



Wilkins Township

# Climate Action Plan

## September 2010



Prepared by  
Center for Environmental Research and Education  
Duquesne University

**Wilkins Township**

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**Prepared by  
Center for Environmental Research and Education  
Duquesne University**

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## Letter from the Mayor

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Dear fellow citizens and members of the Wilkins Township community:

On behalf of the Board of Commissioners, I am pleased to present to you Wilkins Township's first Greenhouse Gas Emissions Inventory and Climate Action Plan. Together these documents form the foundation on which Wilkins can develop specific projects and programs to reduce energy use, cut greenhouse gas emissions from municipal functions and the community at large, and join other municipalities across the country in meeting the challenge to our prosperity and well-being posed by global climate change.

Wilkins Township is already working to reduce its GHG emissions by converting traffic signals to the LED technology, buying more fuel efficient vehicles for its fleet, and replacing boilers with more efficient models. These actions represent the first of many steps to be taken toward the goal of reducing its carbon footprint.

Municipal government is fundamentally the job of stewardship of the common wealth of a community. Now with this effort, we have engaged in no small way in becoming stewards of our natural world for coming generations. I hope you will join your local government to further these admirable aims by undertaking projects across the spectrum of possibilities in your homes, businesses, and places of work, schools, and civic organizations.

The effort represented by these documents required the resources, skills, talents, and work of numerous parties. We appreciate the financial support of the Pennsylvania Department of Environmental Protection under its Local Government Greenhouse Gas Pilot Program. I would like to thank Dr. Stan Kabala, Associate Director of the Center for Environmental Research and Education of Duquesne University, and his graduate students for providing the technical expertise that made preparation of this Inventory Report and Climate Action Plan possible. I would also like to thank our Township staff, in particular Township Manager Rebecca Bradley, for their efforts to this end. Additionally, I would like to thank the our neighbors, the Borough of Forest Hills and the Municipality of Penn Hills for joining us to together carry out a quite special *multi-municipal* project. Together we have shown how the municipalities of southwestern Pennsylvania can respond to the challenges of the times we live in.

Thank you.

Sincerely,

Sylvia J. Martinelli, Chairperson  
Board of Commissioners  
Township of Wilkins  
September 30, 2010

## **Acknowledgements**

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## **Glossary**

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### **Alternative Energy**

Sources of energy beyond conventional sources (coal, oil, natural gas, nuclear); often used as a synonym for “renewable” energy, but alternative energy includes some non-renewable sources, e.g., coal recovered from slate or other coal refuse piles. Examples of renewable energy are wind, solar, hydro, and geothermal

### **Biodiesel**

Liquid fuel made by chemically reacting lipids, i.e., vegetable oils and animal fat diesel fuel consisting of long-chain alkyl (methyl, propyl or ethyl) esters

### **Cap-and-Trade**

An environmental policy tool which sets a limit on the aggregate quantity of a pollutant that can be emitted in a given geographic area. This limit is known as the cap. Segments of the cap are allocated or sold to companies in the form of emissions permits, also known as credits. The total number of permits allotted cannot exceed the cap, which limits the total emissions to that level. These permits represent the right to emit or discharge a quantity of pollutant equal to the number of permits held. If a company has more emissions than permits, it must either reduce its emissions or buy more buy permits—that is, trade—from companies whose emissions are lower than the levels covered by the permits they own. This process in effect charges the company that is polluting more, and rewards the company that is polluting less. This aim of cap-and-trade is to reduce pollution at the lowest cost to society

### **Carbon footprint**

The amount of greenhouse gas (GHG) emissions produced by an organization, event, product, or individual; often expressed in terms of the amount of carbon dioxide emitted

### **Cities for Climate Protection**

A campaign of ICLEI (see below) initiated in 1993 working with over 500 local governments worldwide to develop a strategic agenda to reduce global warming

### **Clean Air-Cool Planet (CA-CP)**

A nonprofit organization dedicated to reducing carbon emissions. CA-CP supports to companies, communities, and universities in their efforts to reduce GHG reducing their emissions

### **Clean energy**

Sustainable energy or renewable energy—energy that does not pollute, meets the needs of the present without compromising future needs, and does not deplete natural resources or destroy the environment. Examples are wind, solar, hydro, and geothermal.

### **Clean Air and Climate Protection**

A software tool developed by ICLEI for use by towns and cities to determine their greenhouse gas emissions associated with electricity, fuel use, transportation, and waste disposal; chart future emissions levels; set reduction targets; and track progress towards meeting goals

**Climate Change**

A change over period of decades in the statistical distribution of weather events

**CO<sub>2</sub>e (CO<sub>2</sub> equivalent)**

A term that renders the heat trapping capacity of all GHG in terms of the heat trapping capacity of carbon dioxide

**Energy Audit**

An inspection, survey, and analysis of energy flow in a building, process, or system; typically used to reduce the amount of energy input into the system without negatively affecting the output(s)

**Energy Efficiency**

The use of less energy to provide the same level of service

**Environmentally Preferable Purchasing (EPP)**

Purchasing products or services that affect the environment or human health less than a competing product or service; applies to raw materials, manufacturing, packaging, distribution, use, reuse, operation, maintenance, and waste disposal

**EPA (or USEPA)**

The U.S. Environmental Protection Agency, the federal body responsible for enforcement of federal environmental statutes

**F-gases**

Also known as hydrofluorocarbons or HFCs, perfluorocarbons or PFCs, and sulfur hexafluoride or SF<sub>6</sub>, are industrial gases widely used in refrigeration, air conditioning systems, foam blowers, electrical switches, sport shoe “air soles”, and car tires

**Fossil fuels**

Fuels containing a high percentage of carbon formed by anaerobic decomposition of buried dead organisms; includes coal, petroleum, and natural gas

**Green Building Alliance (GBA)**

A non-profit organization based in Pittsburgh, Pa. with the mission is to promote green building design, building practices, construction, and operations in western Pennsylvania

**Green Government Task Force (GGTF)**

A task force formed by the City of Pittsburgh to introduce environmentally sound practices and policies into city government and operations; responsible for developing the Pittsburgh Climate Action Plan to reduce greenhouse gas emissions

**Greenhouse gases (GHG)**

Gases in the atmosphere that absorb and solar radiation within the thermal infrared range, hence maintain the greenhouse effect; include water vapor, carbon dioxide, methane, nitrous oxide, chlorofluorocarbons

**Green Roof**

A roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane

**Green Technology** (also known as clean technology)

Applies science to conserve the natural resources and the environment and reduce negative impact of human activity on natural systems

**Global Anthropogenic GHG emissions**

Greenhouse gases caused by human activity, including the burning of fossil fuels, deforestation, use of chlorofluorocarbons (CFCs) in refrigeration systems, and agricultural activities that produce an increase in nitrous oxide (N<sub>2</sub>O) concentrations

**High Emissions Scenario**

Projections made about global climate change on the assumption that GHG emissions will continue to increase

**HVAC**

Acronym for Heating, Ventilating, and Air Conditioning; refers to the technology of indoor or automotive environmental comfort

**ICLEI: Local Governments for Sustainability**

An international association of local, national and regional government organizations that committed to sustainable development

**Intergovernmental Panel on Climate Change (IPCC)**

An intergovernmental body scientific body formed under the INFCCC tasked with evaluating the risk of climate change caused by human activity

**KWh**

A unit of energy equal to 1000 watt hours or 3.6 mega joules

**Kyoto Protocol**

A treaty under the United Nations Framework Convention on Climate Change (UNFCCC) whose main objective is to address global warming

**LED**

Light-emitting diode is a semiconductor light source used lighting or as an indicator lamp in many devices

**LEED**

Leadership in Energy & Environmental Design, a green building certification system that is internationally recognized and uses third-party verification to determine what strategies a building or community to improve performance in relation to energy savings, water efficiency, carbon dioxide emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts

**Local Government Operations Protocol (LGOP)**

A format developed in partnership by the California Air Resources Board, California Climate Action Registry, and ICLEI to serve as a standardized guideline for use by local governments in quantifying and reporting GHG emissions related to government operations

**MCF**

1000 cubic feet, a unit of measure in the oil and gas industry for natural gas

**MPG**

Miles per gallon, gasoline consumption measurement used in the United States and the United Kingdom

**Photovoltaic (PV)**

Refers to the conversion of light directly into electricity, typically by the use of a silicon-cell technology converts solar radiation into direct current electricity

**Pittsburgh Climate Initiative (PCI)**

A program of the City of Pittsburgh aimed at leading residents, businesses, governments, and institutions of higher learning in the reduction of greenhouse gas emissions

**Plant Hardiness Zones**

Geographically-defined areas in which a specific category of plant life is capable of growing, as defined by climatic conditions, including its ability to withstand the minimum temperatures of the zone

**Union of Concerned Scientists (UCS)**

A nonprofit science advocacy group based in the United States with a membership of more than 250,000 citizens and scientists

**United Nations Framework Convention on Climate Change (UNFCCC)**

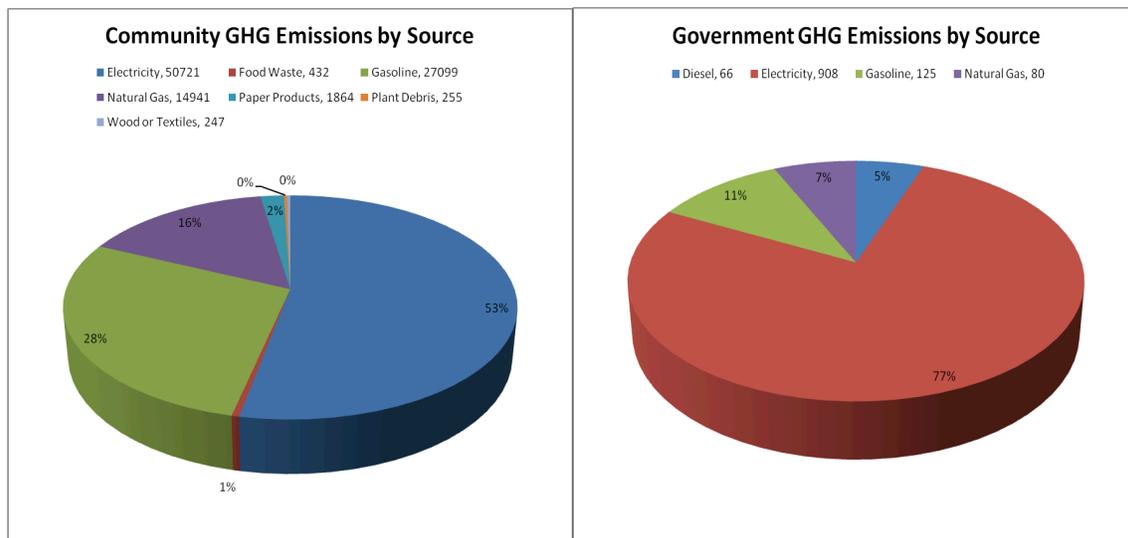
An international environmental treaty with the goal of stabilizing GHG concentrations in the atmosphere at a level that would avoid dangerous anthropogenic interference with the climate system

## Executive Summary

This Climate Action Plan is made up of the 2008 greenhouse emissions inventory results for Wilkins Township and a climate action for the township and its community. Funded by the Pennsylvania Department of Environmental Protection (PADEP) *Local Government Greenhouse Gas Pilot Grant Program*, this project provides Wilkins with a foundation on which to build a program with which to reduce municipal and community greenhouse gas (GHG) emissions. It was prepared by graduate students of the Center for Environmental Research and Education (CERE) at Duquesne University under the direction of Dr. Stanley Kabala, Associate Director of CERE.

