to voluntarily limit output of the greenhouse gases and take advantage of the benefits relating to energy conservation, improved waste and materiel management, and improved environmental quality through reductions in pollutant emissions into air, water, and other environmental media. To this end, preliminary recommendations for action plan initiatives towards climate protection goals in the District have been included in this report.

## **2. DISTRICT OF COLUMBIA'S GREENHOUSE GAS EMISSION INVENTORIES**

The greenhouse gas (GHG) emissions inventory has been compiled for the District of Columbia for the years 1990 and 2000. Projected GHG inventories have also been prepared for 2005 and the future year 2012. The future year 2012 coincides with the Kyoto Protocol's milestone year for developed countries, including the United States of America. The main purpose of the future year inventory is for planning application; that is, to help identify and possibly evaluate opportunities for a GHG emissions stabilization/reduction action plan for the District. This greenhouse gas inventory report primarily focuses on emissions of the three gases— carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) - most commonly associated with the greenhouse effect and global warming.

The inventory is intended to focus on emissions that are related both to the District of Columbia's internal activities as a (state-like) city government, and to the emissions in the larger *District-wide* community that may be influenced by District's policies and programs. To capture both of these aspects independently, this report includes both a "*District-wide*" greenhouse gas inventory and a "*City Operations*" emissions inventory. Neither of these inventories provides a precise picture of the GHG emissions that the District can directly or indirectly influence. But together, they are expected to provide a preliminary database from which to identify emission reduction opportunities and to develop preliminary action plan recommendations.

The *District-wide* emissions estimates, for the entire geographic domain of the District of Columbia, are carried out for four broad anthropogenic activity sectors. These four major sectors are the energy sector, transportation, waste management (solid waste and wastewater), and industrial processes. Estimates are also made for CO<sub>2</sub> sequestration (CO<sub>2</sub> sink) attributable to urban forestry and tree cover area in the District.

The District does not have any major base-load electric power generation facilities within its boundaries. In any given year, approximately 98 percent of the electricity needs of the District and its residents and businesses are met by power generation facilities outside of the District in the PJM Interconnection territory. An attempt has been made for including the CO<sub>2</sub> emissions arising from the District's electric power generated elsewhere.

The District *City Operations* inventory is an inventory of the greenhouse gas emissions associated with or directly influenced by the city operations ranging from fuel use by motor pool vehicles and city office building energy usage, to employees commute and employee business travel. To the extent possible, the city operations inventory also captures those GHG emissions that indirectly result from, for example, emissions associated with the manufacture

of cement and asphalt which is used in pavement, and the emissions associated with employee business travel by air.

The greenhouse gas emissions due to the city operations make up a relatively small portion of the overall *District-wide* inventory. However, the city operations related sources are the emission sources over which the Mayor and the Council of the District of Columbia often have more direct influence or control. Generally, most of the city operations related emissions are a sub-set of the District-wide emissions with minor exceptions. For example, emissions related to employee business travel may not have been included in the *District-wide* emissions.

Both the *District-wide* and the City Operations related inventories are reported in metric tonnes (one metric tonne is equivalent to 2,200 pounds) for maintaining consistency with the international convention for reporting GHG emissions. The emissions for all the greenhouse gases are presented in terms of a common unit - *metric tonnes of carbon dioxide equivalent (MTCO<sub>2</sub>E)* - by converting emissions of the individual gases with their global warming potential (GWP) index values. This becomes useful since some greenhouse gases trap more heat than others and therefore have a greater impact on global warming. The GWP is an index which accounts for the direct effects that various greenhouse gases have on radiative forcing. The IPCC approved global warming potentials are incorporated into the emissions estimation tools used for developing GHG inventories in the District. For example, the GWP index values for methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) are estimated at 21 and 310 respectively over a 100-year time horizon. Hence, a ton of methane is equivalent to 21 tonnes of CO<sub>2</sub>, and one ton of nitrous oxide is same as 310 tonnes of CO<sub>2</sub> emissions.

### ***District-Wide Inventories***

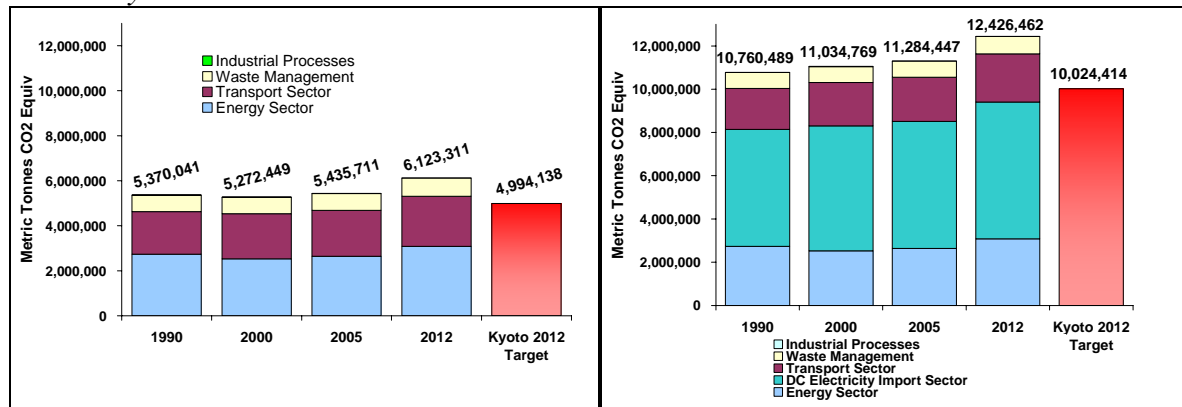
A summary of the *District-wide* greenhouse gas emissions for anthropogenic activities for the years 1990, 2000, 2005, and 2012 are presented in Table 1 and Figure 2 below. The GHG estimates for 1990 and 2000 are generally based on historical activity input data, whereas the years 2005 and 2012 data are projected inventories. The emissions are given in terms of metric tones of carbon dioxide equivalent (MTCO<sub>2</sub>E). The net emissions presented in the table are determined by subtracting the carbon dioxide uptake portion by the Urban Forestry/Tree Cover (CO<sub>2</sub> sink) from the District's gross emissions. A slight drop in urban forests and tree cover is assumed to accommodate the projected population growth. The decreased tree cover leads a drop in CO<sub>2</sub> sequestration benefits in future years.

In the year 1990, the gross GHG emissions from all *District-wide* anthropogenic activities were approximately 5.370 Million MTCO<sub>2</sub>E. Additionally, the GHG emissions (CO<sub>2</sub> only) related to *District-wide* electricity purchase were estimated at 5.409 Million MTCO<sub>2</sub>E. The District's aggregate GHG emissions for the year 1990 were estimated at 10.761 Million MTCO<sub>2</sub>E, whereas the *District-wide* net emissions for the year 2000 were estimated at 11.035 Million MTCO<sub>2</sub>E, a 2.5 percent increase from the 1990 levels. The *District-wide* projected net GHG emissions for the year 2012 are 12.427 Million MTCO<sub>2</sub>E, a 15 percent jump from the 1990 levels. The District wide energy sector combined with electricity import sector is by far the major contributor for at least 75 percent of the total GHG emissions in the District.