The project team used the ICLEI Clean Air/Climate Protection (CACP) municipal GHG emissions inventory software tool to translate Wilkins data into a measure of GHG emissions measured in terms of carbon dioxide equivalent (CO<sub>2</sub>e). The CACP calculator looks separately at community-level and government-level sources of GHG emissions, and divides the community-level analysis into six categories and the government-level analysis into 13 categories. Each applicable category for the community and government analysis is described in the Action Plan.

In 2008, the Wilkins Township was responsible for approximately 96,737 tons of emitted greenhouse gases. Of this, 95,558 tons came from the community sector, while 1,179 tons came from the government sector. The following charts present community and government emissions according to the sources of energy that produced them.



Community Emissions by Source

Government Emissions by Source

In terms of municipal operations, energy for streetlights accounted for 68% of greenhouse gases, derived from electricity and natural gas usage, while fleet vehicles contributed for 16% and streetlights 12% respectively.

Numerous opportunities for emissions reduction exist at both the municipal and community levels. These would enable Wilkins to reduce both greenhouse gas emissions and costs associated with practices that generate them. This report incorporates figures from energy audits of governmental operations in Allegheny County as a way to demonstrate the internal rate of return (IRR) cost calculations on recommendations listed. In addition to the energy audit, this action plan provides detailed recommendations and funding sources, located in the appendix.

Ultimately, the goal of Wilkins' Climate Action Plan is to build on existing planning and implementation efforts and integrate them into the broader task of reducing the community's impact on climate. Wilkins has already undertaken a number of programs and projects (community-scale and municipal operations) that will result in GHG emissions reductions. For example, in 2006, traffic lights were converted to LED lighting; office lighting was converted to compact fluorescent bulbs, and replacing thermometers and renovating meeting space to reduce energy usage in the Municipal Buildings.

Elsewhere in southwestern Pennsylvania, Pittsburgh City Council adopted the Pittsburgh Climate Initiative (PCI) in 2008, with the goal of engaging the City's residents, businesses, government agencies, and institutions of higher learning to work toward the goal of reducing the city's GHG by 20% by 2023. Allegheny County has completed a GHG emissions inventory of County operations, and plans ultimately to expand its inventory to include activities of all County authorities, including the Port, Housing, Airport, and Sanitary Authorities. At the state level, the Pennsylvania Climate Change Act of 2008 calls for the development of a state Climate Change Action Plan. At the federal level, the U.S. government has slated \$80 billion for investment in clean energy as a part of the American Recovery and Reinvestment Act. In June 2009, the U.S. House of Representatives passed the American Clean Energy and Security Act.

**Background: PADEP Local Government Greenhouse Gas Pilot Grant Program**

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The Pennsylvania Department of Environmental Protection (PADEP) *Local Government Greenhouse Gas Pilot Grant Program* released a request for proposals from municipalities in 2008 to provide funds to local governments in Pennsylvania to prepare inventories of their municipal and community greenhouse gas (GHG) emissions. Municipalities receiving funds under this program were to craft climate action plans aimed at lowering their GHG emissions. The municipalities awarded grants in 2009 for this purpose are listed below.

The eventual GHG inventory shows municipalities the extent of their GHG emissions from direct and indirect sources within the municipality according to sector, i.e., facilities, vehicles, lighting, and so on. The climate action plan sets out recommendations for reducing emissions in a timeline while remaining cognizant of municipal financial constraints as well as long-term savings. Municipalities funded by the program are not required to implement any of the measures identified in the action plan.

*Local Government Greenhouse Gas Pilot Grant Program: Municipalities grantees*

ALLEGHENY COUNTY: Wilkins Township (for itself, Forest Hills, and Penn Hills) & Mt. Lebanon

BUCKS COUNTY: Bucks County Multi-Municipal Program

BUTLER COUNTY: Cranberry Township

CENTRE COUNTY: Centre Region Greenhouse Gas Pilot Grant

CRAWFORD COUNTY: Meadville

DELAWARE COUNTY: Swarthmore Region<sup>1</sup>

**Background: Wilkins Township**

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Wilkins Township is a hilly and heavily wooded municipality 2.75 square miles in size located eleven miles east of Pittsburgh. According to the 2000 Census, its population is 6,917. Wilkins became a political subdivision of the Commonwealth of Pennsylvania in 1821. Coal mining began in the areas in the latter part of the 1800s, and by the early 20<sup>th</sup> century the township had begun its manufacturing history with the construction of the Westinghouse foundry in Linhart.<sup>2</sup>

The total number of Wilkins residents working as of 2008 was 8,420:<sup>3</sup> 17.6% worked in Administration & Support, Waste Management and Remediation, 17.6% in Information, 15.3% in Professional, Scientific, and Technical Services, 14.7% in Retail Trade, 10.7% in Construction, and 6.8% in Accommodation and Food Services. Of the Wilkins Township’s working residents, 10.5% work in the City of Pittsburgh, 6.5% in Penn Hills CDP, and 3.9% work in Monroeville. The remaining 79.1% of residents commute to various other locations.<sup>3</sup>

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<sup>1</sup> <http://www.portal.state.pa.us/portal/server.pt?open=514&objID=552419&mode=2>

<sup>2</sup> <http://www.wilkinstownship.com/wilkinshistory.htm>

<sup>3</sup> Bob Schwartz (grad email) of the spc.



**Figure 1: Wilkins Township in Allegheny County<sup>4</sup>**

<sup>4</sup> [http://www2.census.gov/geo/maps/general\\_ref/cousub\\_outline/cen2k\\_pgsz/pa\\_cosub.pdf](http://www2.census.gov/geo/maps/general_ref/cousub_outline/cen2k_pgsz/pa_cosub.pdf)

## **Background: ICLEI**

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### **ICLEI and the Cities for Climate Protection Campaign**

ICLEI: Local Governments for Sustainability is a nonprofit organization whose mission is to support municipalities around the world seeking to reduce their environmental impact. ICLEI launched its *Cities for Climate Protection* (CCP) campaign for the United States in 1993 with the goal of reducing U.S. greenhouse gas emissions by educating and empowering local governments to take action on climate change. Through this action, local governments can improve local air quality, reduce government operating costs, and improve quality of life. ICLEI uses a five-milestone approach in assisting local governments along their path to reduce greenhouse gas emissions:

- Milestone 1: Conduct a baseline emissions inventory and forecast.
- Milestone 2: Adopt an emissions reduction target.
- Milestone 3: Develop a Climate Action Plan for reducing emissions.
- Milestone 4: Implement policies and measures.
- Milestone 5: Monitor and verify results.

For this purpose ICLEI developed the Clean Air Climate Protection (CACP) municipal GHG emission inventory software tool. The CACP calculators used up-to-date conversion factors to translate readily available data (such as electricity and natural gas usage) into a measure of GHG emissions in terms of tons of carbon dioxide equivalent (CO<sub>2</sub>e). CO<sub>2</sub>e is a representation of total emissions of various GHG (carbon dioxide, methane, chlorofluorocarbons, nitrous oxide) are weighted according to their global warming (or heat-trapping) potential relative to that of carbon dioxide. In most cases, data inputs used in for the CACP calculator were obtained simply by surveying utility bills and purchase receipts for the appropriate usage units (kWh, MCF, gallons, etc.).

### **Benefits of a GHG Inventory**

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A greenhouse gas (GHG) inventory provides a municipality with a measure of GHG emissions and their sources. There numerous benefits in developing a GHG inventory include:

- **Managing Risk:** By voluntarily reporting emissions, municipalities may be at an advantage in applying for state or federal grants as well as being accepted by future state, federal, or international regulatory GHG programs.
- **Addressing Inefficiencies:** By indicating major sources of GHG emissions, an inventory can enable a municipality to address energy inefficiencies, thus cutting costs along with emissions;
- **Preparing for a Carbon Constrained Future:** GHG inventories allow municipalities to be prepared for new regulations that may be implemented regarding emissions in the future.
- **Gaining Recognition as an Environmental Leader:** A GHG inventory can enable a municipality to, publicize and be recognized for environmental stewardship
- **Educating Stakeholders:** A GHG inventory can inform stakeholders about local government's GHG emissions profile.<sup>5</sup>

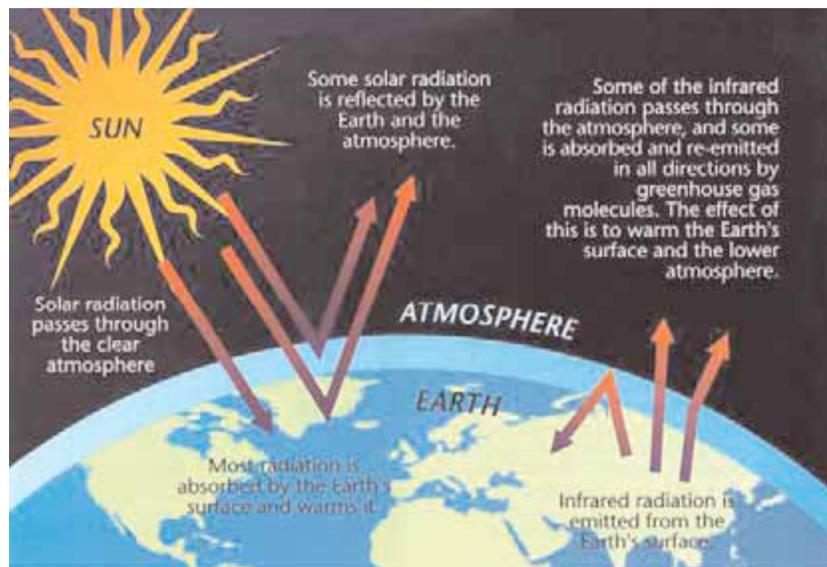
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<sup>5</sup> <http://www.theclimaterestory.org/downloads/2010/05/2010-05-06-LGO-1.1.pdf>

## I. Introduction

### A. Climate Change Science: An Introduction

Greenhouse gases (sometimes referred to as or heat-trapping gases) include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and chlorofluorocarbons (CFC) essentially trap heat in the atmosphere by absorbing it as it radiates from the earth. As the sun beams solar radiation onto the earth's surface, a share of that light energy is absorbed by the earth and re-radiated into the atmosphere as heat. Of the energy that is re-radiated, some is trapped by GHG in the atmosphere. As concentrations of GHG in the atmosphere rise, more heat is trapped (Figure 2). While some level of GHG is essential for maintaining livable temperatures on the planet, excess levels lead to warming. This is predicted to have dramatic effects on the earth's climate, including impact on human health, damage to agriculture, extreme weather conditions like droughts, flooding and more intense hurricanes, and shrinking coastlines due to rising sea levels. As GHG concentrations increase, other factors come into play. For example, the oceans, which absorb large quantities of CO<sub>2</sub>, can become, with the effect that more CO<sub>2</sub> will remain in the atmosphere.