Table 1: Greenhouse Gas Emissions Summary for District of Columbia for Years 1990, 2000, 2005, and 2012

Source Sector	1990	2000	2005	2012
Energy Sector	2,735,676	2,530,723	2,641,547	3,086,153
Transport Sector	1,891,281	2,001,313	2,043,823	2,226,749
Waste Management	736,524	735,042	745,935	806,877
Industrial Processes	6,559	5,370	4,406	3,532
<b>District wide GHG Sources Total</b>	<b>5,370,041</b>	<b>5,272,449</b>	<b>5,435,711</b>	<b>6,123,311</b>
<b>Urban Forestry/Tree Cover (CO2 Sink)</b>	<b>-18,452</b>	<b>-18,452</b>	<b>-18,177</b>	<b>-16,818</b>
<b>DC's GHG Sources and Sinks Total</b>	<b>5,351,589</b>	<b>5,253,997</b>	<b>5,417,534</b>	<b>6,106,493</b>
<b>DC Electricity Import Sector</b>	<b>5,408,899</b>	<b>5,780,771</b>	<b>5,866,912</b>	<b>6,319,968</b>
<b>Net Emissions w/Electricity Import</b>	<b>10,760,489</b>	<b>11,034,769</b>	<b>11,284,447</b>	<b>12,426,462</b>

Figure 1: District-Wide Greenhouse Gas Emissions for 1990-2012, Without and With, the Electricity Purchase Sector Emissions Contribution

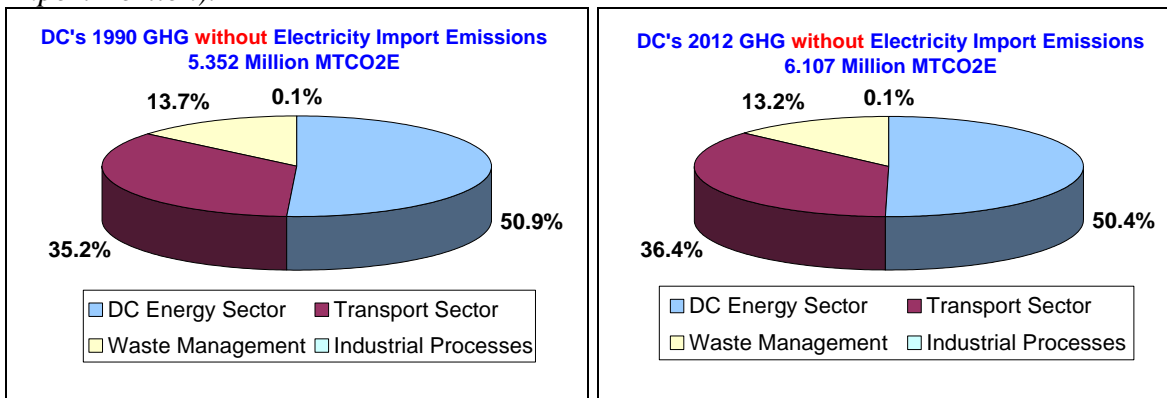


If we exclude the electricity import emissions, the transport sector contributes at least one-third of the *District-wide* GHG emissions. Figure 2 shows a distribution of the *District-wide* GHG emissions for 1990 and 2012. Due to the absence of major processing industrial operations in the District, the industrial processes sector contributes nominally to GHG emissions. The waste management sector includes emissions both from wastewater treatment, and from solid waste handling activities. The GHG emissions from the wastewater treatment facilities (WASA) were estimated and combined with the solid waste management emissions data reported here. Because of data unavailability for the solid waste activities in the District, GHG emissions from the state of Delaware were used as a surrogate for estimating *District-wide* emissions and for emissions projections for the solid waste category. Hence, one must use caution when interpreting the emissions from waste management sector.

The *District-wide* GHG inventory dropped nearly 98,000 metric tonnes, a three percent decrease, between the years 1990 and 2000. During this period, the emissions from the energy sector decreased by about 205,000 MTCO<sub>2</sub>E, while emissions of the transportation source sector increased by 110,000 MTCO<sub>2</sub>E. The GHG emissions drop in the energy sector could be a co-benefit of control programs implemented on major point sources for controlling nitrogen oxides after the year 1995 aimed at addressing the ground-level ozone air quality issues. The result is a shift from combusting more petroleum products to increased use of

natural gas which contains lower carbon content, thereby, releasing less carbon into the atmosphere.

Figure 2: District-Wide Greenhouse Gas Emissions for 1990 and 2012 (Without Electricity Import Portion).



Numerous control programs (local and national) have also been implemented since 1990 for reducing nitrogen oxides and organic compounds from the transportation sector. However, many of the measures have nominal GHG co-benefits, and also population growth appears to have been outpacing any emissions reduction gains in all sectors post-2005 period.

### City Operations Greenhouse Gas Inventory

Table 2 and the accompanying chart in Figure 3 show a summary of greenhouse gas inventory for the *City Operations* for the years 1990, 2000, 2005, and 2012. These GHG inventories do not include the emissions from the public school system or its facilities. However, the schools are part of the *District-wide* estimates. Due to data unavailability for the city operation activities, the preliminary estimates of the District’s city operations inventory are based on the City of Seattle’s methodology. The City of Seattle’s data were used as a surrogate data set for developing the year 1990 inventory in the District. Appropriate growth factors (population or household) are then applied to the 1990 data for estimating and projecting city operations emissions for all other years presented in this report. This component of the database will be revised in the future as District specific city operations data information becomes available.

The greenhouse gas emissions from the District government operations range between 0.411 Million and 0.458 Million MTCO2E for the reporting period, 1990-2012. The District’s government operations account for approximately nine percent of the *District-wide* GHG emissions without the electricity purchase related emissions, and for about four percent of the *District-wide* emissions including the electricity import related emissions.

The District government’s operations GHG inventories indicate that the emissions stay below those of the 1990 emissions. Emissions estimates indicate a nine percent drop between 1990 and 2000. This decrease can be due to a combination of both new *District-wide* controls that went into place post-1995 period and the District government’s initiatives related to energy