**Figure 2: The Greenhouse Gas Phenomenon**

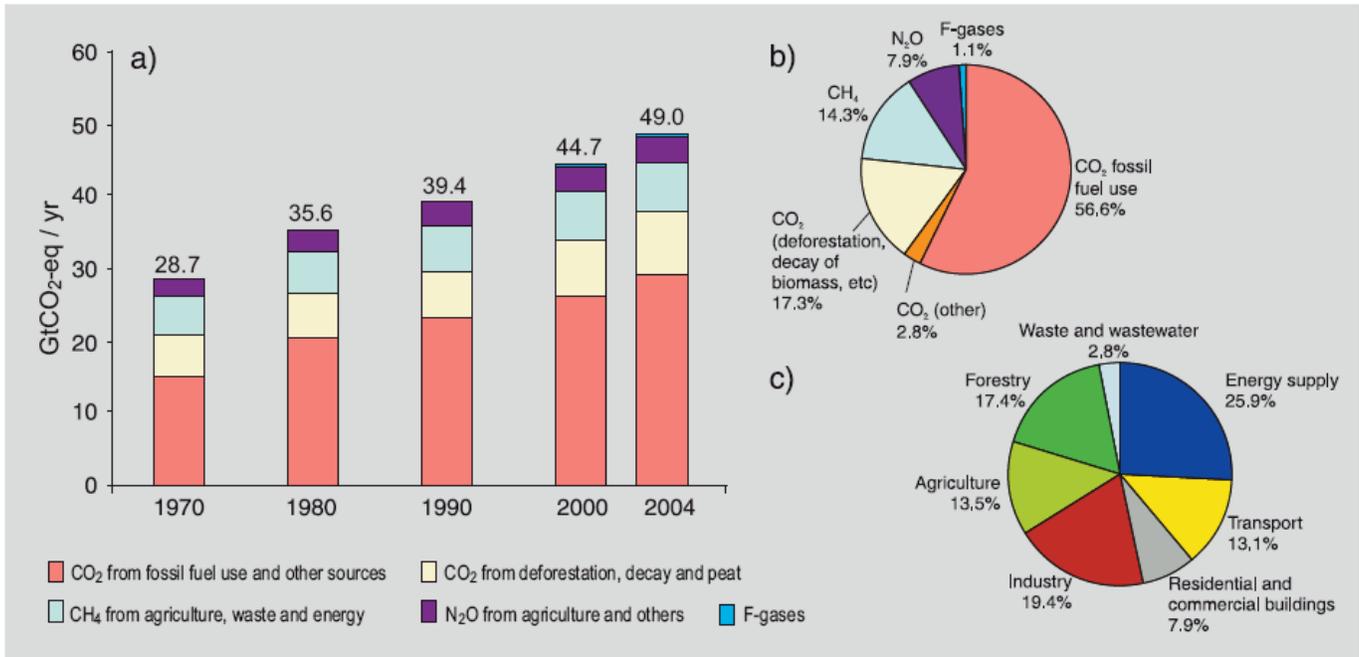
Source: US Environmental Protection Agency

Evidence for climate change has accumulated from many sources. The most definitive, that from the United Nations Intergovernmental Panel on Climate Change (IPCC), has led to the resounding conclusion that "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level." (*IPCC 4<sup>th</sup> Assessment Report, Summary for Policymakers, 2007*)

To determine how much a particular type of greenhouse gas warms the globe, a measure known as carbon dioxide equivalent (CO<sub>2</sub>e) is used. All GHG are expressed in terms of their heat

trapping potential as equivalents of carbon dioxide. This is expressed in parts per million by volume. In terms of common activities, one ton of CO<sub>2</sub>e is emitted by:

- Travelling 2,000 miles in an airplane
- Driving 1,350 miles in a large sport utility vehicle
- Driving 1,900 miles in a mid-sized car
- Driving 6,000 miles in a hybrid gasoline-electric car
- Running an average U.S. household for 60 days
- Having your computer on for 10,600 hours
- Grazing one dairy cow in Uganda for eight months



**Figure 3: Global Anthropogenic GHG emissions**

Source: Environmental Protection Agency<sup>6</sup>

Average CO<sub>2</sub>e emissions per year

- |   |                            |
|---|----------------------------|
| • Average U.S. car driven typical mileage       | <b>4.5 tons</b>            |
| • Average global citizen                        | <b>.5 tons</b>             |
| • Average U.S. resident                         | <b>21 tons</b>             |
| • Electricity use of the average U.S. household | <b>6.2 tons</b>            |
| • 500 MW gas power plant                        | <b>1.5 million tons</b>    |
| • An older 1,000 MW coal plant                  | <b>8.3 million tons</b>    |
| • The U.S. as a whole                           | <b>6 billion tons</b>      |
| • The planet as a whole                         | <b>&gt;25 billion tons</b> |

1,000 Tons of CO<sub>2</sub>e is offset by:

<sup>6</sup> <http://www.epa.gov/climatechange/emissions/globalghg.html>

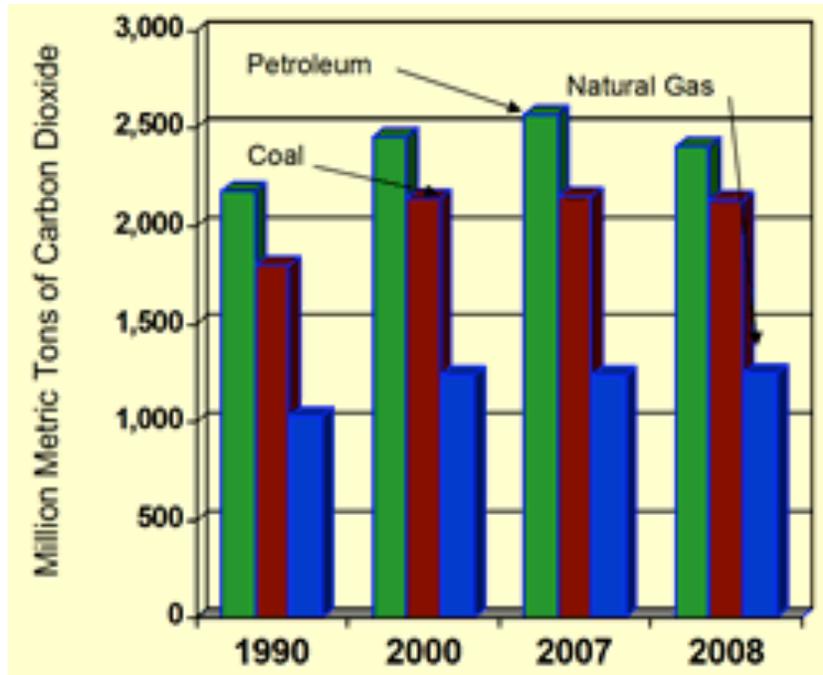
- Moving 145 drivers from large SUVs to hybrids for one year
- Running one 600 kW turbine for an average year
- Replacing 500 100-watt light bulbs with 18-watt compact fluorescent lights (10-year life)
- Replacing 2,000 refrigerators with the highest efficiency model (10-year life)
- Installing 125 home solar panels in India (20-year life)
- Planting an acre of Douglas fir trees (50 years of growth)
- Protection four acres of tropical rainforest from deforestation<sup>7</sup>

#### **Scientific Facts and Projections**

- Fossil fuels account for 84% of energy use.
- 50% + of electricity is coal fired.
- 17% of greenhouse gases are offset by forests and other land-use sinks.
- Of the twelve years from 1995-2006, eleven rank among the twelve warmest years for global surface temperature since records were first kept in 1850.
- The last 50 years have been hotter than any other period in the last 500 years.
- Global average sea level has risen since 1961 at an average rate of 1.8 mm/yr and since 1993 at 3.1 mm/yr, due to expanding warmer water and melting glaciers and ice caps.
- Solid evidence from 650,000 years of data on air bubbles captured ice core samples showing CO<sub>2</sub> levels never higher than they are now.
- Arctic sea ice shrinking at 2.7%/decade (7.4% summer rate).
- The number and size of glacial lakes is increasing and the stability of permafrost is decreasing.
- Runoff is increasing in many snow-fed hydrological systems.
- Poleward movements (moving away from the equator) in plant and animal ranges have been documented.
- A 0.2° C per decade increase in global average temperature is projected over the next two decades.
- The continuation of anthropogenic warming and sea level rise would be observed for centuries even after the stabilization of GHG concentrations.

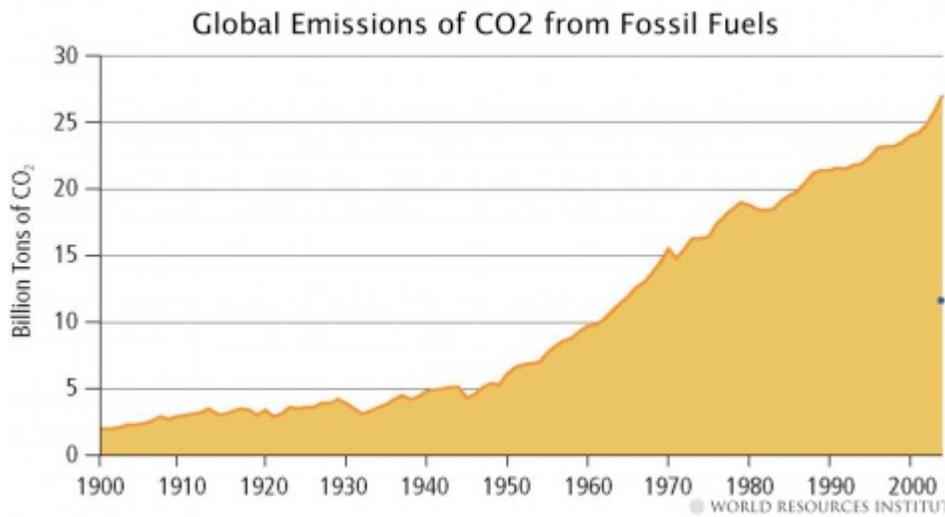
*Source: The Intergovernmental Panel on Climate Change*

<sup>7</sup> <http://www.cleanair-coolplanet.org/ConsumersGuidetoCarbonOffsets.pdf>



**Figure 4: U.S. Energy-Related Carbon Dioxide Emissions by Fuel for Selected Years**

Source: U.S. Energy Information Administration, preliminary estimate for 2008.<sup>8</sup>

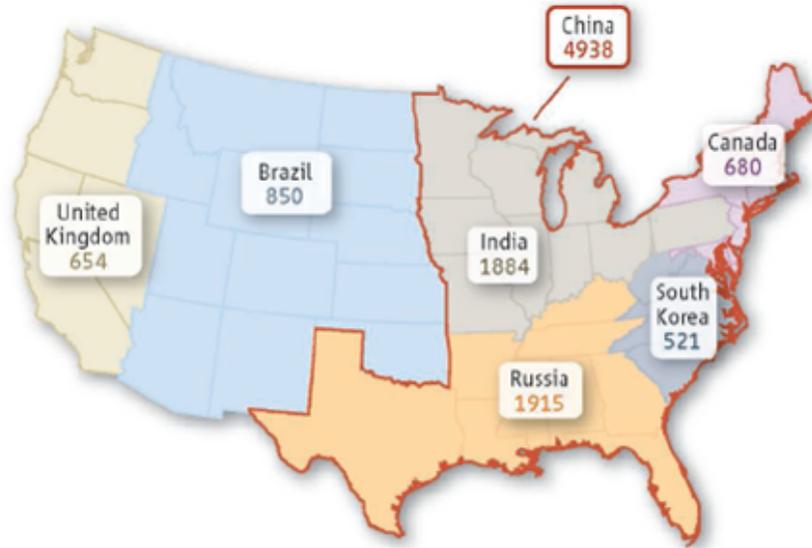


**Figure 5: Carbon Dioxide Emissions from Fossil Fuels**

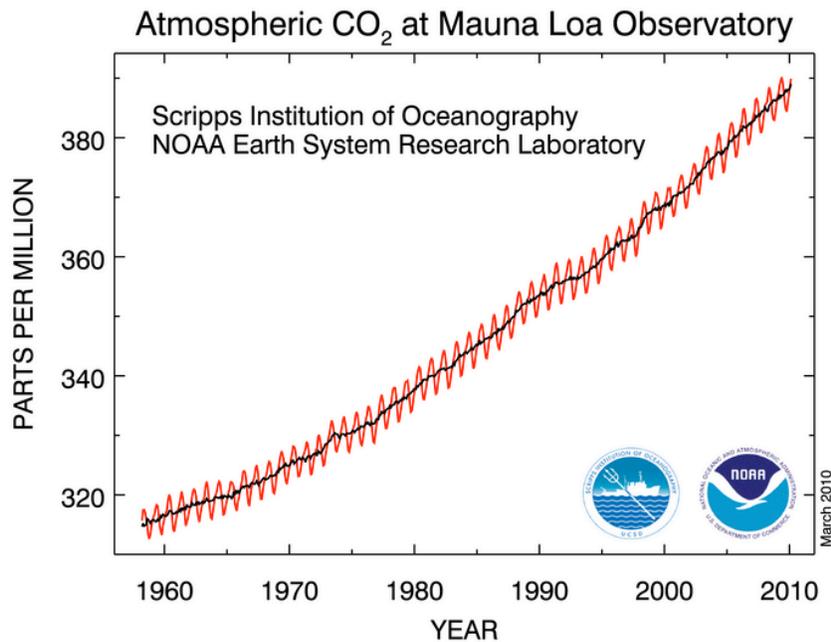
Source: World Resources Institute<sup>9</sup>

<sup>8</sup> <http://www.eia.doe.gov/oiaf/1605/flash/flash.html>

<sup>9</sup> <http://www.wri.org/chart/global-emissions-co2-from-fossil-fuels-1900-2004>



**Figure 6: Map illustrating different U.S. regions compared to top emitting countries. Total emissions are shown in millions of tons of carbon dioxide equivalent (CO<sub>2</sub>e).**  
 Source: Science Magazine<sup>10</sup>



**Figure 7: Atmospheric Carbon Dioxide Concentrations since establishment of the Mauna Loa Observatory**  
 Source: National Oceanic and Atmospheric Administration<sup>11</sup>

<sup>10</sup> <http://www.sciencemag.org/cgi/reprint/313/5793/1549d.pdf>

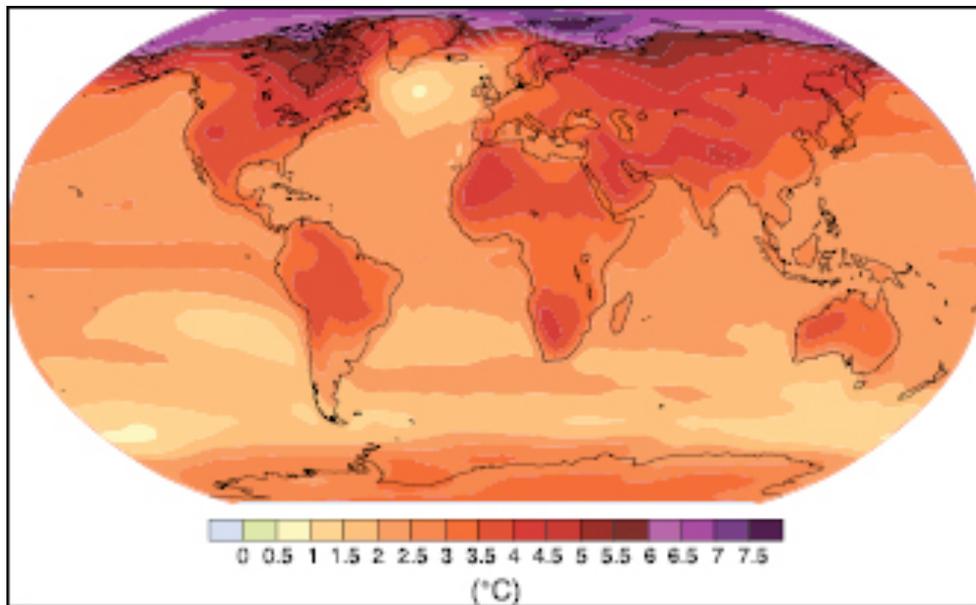
<sup>11</sup> <http://www.esrl.noaa.gov/gmd/ccgg/trends/>

## *B. Climate Change: Effects & Impacts*

### Global Impacts

In addition to causing an increase in average global surface temperature, rising levels of GHG have a destabilizing effect on a number of different micro-climates weather conditions, and global systems. According to the IPCC, surface temperatures are on course to increase by between 2.5 to 10.50 °F by the year 2100, with regions in the northern parts of North America and Asia heating by 40% above the mean increase. An increase in the temperature of the oceans is projected to accelerate the water cycle, thereby increasing the severity and rate of both storms and drought, which, along with decreased snow pack, could disrupt ecosystems, agricultural systems and water supplies.

Snow cover has decreased globally by 10% in the last forty years. Average sea levels have risen between 4 and 8 inches over the course of the 20th century and are projected to rise by at least another 4 inches by the year 2100. Resulting coastal infringements on the scale that would be precipitated by such sea-level rise will lead to not only significant environmental and ecosystem disturbances, but also major population displacement and economic upheaval.<sup>12</sup>



**Figure 8: Projected surface temperature changes, late 21<sup>st</sup> century.**

**Temperatures are relative to the period 1980-1999.**

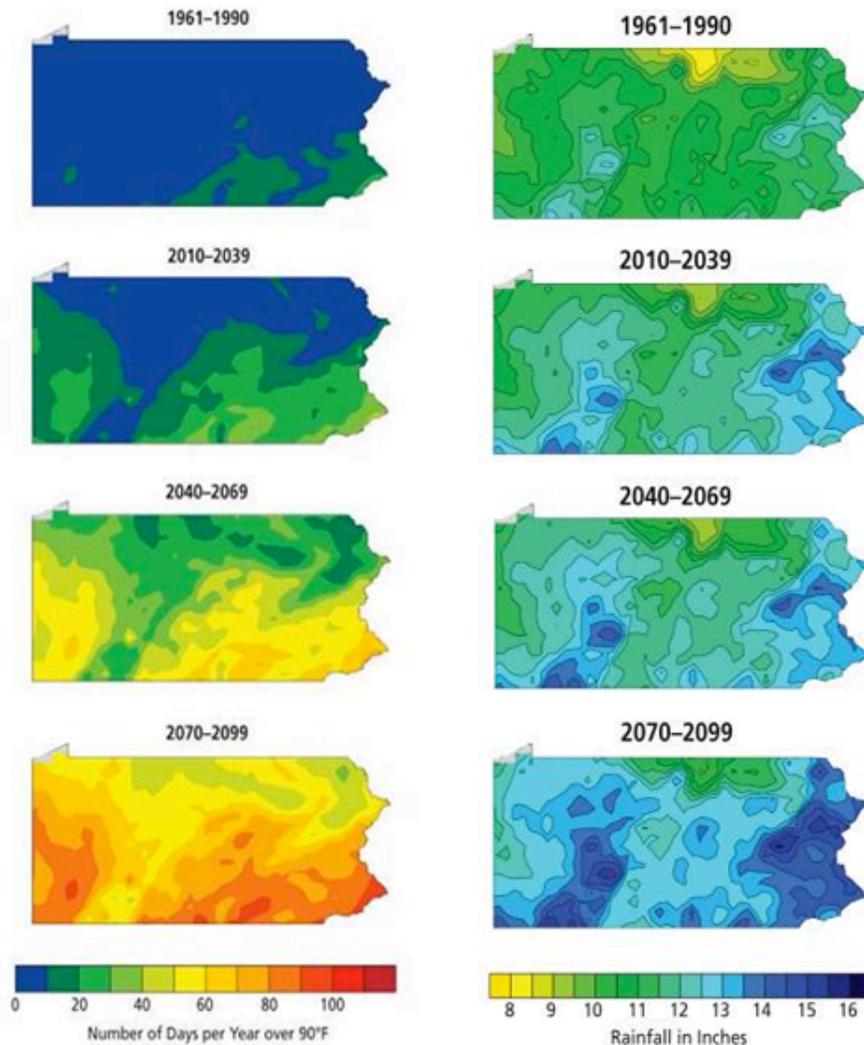
*Source: Intergovernmental Panel on Climate Change<sup>13</sup>*

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<sup>13</sup> [http://www.ipcc.ch/publications\\_and\\_data/ar4/syr/en/spms3.html](http://www.ipcc.ch/publications_and_data/ar4/syr/en/spms3.html)

### Local Impacts

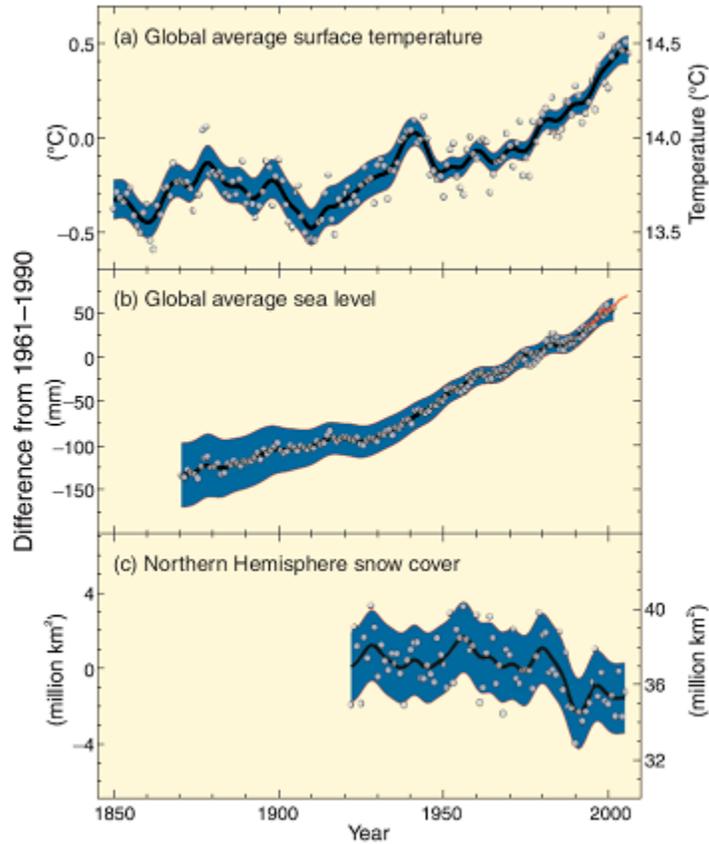
A study by the Union of Concerned Scientists explored the impacts of climate change on the northeastern United States. The results showed that this region of the United States, including western Pennsylvania, will experience climate change due to GHG emissions that have already taken place, as well as due to future emissions. Over the next several decades, past emissions will result in a projected increase above normal averages of 2.5 to 4° F in the winter and 1.5 to 3.5° F in summer. Based on the lower estimates projected by the IPCC due to current and future greenhouse gas emissions, temperature will increase by 5 to 8°F in the winter and 3 to 7°F in the summer by midcentury. The Union of Concerned Scientists predicts that if no steps to decrease emissions are taken, western Pennsylvania can expect a climate similar to that of northern Alabama by the end of the current century.