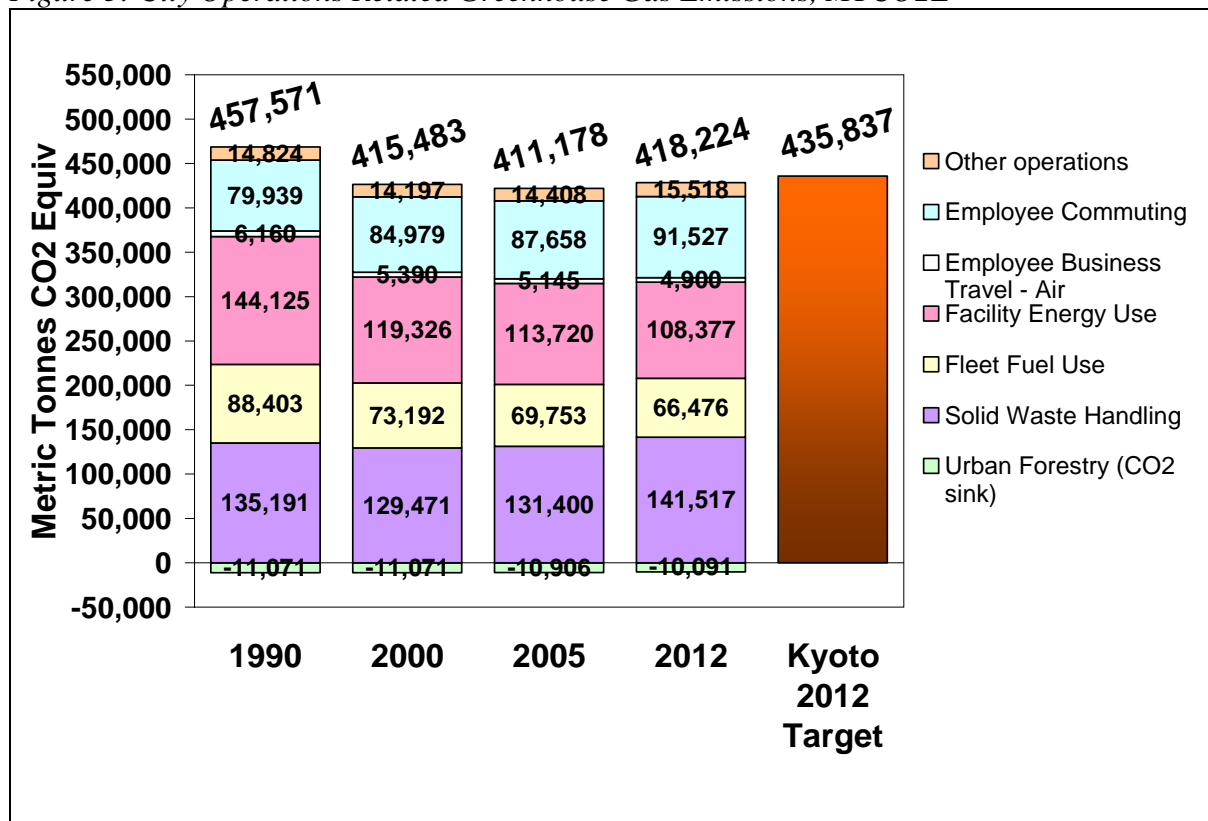


and fuel conservation measures. Even though the emissions for the 2000-2012 appear to stay below the 1990 levels, there is a gradual increasing trend in GHG emissions post-2005 period.

Table 2: Greenhouse Gas Emissions of District's City Operations, MTCO<sub>2</sub>E

City Operations Sector	1990	2000	2005	2012
Solid Waste Handling	135,191	129,471	131,400	141,517
Facility Energy Use	144,125	119,326	113,720	108,377
Fleet Fuel Use	88,403	73,192	69,753	66,476
Employee Commuting	79,939	84,979	87,658	91,527
Employee Business Travel - Air	6,160	5,390	5,145	4,900
Other operations	14,824	14,197	14,408	15,518
<b>City Operations Sources Total</b>	<b>468,642</b>	<b>426,555</b>	<b>422,085</b>	<b>428,315</b>
<b>Urban Forestry (CO<sub>2</sub> sink)</b>	<b>-11,071</b>	<b>-11,071</b>	<b>-10,906</b>	<b>-10,091</b>
<b>City Operations Net Emissions</b>	<b>457,571</b>	<b>415,483</b>	<b>411,178</b>	<b>418,224</b>

Figure 3: City Operations Related Greenhouse Gas Emissions, MTCO<sub>2</sub>E



### 3. KYOTO PROTOCOL TARGETS AND DISTRICT'S GHG EMISSIONS

On February 16, 2005, the Kyoto Protocol, an international agreement to address climate disruption, went into effect in the 141 countries that have ratified it to date. Thirty-eight of those countries are now legally required to reduce greenhouse gas emissions on average 5.2 percent below 1990 levels by 2012. The United States has not yet ratified the Kyoto Protocol.

The United States of America, with less than five percent of the world's population, is producing approximately 25 percent of the world's global warming pollutants. The Kyoto Protocol emissions reduction target for the United States would have been seven percent below 1990 levels by 2012.

State and local governments throughout the United States are voluntarily adopting emission reduction targets and programs. Many jurisdictions, including the District of Columbia, are looking into reducing global warming pollutants through programs that provide economic and quality of life benefits such as reduced energy bills, green space preservation, air quality improvements, reduced traffic congestion, improved transportation choices, and economic development and job creation through energy conservation and new energy technologies.

The District of Columbia Mayor Anthony A. Williams endorsed the U.S. Mayors Climate Protection Agreement (The United States Conference of Mayors 73<sup>rd</sup> Annual Meeting, Chicago, June 10-14, 2005), pledging to strive to meet or exceed the Kyoto Protocol targets for reducing greenhouse gas emissions. In this section, an attempt has been made to evaluate the District's GHG Inventories and projections, if the District were to voluntarily implement measures for meeting the Kyoto Protocol targets.

Table 3 shows *District-wide* GHG emissions, 2012 Kyoto Protocol target levels and projected shortfall under the business as usual scenario. The Table 3(a) shows targets and shortfall for District-wide inventories if we did not include the electricity purchase sector GHG emissions, whereas Table 3(b) shows the projected shortfall for District's emissions with the electricity import emissions. The District's targets were calculated as seven percent below the 1990 GHG emissions unadjusted for the CO<sub>2</sub> sinks (urban forestry in the District).

*Table 3: District-Wide GHG Emissions, Kyoto Protocol 2012 Targets and Projected Emissions Reduction Shortfall- (a) Without Electricity Purchase Emissions, and (b) With Electricity Purchase GHG Emissions*

a)		Year	1990	2000	2005	2012
DC's Net Emissions w/o electricity purchase emissions			5,351,589	5,253,997	5,417,534	6,106,493
Kyoto Protocol 2012 GHG Target - 7% below the year 1990 GHG levels						4,994,138
<b>DC's Projected GHG Reduction Shortfall in 2012</b>						<b>1,112,355</b>
b)		Year	1990	2000	2005	2012
Net GHG Emissions w/Electricity related emissions			10,760,489	11,034,769	11,284,447	12,426,462
Kyoto Protocol 2012 GHG Target - 7% below the year 1990 GHG levels						10,024,414
<b>DC's Projected GHG Reduction Shortfall with Imported Electricity in 2012</b>						<b>2,402,048</b>

The District-wide GHG emissions shortfall is 2.402 Million MTCO<sub>2</sub>E and 1.112 Million MTCO<sub>2</sub>E respectively for inventories with and without the electricity purchase sector related emissions.

Figure 3 in the previous section and the Table 4 show the District's *City Operations* GHG inventories and the projected Kyoto Protocol 2012 targets for the *City Operations* portion of

the inventories. The *City Operations* targets were calculated as seven percent below the 1990 GHG emissions unadjusted for the CO2 sinks (urban forestry).

*Table 4: City Operations Sub-Component Emissions and Kyoto 2012 Targets*

	1990	2000	2005	2012
<b>City Operations Net Emissions</b>	<b>457,571</b>	<b>415,483</b>	<b>411,178</b>	<b>418,224</b>
<b>Kyoto 2012 Target for <i>City Operations</i> sub-component</b>				<b>435,837</b>

The Kyoto Protocol 2012 target for the *City Operations* component is estimated at 0.436 Million MTCO2E with no projected shortfall. Even though the *City Operations* related emissions are below the 1990 levels and Kyoto targets for this sub-component, there appears to be a gradual increasing trend post-2005 period.

In the subsequent sections of the report, an attempt has been made to discuss a host of programs and measures at the *City Operations* level and at the District’s entire community level for addressing the projected shortfalls. The menu of options is expected to provide recommendations for a Climate Protection Action Plan in the District of Columbia.

#### **4. RECOMMENDATIONS FOR MITIGATING GHG EMISSIONS**

The District of Columbia’s Mayor Anthony A. Williams endorsed the U.S. Mayors Climate Protection Agreement. This agreement, which was amended at the 73rd Annual Meeting of the United States Conference of Mayors in Chicago (June 10-14, 2005), reads:

*“The U.S. Mayors Climate Protection Agreement*

*A. We urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to 7 percent below 1990 levels by 2012, including efforts to: reduce the United States’ dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels;*

*B. We urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that includes 1) clear timetables and emissions limits and 2) a flexible, market-based system of tradable allowances among emitting industries; and*

*C. We will strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as: 1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan. 2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities; 3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car pooling and public transit; 4. Increase the use of clean, alternative energy by, for example, investing in “green tags”, advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology; 5. Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money; 6. Purchase only Energy Star equipment and appliances for*

*City use; 7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system; 8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel; 9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production; 10. Increase recycling rates in City operations and in the community; 11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO<sub>2</sub>; and 12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.”*

The *District-wide* GHG inventory projections show a significant shortfall for meeting the Kyoto Protocol 2012 target levels. The shortfall is estimated at 2.402 Million MTCO<sub>2</sub>E.