**Figure 9: Change in Temperatures and Precipitation across Pennsylvania**  
*Source: Pennsylvania State University, Department of Geography<sup>13</sup>*

<sup>13</sup> <http://www.portal.state.pa.us/portal/server.pt?open=18&objID=496546&mode=2>

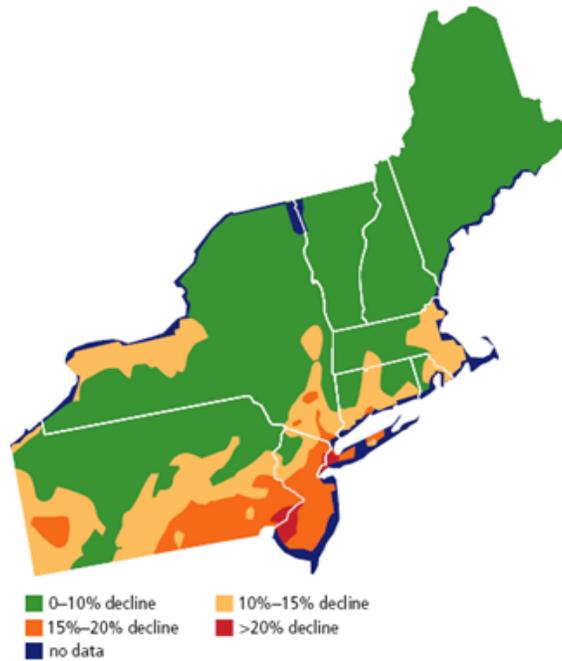
These changes in temperature will have serious effects on the Pittsburgh area. By the end of the century, Pennsylvania can expect over 30 days of temperatures above 90°F (based on lower emissions estimates) and over 25 days above 100°F (based on higher emissions estimates). In addition to hotter summers, the Pittsburgh region can expect wetter winters. By the end of the century, the region may see winter precipitation increase by 20-30%. Warmer temperatures would result in earlier snow melt, producing increased runoff and soil moisture. These changes will have impact on both recreation and agriculture: the likely result will be fewer skiing and snowmobiling opportunities, decreased milk production due to heat stress in cattle, and higher temperatures that will make the area unsuitable for fruit production, including some varieties of apples, blueberries, and cranberries.



**Figure 10: Changes in Temperature, Sea Level, and Northern Hemisphere Snow Cover**

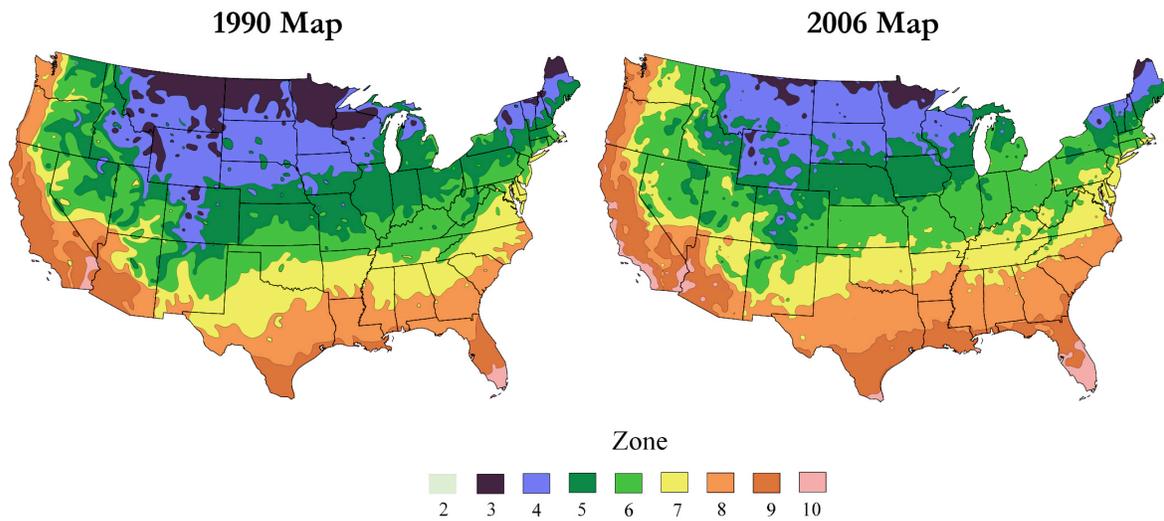
Source: IPCC Fourth Assessment<sup>14</sup>

<sup>14</sup> [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf)



**Figure 11: Vulnerability of Milk Production by Late Century under High Emissions Scenario**

*Source: Union of Concerned Scientists<sup>16</sup>*



**Figure 12: Plant Hardiness zones comparing data from 1990 and 2006**

*Source: The Arbor Day Foundation<sup>15</sup>*

<sup>15</sup> [http://www.arborday.org/media/map\\_change.cfm](http://www.arborday.org/media/map_change.cfm)

Human health will also be affected by these changes in the local climate. Hotter summer temperatures will lead to more heat related health problems, including heat stroke. Ground level ozone and other types of air pollution will increase as temperatures increase, resulting in higher numbers of respiratory health problems. Warmer temperatures will expand the range of disease-carrying species, such as ticks and mosquitoes. These species could lead to increased incidences of West Nile Virus and Lyme Disease.<sup>16</sup>

### *C. Climate Change: Policy and Action*

#### International Action

##### *United Nations Framework Convention on Climate Change (UNFCCC)*

The UNFCCC is an international treaty on climate change. In 1997 the Kyoto Protocol was promulgated by the countries that are signatories to the UNFCCC. This Protocol, a legally binding treaty created through the efforts of 10,000 international delegates and observers, requires industrialized nations to reduce their collective greenhouse gas emissions 5.2% below 1990 levels by 2012. As of November 2009, 187 countries had ratified the Protocol. President Bill Clinton signed the treaty for the United States, but the Senate has not ratified it. In the U.S. system of government, a treaty does not become the law of the land until it is ratified by the Senate. There are other international organizations that are making efforts to reduce climate change. Here are a few examples<sup>17</sup>:

##### *Intergovernmental Panel on Climate Change (IPCC)*

The IPCC is an intergovernmental body that provides objective views contributed by scientists worldwide on present climate change as well as potential environmental and socio-economic impacts due to current status of the climate. It was established by the United Nations Environmental Programme (UNEP) and the World Meteorological Organization (WMO). Reviews of the scientists that contribute their viewpoints are published in an annual report, which allows for the most objective and complete assessment of current information.<sup>18</sup>

##### *Carbon Disclosure Project (CDP)*

The CDP operates a global climate change reporting system that focuses on making climate change a priority for business, policy and investment decisions. The CDP has developed an international carbon reporting standard that over 60 countries and 2500 organizations are part of disclosing their greenhouse gas emissions and climate change strategies so that they can set reduction targets and make performance improvements. The data is available for use by institutional investors, corporations, policymakers and their advisors, public sector organizations, government bodies, and academics and the public.<sup>19</sup>

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<sup>16</sup><http://www.climatechoices.org/assets/documents/climatechoices/confronting-climate-change-in-the-u-s-northeast.pdf>

<sup>17</sup><http://earthdirectory.net/air>

<sup>18</sup> [www.ipcc.ch](http://www.ipcc.ch)

<sup>19</sup> [www.cdproject.net](http://www.cdproject.net)

### *Clean Air-Cool Planet (CA-CP)*

Clean Air-Cool Planet (CA-CP) focuses solely on finding and promoting solutions to global warming through partnering with companies, campuses, communities, and science centers to help reduce carbon emissions. Through comprehensive outreach efforts, CA-CP helps organizations, stakeholders, and partners understand the impacts of global warming and utilize the best available solutions. CA-CP showcases practical climate solutions that have been adopted by the various partners of CA-CP, illustrating the economic opportunities and environmental benefits associated with early actions on climate change.<sup>20</sup>

### *International Emissions Trading Association (IETA)*

The International Emissions Trading Association (IETA) dedicates its goals to achieving the objectives of the United Nations Framework Convention on Climate Change (UNFCCC). It achieves these objectives by establishing effective market-based trading systems for greenhouse gas emissions by businesses that demonstrate fair, open, efficient, accountability and consistency across national boundaries. The IETA also maintains social equity and environmental integrity while establishing these systems. They provide the most up-to-date information on emissions trading and greenhouse gas market activity as they believe that an integrated view of emissions trading systems is a solution to climate change.<sup>21</sup>

### *Global Warming, Natural Resources Defense Council*

The Natural Resources Defense Council (NRDC) focuses on a variety of issues to help protect the Earth, all inhabitants of Earth, and the natural systems on which all life depends. There are six main areas that the NRDC focuses on: curbing global warming, saving endangered wildlife and wild places, creating clean energy for the future, reviving the world's oceans, stemming the tide of toxic chemicals, and accelerating the greening of China.<sup>22</sup>

### *Atmospheric Research and Environment Programme, World Meteorological Organization (WMO)*

This section of the World Meteorological Organizations (WMO) focuses on extreme weather events and socio-economic impacts. The Atmospheric Research and Environment Programme (AREP) support global research on the composition of the atmosphere and weather forecasting under the guidance from the Commission for Atmospheric Sciences (CAS).<sup>23</sup>

### *Climate Neutral Network (CN Net), UNEP*

The Climate Neutral Network (CN Net) contributes to the United Nations Framework Convention on Climate Change (UNFCCC) by focusing facilitating information exchange and networking on achieving a transition to a low-emissions and eventually climate neutral society. Participation in CN Net is inclusive in the pledges it receives, welcoming clear and explicit commitments to reduce greenhouse gas emissions. Participants include intergovernmental bodies, community

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<sup>20</sup> [www.cleanair-coolplanet.org](http://www.cleanair-coolplanet.org)

<sup>21</sup> [www.ieta.org](http://www.ieta.org)

<sup>22</sup> [www.nrdc.org/globalWarming/default.asp](http://www.nrdc.org/globalWarming/default.asp)

<sup>23</sup> [www.wmo.ch/web/arep/arep-home.html](http://www.wmo.ch/web/arep/arep-home.html)

groups, Non-governmental organizations (NGOs), climate neutral events, and eventually even individual households and citizens. They are given the freedom to be innovative in ways to reach climate neutrality.<sup>24</sup>

#### *Investor Network on Climate Risk (INCR)*

INCR leads a network of more than 90 institutional investors with assets exceeding \$9 trillion by identifying the risks and opportunities from climate and tracking the policy and governance issues that impede investor progress toward more sustainable capital markets.