The District has many on-going and new initiatives that would help reduce the greenhouse gas emissions. Example initiatives are:

- Renewable Energy Portfolio Standard Act of 2004;
- Traffic lights LED signalization; and
- Energy conservation and energy efficiency commitments made in the 2003-2007 Comprehensive Energy Plan.

### **Renewable Energy Measure**

The Renewable Energy Portfolio Standard Act of 2004 requires the District of Columbia Public Service Commission to implement a renewable energy portfolio standard through which a fixed percentage of electricity provider's source would be from renewable energy. The Public Service Commission is developing regulations governing implementation of this act. By the year 2012, this act requires that at least 6.566 percent of the electricity purchases in the District be from the renewable sources. Currently, the electricity purchases from the PJM Interconnection region include only about two percent of renewable sources.

By implementing the Renewable Energy Portfolio Standard Act, the District could potentially avoid 0.458 Million MTCO<sub>2</sub>E of greenhouse gas emission in the year 2012. This measure alone is capable of mitigating 19 percent of the *District-wide* shortfall (projected at 2.402 Million MTCO<sub>2</sub>E).

### **LED Traffic Signals**

The District of Columbia recently installed Light-Emitting Diode (LED) modules in all 1546 signalized intersections in the District. This measure is expected to save approximately 575,000 KWH electricity annually. The greenhouse gas emissions avoided are up to 500 MTCO<sub>2</sub>E per year.

## **Mitigating the *City Operations* GHG Emissions**

For reducing emissions from the *City Operations* related emissions, further measures listed below would have a significant impact:

- i) Strengthening the recycling program for reducing emissions from solid waste management operations (the solid waste management sector accounts for nearly 500,000 MTCO<sub>2</sub>E greenhouse gas emissions in the District);
- ii) Tele-work / tele-commute and flexible work-week programs for reducing the vehicle miles travel by the city workforce;
- iii) Public transit subsidy (similar to the federal government program) to avoid vehicle miles travel and emissions from the transportation sector; and
- iv) Energy efficient lights and motion sensor switches in all office buildings; and turning off lights and electronic equipment at the end of the workday.

## **Other Programs for Reducing GHG Emissions**

In addition to the on-going initiatives and efforts, the District should evaluate various other programs listed below that are being considered across many jurisdictions. The Puget Sound Clean Air Agency in the Seattle metropolitan area has been evaluating many of these programs, excluding the Regional Greenhouse Gas Initiative, for implementation as part of the Puget Sound region's Climate Protection Action Plan. Most of these programs provide economic benefits while reducing the greenhouse gas emissions.

## **Regional Greenhouse Gas Initiative (RGGI)**

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort by nine Northeast and Mid-Atlantic states to discuss the design of a regional cap-and-trade program initially covering carbon dioxide emissions from power plants in the region. In the future, RGGI may be extended to include other sources of greenhouse gas emissions, and greenhouse gases other than CO<sub>2</sub>. Currently, nine states including Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont are participating in the RGGI effort.

Non-member observers in the RGGI process include: Maryland, the District of Columbia, Pennsylvania, the Eastern Canadian Provinces, and New Brunswick.

The District of Columbia does not have any major base-load electric power generation facilities within its boundaries. In any given year, approximately 98 percent of the electricity needs of the District, its residents and businesses, are met by power generation facilities outside of the District in the PJM Interconnection territory.

### ***Key Action***

The District would need to evaluate the RGGI for possible participation in the process.

## **Energy Efficiency and Renewable Energy**

Energy-efficient lights, appliances, and buildings can save electricity more cheaply than new power plants can produce it. Successful utility efficiency programs and building and construction codes have shown that this “saved” energy can be used to meet new demand, providing both a cost-effective energy resource and major reductions in GHG emissions. Recent successes in the solar and wind power sectors demonstrate that the District will be able to tap into the renewable energy supplies and begin to replace carbon-based fuels in the existing supply as appropriate.

### ***Key actions***

Develop standards that promote meeting new load growth with cost-effective energy efficiencies and renewable energy supplies.

Develop standards that support the use of renewable resources when retiring/replacing existing fuel sources.

Enact energy efficiency standards for selected appliances and products (Energy Star).

Upgrade the non-residential state energy code and improve enforcement, training, and education.

## **Reduce the Greenhouse Gas Emissions of New Vehicles Sold**

Petroleum used in transportation accounts for one third of the District specific greenhouse gas emissions. Achieving major reductions from this sector requires steady and significant declines in the emissions that these vehicles produce.

### ***Key actions***

Actively participate and engage in efforts to urge the federal government to achieve improvements in fuel economy

Adopt California Motor Vehicle standards, which will require stricter emissions standards for new cars sold in the District of Columbia

## **Reduce Motor Vehicle Miles Traveled**

Reducing overall vehicle miles traveled and providing better alternatives to single-occupancy vehicles are both existing regional priorities and a crucial part of any effective strategy for reducing global warming emissions.

### ***Key actions***

Establish a vehicle miles traveled reduction goal.

Develop and implement a series of transit, land-use, and demand reduction strategies. Incorporate climate protection policies and goals into regional transportation and land-use planning.

## **Protect Urban Forestry and Tree Cover**

More than 15 percent of the District includes trees and urban forestry. Managed appropriately, trees can store or “sequester” carbon, providing a way to reduce the concentration of carbon in the atmosphere while emission reduction strategies take hold.

### ***Key action***

Protect and enhance the GHG reduction potential of District’s urban forests and other working landscapes. Specific actions include urban forest and tree cover conservation; and providing incentives to property owners to maintain and plant trees.

## **Increase Recycling and Composting Rates**

Reducing, reusing, and recycling waste can significantly reduce GHG emissions in all phases of a product’s lifecycle, while also protecting the environment, conserving resources, and lowering waste management costs and impacts.

### ***Key action***

Setting realistic goals for food waste composting and mixed paper recovery; and gradually increase paper, plastic, metals, and other materials recovery rates.

## **Develop and Adopt a Climate Change Policy Framework**

An effective climate strategy must combine countless individual actions that collectively reduce greenhouse gas concentrations in the atmosphere sufficient to stabilize the climate. These many individual measures must be bound together with a results-oriented policy framework that lends structure, coherence, pace, and accountability to the enterprise.

### ***Key actions***

Adopt explicit goals and timelines for GHG reduction.

Establish fair, predictable targets on GHG emissions across sectors and use flexible market-based trading systems, such as a national or regional Cap and Trade, which, when properly constructed and with appropriate regulatory support, will allow the goals to be reached as efficiently as possible.

## **Promote Public Education and Citizen/Corporate/Government Action**

Solutions to global warming require action at all levels, from high-level policy development to business investment to individual behavior change. Active engagement by all sectors and a clear understanding of the challenges and opportunities posed by global warming by all citizens are essential.

### ***Key action***

Develop a communication and awareness strategy that includes: broad-based climate education; actionable messages; outreach partnerships with related efforts and institutions; and targeted education/advocacy for specific audiences that can implement high-priority reduction strategies.

## **Encourage District Government Agencies to Act**

District government departments and agencies can and should take significant steps to reduce greenhouse gas emissions. They can contribute in several key ways including: leading by example through their policies, practices, and operations; creating partnerships and leverage existing opportunities; advocating for GHG emission reduction actions; and providing technical assistance, funding, incentives and regulation.

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