#### Federal Action

At the 2009 G-20 Summit, the United States promised to invest over \$80 billion in clean energy as a part of the American Recovery and Reinvestment Act. In April of 2010, the National Highway Traffic Safety Administration established the first joint fuel economy/carbon dioxide emissions standards for cars and trucks, in response to a request from the President. In June of 2009, the US House of Representatives passed the American Clean Energy and Security Act aimed at reducing dependence on foreign oil by utilizing renewable energy and creating millions of new jobs.<sup>25 26 27</sup> The Senate has yet to act on its version of the bill.

#### *The Clean Air Planning Act*

The Clean Air Planning Act would amend the Clean Air Act to establish a national uniform multiple air pollutant regulatory program for the electric generating sector, including national pollutant tonnage limitations for sulfur dioxide, nitrogen oxides, mercury, and carbon dioxide.

#### *Safe Climate Act of 2007*

Congressman Henry Waxman, Democrat from California, introduced a bill in 2007 that would set targets to freeze GHG emissions by 2009, cut emissions 2% each year from 2010 to 2020, and then further reduce emission 5% from 2020 to 2050. With these goals in mind, the Environmental Protection Agency (EPA) would introduce a cap-and-trade program for the largest polluters. The proceeds from sales of emissions permits would go to a Climate Reinvestment Fund. The EPA would also set GHG standards for automobiles at least as stringent as California's. The Department of Energy (DOE) would mandate 20% renewable electricity by 2020, with 1% of energy "supply" for utilities coming from efficiency improvements in customer facilities.

#### *Climate Stewardship and Innovation Act 2007*

The Climate Stewardship and Innovation Act of 2007, aims to reduce U.S. emissions of through the development of a market-driven system of tradable allowances.

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<sup>24</sup> [www.unep.org/climateneutral/](http://www.unep.org/climateneutral/)

<sup>25</sup> [http://energycommerce.house.gov/index.php?option=com\\_content&view=article&id=1697:house-passes-historic-waxman-markey-clean-energy-bill&catid=155:statements&Itemid=55](http://energycommerce.house.gov/index.php?option=com_content&view=article&id=1697:house-passes-historic-waxman-markey-clean-energy-bill&catid=155:statements&Itemid=55)

<sup>26</sup> [http://www.nhtsa.gov/portal/site/nhtsa/template.MAXIMIZE/menuitem.f2217bee37fb302f6d7c121046108a0c/?javax.portlet.tpst=1e51531b2220b0f8ea14201046108a0c\\_ws\\_MX&javax.portlet.prp\\_1e51531b2220b0f8ea14201046108a0c\\_viewID=detail\\_view&itemID=3941edcf677b7210VgnVCM1000002fd17898RCRD&pressReleaseYearSelect=2](http://www.nhtsa.gov/portal/site/nhtsa/template.MAXIMIZE/menuitem.f2217bee37fb302f6d7c121046108a0c/?javax.portlet.tpst=1e51531b2220b0f8ea14201046108a0c_ws_MX&javax.portlet.prp_1e51531b2220b0f8ea14201046108a0c_viewID=detail_view&itemID=3941edcf677b7210VgnVCM1000002fd17898RCRD&pressReleaseYearSelect=2)

<sup>27</sup> <http://www.pittsburghsummit.gov/resources/129661.htm>

### *Low Carbon Economy Act 2007*

The Low Carbon Economy Act of 2007 aims to reduce U.S. emissions of greenhouse gases from the production and use of energy.

### *Lieberman-Warner Climate Security Act of 2008*

Like the Climate Stewardship and Innovation Act 2007, the Lieberman-Warner Climate Security Act of 2008 would reduce U.S. emissions of greenhouse gases through the development of a market-driven system of tradable allowances.

### *Clean Energy Jobs and American Power Act of 2009 (ACES)*

ACES is the Senate climate change bill that seeks to reduce greenhouse gas emission through a nation-wide cap-and-trade program. Emissions would be reduced 20% by 2020 and 83% by 2050. The bill also contains investments in clean energy technology and provisions to encourage the creation of new "green" jobs. The bill focuses on clean energy, energy efficiency, global warming, and economic transitioning. Clean energy comprises renewable energy limiting carbon emissions through carbon capture and sequestration, low-carbon transportation fuels, clean electric vehicles, and the smart grid and electricity transmission. Energy efficiency encompasses across all sectors of the economy (buildings, appliances, transportation, and industry). The global warming title would place a limit on the emissions of greenhouse gases. The transitioning segment will protect United States consumers and industry while promoting green jobs.

ACES would establish a cap-and-trade system in which the government sets a limit (cap) on the total amount of greenhouse gases allowed to be emitted nationally that is reduced over time. This cap-and-trade program allocates 85% of allowances to industry for free, and places the remainder on auction. Companies may trade allowances to other companies. Passed by the House in June 2010, ACES requires electric utilities to meet 20% of their electricity demand through renewable energy sources and energy efficiency by 2020, and achieve a 17% emissions reduction from 2005 levels by 2020. It would also protect consumers from energy price increases and subsidize new clean energy technologies and energy efficiency.<sup>28</sup>

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<sup>28</sup> <http://www.epa.gov/climatechange/economics/economicanalyses.html#cleanenergy>

## Multi-State Action

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

RGGI, inaugurated in 2003, is the first mandatory, market-based effort in the United States to reduce GHG emissions. It has capped and will reduce CO<sub>2</sub> emissions from the power sector 10% by 2018. RGGI covers New England states, eastern Canadian provinces, New Jersey, and New York. Set to begin at 2009, it consists of a multi-state cap-and-trade program for GHG emissions with an initial focus on CO<sub>2</sub> from fossil-fuel fired electricity generating plants with rated capacity of at least 25 megawatts. The scheduled reduction is 2.5% per year, with consideration of energy affordability and reliability taken into account. RGGI will use interstate trading of GHG allowances.<sup>29</sup>

### *Western Climate Initiative (WCI)*

WCI, organized in 2007, aims to reduce GHG 15% below 2005 levels by 2020 through a regional cap-and-trade program. It covers emissions of the six main GHG (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) from:

- Electricity generation, including imported electricity
- Industrial and commercial fossil fuel combustion
- Industrial process emissions
- Gas and diesel consumption for transportation
- Residential fuel use

The WCI Regional Cap-and-Trade Program will be phased in over the next ten years in a way that allows the freedom to obtain low-cost emissions reductions through trading, allowance banking, and offsets. Signatories of the WCI include Arizona, British Columbia, California, Manitoba, New Mexico, Oregon, Utah, and Washington.

WCI encourages new participants in the U.S. states, tribes, Canadian provinces, and Mexican states that are making changes to combat climate change. Participants are considered to be combating climate change if they have adopted an economy-wide GHG reduction goal, has developed or developing a comprehensive multi-sector climate action plan to achieve that goal, has committed to adopt GHG tailpipe standards for passenger vehicles, and is participating in The Climate Registry. Members of WCI are required to update other members of their climate action plans and GHG inventories every two years to ensure that actions are conducive to the ultimate 2020 regional goal.<sup>30</sup> The registry contains public reports of carbon footprints of over 400 members.<sup>31</sup>

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<sup>29</sup> <http://www.rggi.org/home>

<sup>30</sup> <http://www.westernclimateinitiative.org/>

<sup>31</sup> <http://www.theclimateregistry.org/>

## State Action

### *Climate Change Action Report*

In the U.S. federal system of government states have the legal authority to regulate their internal affairs provided their actions do not contradict federal law or set standards lower than those in a federal statute. Pennsylvania is responsible for one percent of the planet's man-made greenhouse gas emissions. Given this significant carbon footprint, the state's Climate Change Act of 2008 (signed into law by Governor Ed Rendell on July 9 on that year) called for the development of a state Climate Change Action Plan. Working with the Climate Change Advisory Committee, the PADEP prepared the Climate Change Action Report, which identifies 52 specific actions that would reduce Pennsylvania's GHG emission by 95.6 million metric tons of carbon dioxide equivalent (MMtCO<sub>2</sub>e) 2020. Among the Plan's recommendations are:

- Creating an inventory of all sources and amounts of global warming pollution.
- Setting up a registry of emitters in order to track their emissions and get credit for reductions.
- Creating a stakeholder group to advise the DEP on implementation of the act, and
- (Most importantly) charging the DEP with developing a state plan to reduce emissions of greenhouse gases.<sup>32</sup>

### *Climate Change Advisory Committee*

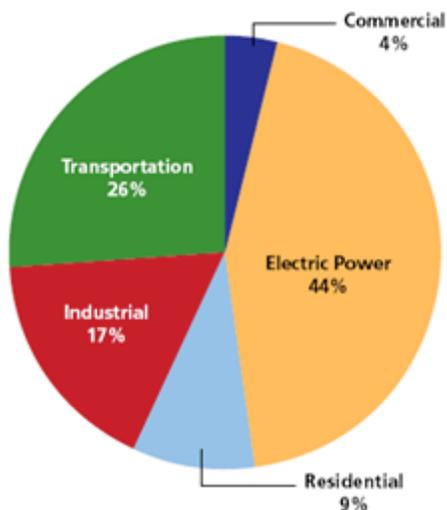
The PADEP Climate Change Advisory Committee supported PADEP to develop the plan that includes:

- A non-binding goal of reducing global warming pollution in Pennsylvania by 30 percent below 2000 levels by 2020—a goal consistent with what scientists recommend for all industrialized nations.
- A robust set of policy initiatives that, if implemented by the state in full along with federal actions, would cut global warming pollution in Pennsylvania by at least 38 percent below 2000 levels by 2020.
- Recommendations to improve the energy efficiency of buildings expand existing energy efficiency and conservation programs in the state, expand recycling initiatives, improve and expand public transportation systems throughout the state, and enhance land conservation and urban forestry programs.<sup>33</sup>

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<sup>32</sup> [http://www.portal.state.pa.us/portal/server.pt/community/climate\\_change\\_advisory\\_committee/10412](http://www.portal.state.pa.us/portal/server.pt/community/climate_change_advisory_committee/10412)

<sup>33</sup> <http://www.pennenvironment.org/legislature/testimony/oceans-testimony/global-warming/pennenvironments-comment-on-state-climate-change-action-plan>



**Figure 13: Sources of Carbon Emissions in Pennsylvania Transportation and Electric Power account for over two-thirds of the state’s emissions**

Source: Union of Concerned Scientists<sup>34</sup>

One of the most significant components of Pennsylvania’s energy and climate policy is its Alternative Energy Portfolio Standard (AEPs) that requires that 8 percent of the state’s electricity come from clean, renewable energy sources by 2021. The environmental organization PennEnvironment compares Pennsylvania’s AEPs target with higher percentages in neighboring states: New Jersey (22.5 percent by 2021), Delaware (20 percent by 2019), Maryland (20 percent by 2022) and New York (25 percent by 2013). This difference is important for the state to take into account, PennEnvironment points out, because if Pennsylvania is not more ambitious in its alternative energy development, it may lose out on clean energy development jobs and dollars that will instead go to neighboring states.<sup>35 36</sup>

#### *Pennsylvania Climate Roadmap*

Pennsylvania is responsible for about 1% of GHG worldwide and third nationally, putting Pennsylvania in the league of the top twenty-five most polluting nations in the world. Launched through the Pennsylvania Environmental Council (PEC), this *Roadmap* reflects GHG emissions under the current policies, with hopes that it can join other states in setting goals for reducing GHG emissions, and adopting the necessary supporting policies. This project is intended to:

- Conduct GHG inventory and reports.
- Give policy recommendations for reducing Pennsylvania’s emissions.
- Set emission goals or targets for Pennsylvania, along with a short-term strategy for pursuing these goals.

<sup>34</sup> <http://www.climatechoices.org/assets/documents/climatechoices/confronting-climate-change-in-the-u-s-northeast.pdf>

<sup>35</sup> <http://www.pennenvironment.org/legislature/testimony/oceans-testimony/global-warming/pennenvironments-comment-on-state-climate-change-action-plan>

<sup>36</sup> <http://www.pennenvironment.org/news-releases/global-warming/global-warming-news/record-number-of-pennsylvanians-support-state-action-on-global-warming>

The Roadmap presents a series of policy and action item recommendations to reduce greenhouse gas emissions in Pennsylvania. The GHG inventory included emissions and forecasts from 1990-2025 with a trajectory of future emissions using policies already adopted or implemented as of 2007.<sup>37</sup>

### Local Action

In 2008 Pittsburgh City Council adopted the Pittsburgh Climate Initiative (PCI), which seeks to raise awareness and engage Pittsburgh's residents, businesses, government agencies, and institutions of higher learning in reducing greenhouse gas emissions in the city. The PCI is supported through grants from the Roy A. Hunt Foundation, The Heinz Endowments, and the Surdna Foundation.<sup>38</sup> The PCI aims to reduce the City's GHG emissions by 20% by 2023. In 2010 Allegheny County completed its first operations GHG emission inventory.<sup>39</sup>

## **II. Existing Emissions Reduction Measures & Policies**

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At both the community-scale and within municipal operations, Wilkins is already undertaking a number of program and project that will result in GHG emissions reductions. While the goal of many of the actions is not necessarily to reduce GHG emissions, the policies do serve that function. Ultimately, the goal of Wilkins' Climate Action Plan is to build on existing planning and implementation efforts and integrate them into the broader task of reducing the community's impact on climate. In 2006, Wilkins observed:

- A decrease in natural gas usage that was attributable to replacement of the boiler with a more energy efficient model;
- An increase in electricity consumption due to increased use at the Community Center in the former Ambulance Company Buildings, and;
- A decrease in gasoline usage attributable to use of more energy-efficient vehicles with increased efficiency and a change to vehicles operating on diesel.

Thermometers were replaced and the meeting space renovated in the Municipal Buildings in order to reduced energy use. As of this writing, Wilkins and Penn Dot are in the process of converting traffic signals to LED signals.

## **III. The Greenhouse Gas Emissions Inventory**

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### *A. Reasoning, Methodology & Model*

Wilkins Township GHG emissions inventory was conducted by graduate students from Duquesne University's Center for Environmental Research and Education in partnership with municipal staff. Wilkins joined ICLEI-Local Governments for Sustainability to gain user access ICLEI's *Clean Air and Climate Protection* (CACP) software. The purpose of the baseline emissions inventory is to determine the levels of the municipality's greenhouse gas emissions in the base year, 2008.

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<sup>37</sup> <http://www.pecpa.org/roadmap.htm>

<sup>38</sup> <http://www.pittsburghclimate.org/aboutUs.htm>

<sup>39</sup> <http://www.alleghenycounty.us/allegheenygreen/emissions.aspx>

This inventory project was funded by the PADEP Local Government Greenhouse Gas Pilot Grant Program for municipalities throughout the state.

ICLEI's *Cities for Climate Protection* inventory methodology allows local governments to systematically calculate and track greenhouse gas emissions from energy use, air conditioning and waste management and disposal in both municipal functions and at the community scale. As of February 2009, 550 cities, towns, and counties across the U.S. have joined ICLEI, which has approximately 1000 members worldwide.<sup>40</sup>

Once completed, such an inventory provides the basis for creating emissions forecast and reduction target, as well as enabling the quantification of emissions reductions associated with implemented and proposed measures.

### *1. ICLEI's Emissions Analysis Software*

As noted, there are over 1000 registered users of the CACP emissions calculator, including cities, counties, townships, regional planning districts, air quality authorities, universities, consulting firms, numerous state government agencies, and the U.S. Environmental Protection Agency (EPA).<sup>23</sup> This software tool estimates emissions derived from energy consumption, air conditioning, and waste generation within a community. The CACP calculator uses up-to-date conversion factors to translate readily available data like electricity and natural gas usage into tons of carbon dioxide equivalent (CO<sub>2</sub>e) emissions. CO<sub>2</sub>e is a representation of total emissions of various greenhouse gases in which each greenhouse gas is weighted according to its global warming potential relative to carbon dioxide. For example, methane is twenty-one times more powerful than carbon dioxide in its capacity to trap heat, so the model converts one ton of methane emissions to 21 tons of CO<sub>2</sub>e. This conversion allows for an accessible comparison of greenhouse gases.

In most cases, the data inputs for the CACP calculator are obtained simply by surveying utility bills and purchase receipts for the appropriate usage units (kWh, MCF, gallons, etc.). The following section summarizes the data needed for each emissions category, the source from of the data, and any assumptions that were incorporated. The model depends upon numerous assumptions, and it is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the model as an approximation rather than an exact value.

### *2. Sources of Data for the Inventory*

Beginning with municipal operations, and then expanding to industrial and community sectors, the CERE team gathered data from a variety of sectors and sources. Data on community electricity and natural gas consumption were received from Equitable Gas, Dominion Peoples, and Duquesne Light. Utility bills were used to estimate usage of natural gas consumption, electricity, gasoline, and diesel fuel in municipal functions.

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<sup>40</sup> <http://www.icleiusa.org/about-iclei/faqs/general-information-faq>

## Community-Level Analysis

### *Electricity*

Duquesne Light Company provided the utility information in kWh for 2008 residential, commercial, and industrial sectors.

### *Natural Gas*

Equitable Gas and Dominion Peoples provided 2008 annual gas consumption for commercial, residential, and industrial sectors.

### *Commuting habits*

The Environmental Protection Agency (EPA) lists the average miles driven per car in the United States as 12,000 and calculates an average fuel economy for passenger vehicles to be 20.3 miles per gallon (mpg), weighted by vehicle miles traveled (VMT) for passenger cars and light trucks.<sup>41</sup>

Relying on census data for 2000, an estimate of the number of cars in Wilkins was determined using the "Housing Characteristics" link.<sup>42</sup> These numbers were multiplied by the average miles driven per year and divided by the average mpg, resulting in a total of 2,670,739 gallons of gas used in a year. Since this is data from the 2000 census, these numbers should be updated again once the 2010 census is complete. Another option for gathering this information could be in the form of a survey, which could be sent via mail or accessed on the municipal website.

### *Waste*

EPA methodology<sup>43</sup> was used to determine Wilkins Township's total tonnage of waste for entry into the software. For 2008, the EPA estimates divided total waste into 31% paper products, 12.7% food waste, 14.5% wood/textiles, and 28.6% other (plastic, metal, and glass etc).

### *Town Meetings and Input*

At a town meeting held in spring 2010, preliminary results of the GHG inventory were presented. Participants requested information on how to reduce greenhouse gas emissions. Questions about the inventory were invited. Topics of discussion included energy efficiency of products, LED lighting fixture reflectors, and programs providing funding for implementation of climate action recommendations.

## Government-Level Analysis

The CACP calculator divides government-level analysis into 13 categories. Certain of these were omitted as not applicable: port facilities, airport facilities, water delivery facilities, wastewater facilities, solid waste facilities, transit fleet, electricity generation, and fugitive emissions. The five categories used for this emissions inventory are described here.

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<sup>41</sup> <http://www.epa.gov/oms/climate/420f05004.htm#step3>

<sup>42</sup> [http://factfinder.census.gov/home/saff/main.html?\\_lang=en](http://factfinder.census.gov/home/saff/main.html?_lang=en)

<sup>43</sup> <http://www.epa.gov/osw/nonhaz/municipal/pubs/msw2008rpt.pdf>

### *Office Buildings and Other Structures*

The main sources of greenhouse gas emissions from office buildings are electricity usage and natural gas usage. The CACP calculator requires the kilowatt hours of electricity and thousands of cubic feet of natural gas used by each building. Figures on both were available in municipal utility bills, which were summed to reach the yearly total for 2008 then entered into the calculator.

### *Vehicle Fleet*

Emissions for vehicle fleet came exclusively from the use of gasoline or diesel fuel. This data was available in purchase receipts. The gasoline/diesel conversion factor differed subtly depending on the type and model year of the vehicle; however the resulting change in emissions is so small as to be undetectable in the CACP calculator. Wilkins was able to provide a list of all the vehicle types and model years used by all departments.

### *Streetlights and Traffic Signals*

The CACP calculator requires kilowatt hours (kWh) consumed by streetlights and traffic signals. This information was obtained from municipal utility bills.

### *Problems Encountered and Assumptions Made*

Data on refrigerant use and employee commuting was not received.

### *3. The Process of Creating the Inventory*

This data were entered into the software to create inventories of community-level emissions inventory and municipal operations emissions. The community inventory represents all the energy used and waste produced within Wilkins and its contribution to greenhouse gas emissions. The municipal inventory is a subset of the community inventory, and includes emissions derived from internal government operations.

There are two main reasons for completing separate emissions inventories for community and municipal operations. First, the government is committed to action on climate change, and has a higher degree of control to achieve reductions in its own municipal emissions than those created by the community at large. Second, by proactively reducing emissions generated by its own activities, the Wilkins government takes a visible leadership role in the effort to address climate change. This is important for inspiring local action in Wilkins, as well as for inspiring other communities.

The Wilkins inventory is based on the year 2008. When calculating the emissions inventory, all energy consumed was included. This means that, even though the electricity used by the Wilkins residents is produced elsewhere, this energy and emissions associated with it appears in the inventory. The decision to calculate emissions in this manner reflects the general philosophy that a community should take full ownership of the impacts associated with its energy consumption, regardless of whether the generation occurs within the geographical limits of the community.

## B. Inventory

The results below represent the Wilkins completion of the first milestone of ICLEI's CCP campaign.

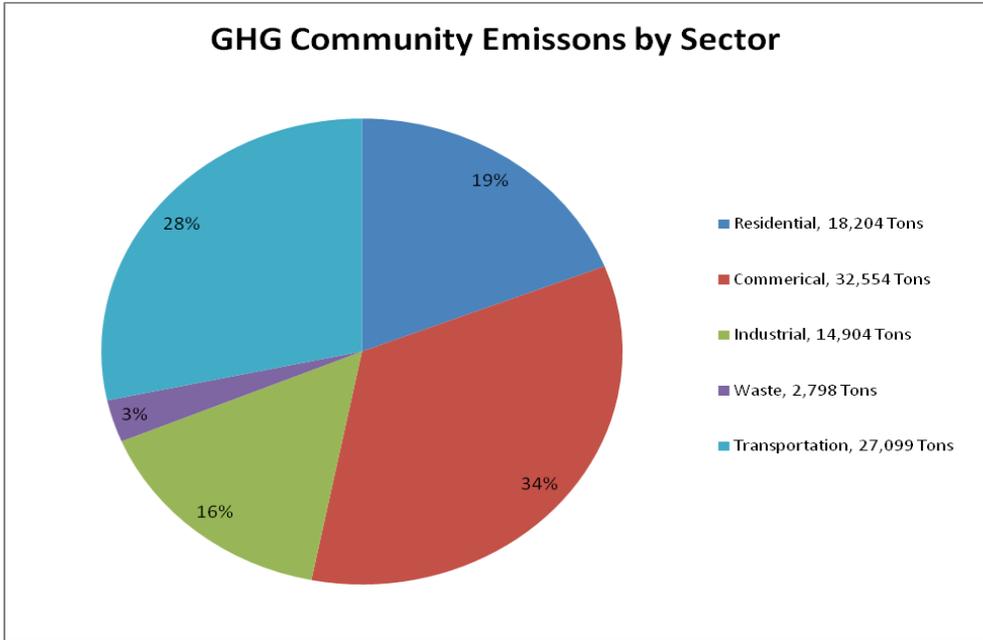
### 1. Community-Level Emissions Inventory

Results of the Wilkins GHG emissions inventory are in Table 1 and Figure 14 show total greenhouse gas emissions from all community sector sources for the year 2008. Energy for commercial made up the largest share of greenhouse gases (34%), derived from electricity and natural gas usage. Other major sources are transportation (28%) and residential (19%).

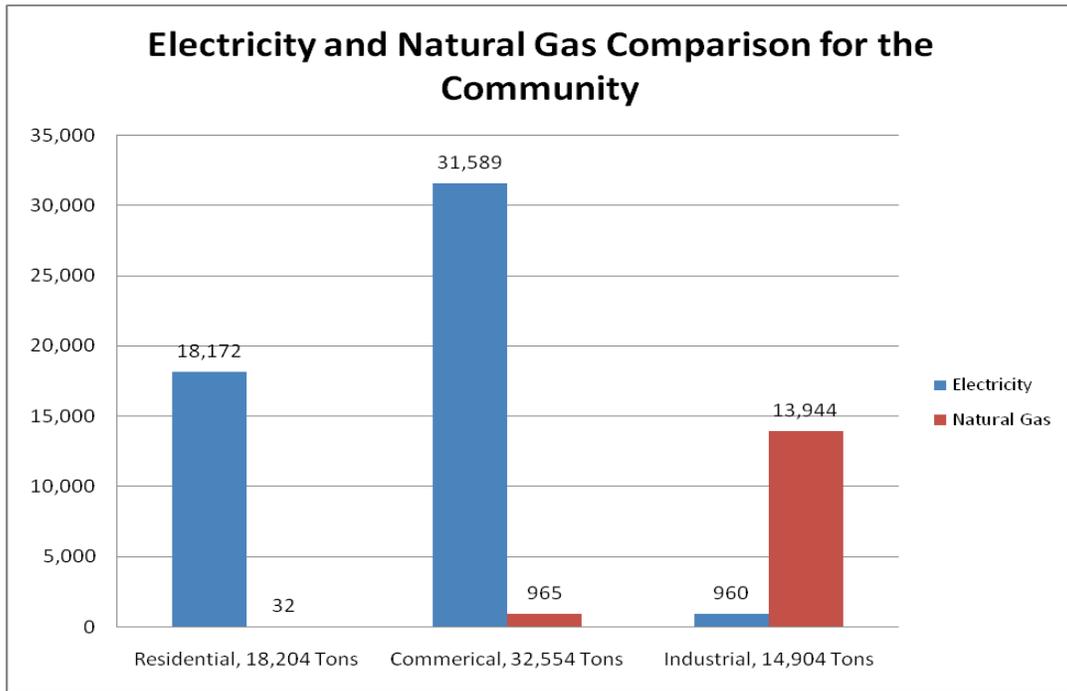
GHG Emissions Community Inventory Wilkins	Total CO <sub>2</sub> e tons/year
	Baseline year <sup>1</sup>
Residential	18,204
Commercial	32,554
Industrial	14,904
Transportation	2,798
Waste	27,099
<b>TOTAL</b>	<b>95,559</b>

**Table 1: Wilkins Township Community GHG Emissions**

<sup>1</sup>The Baseline year is 2008



**Figure 14: Community GHG Emissions by sector**  
*Source: CACP Output*



**Figure 15: Community GHG Emissions for Electricity and Natural Gas**  
*Source: CACP Output*

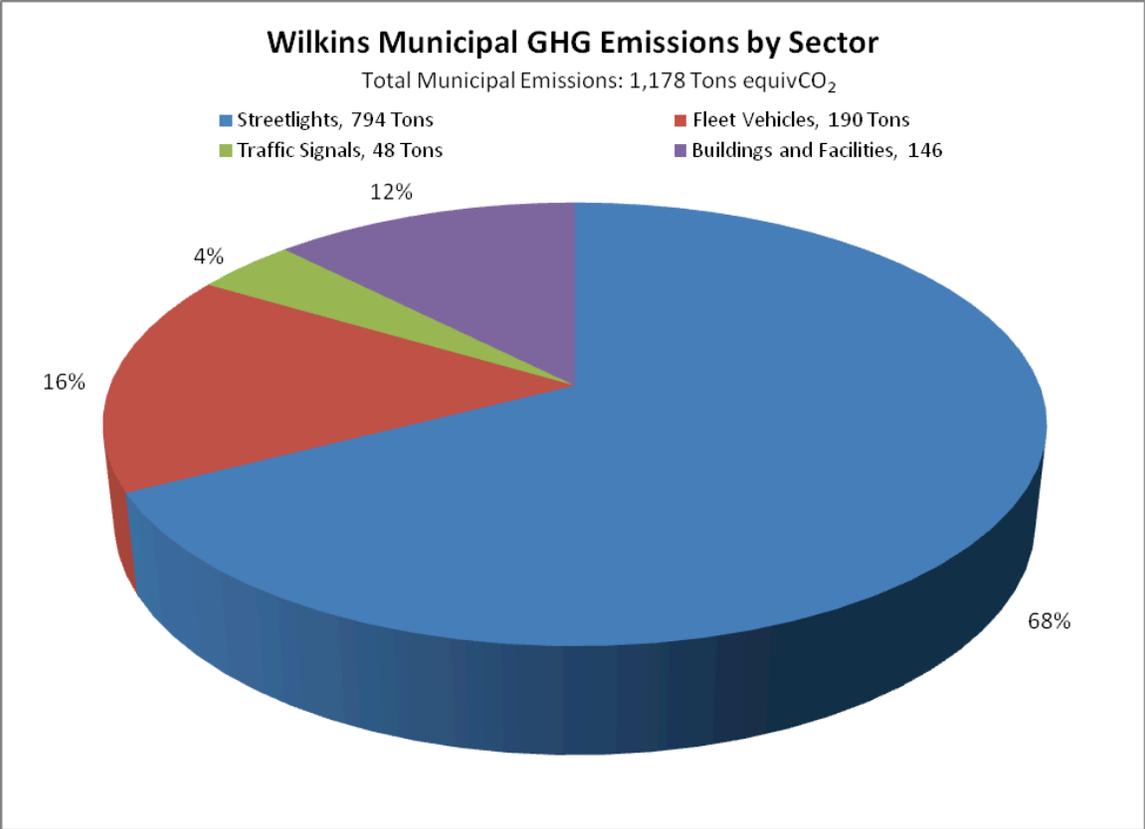
## 2. Municipal-Level Emissions Inventory

Results of the Wilkins GHG emissions inventory are shown in Table 2 and Figure 16, which show total greenhouse gas emissions from all municipal sector sources for the year 2008. Energy for street lights made up the largest share of GHG (68%), derived from electricity and natural gas usage. Other major sources are fleet vehicles (16%) and buildings and facilities (12%).

GHG Emissions Municipal Inventory Wilkins	Total CO <sub>2</sub> e tons/year
	Baseline year <sup>1</sup>
Buildings and Facilities	146
Streetlights	794
Fleet Vehicles	190
Traffic Signals	48
<b>TOTAL</b>	<b>1,178</b>

**Table 2: Wilkins Township Municipal GHG Emissions**

<sup>1</sup>The Baseline year is 2008

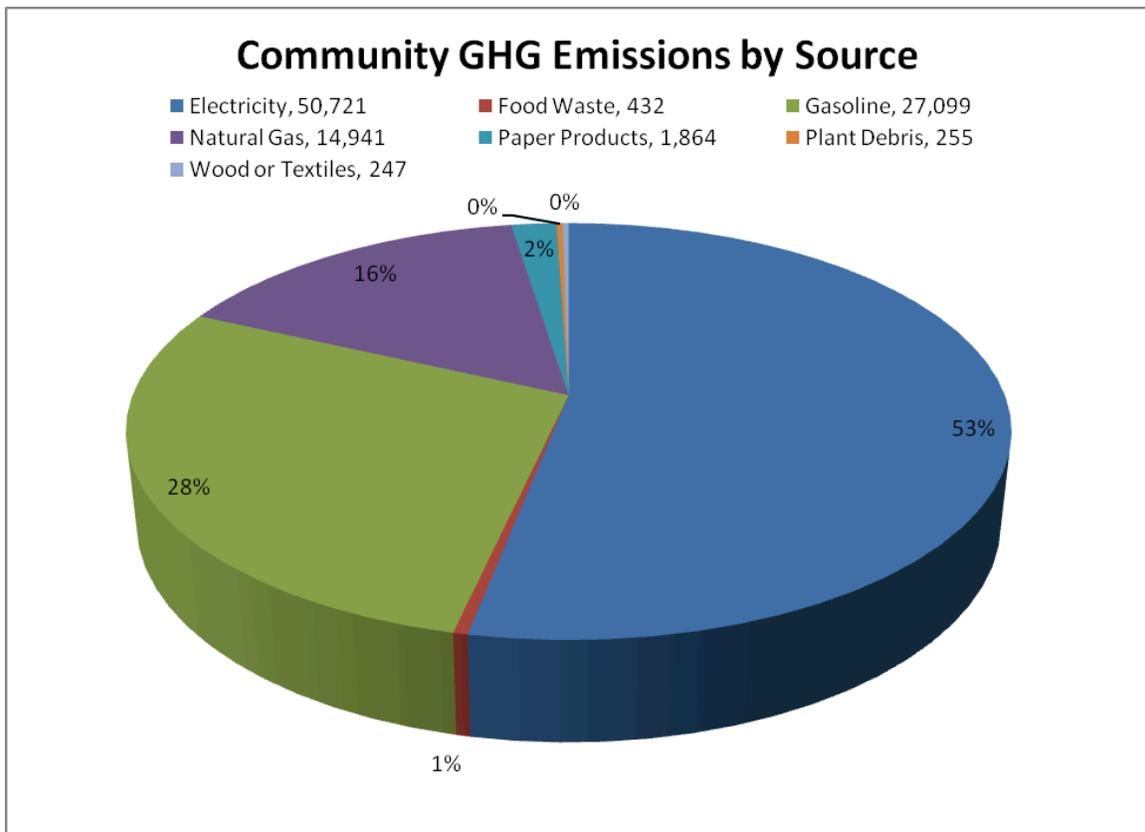


**Figure 16: Municipal GHG Emissions by Sector for 2008**  
*Source: CACP Output*

**Results:**

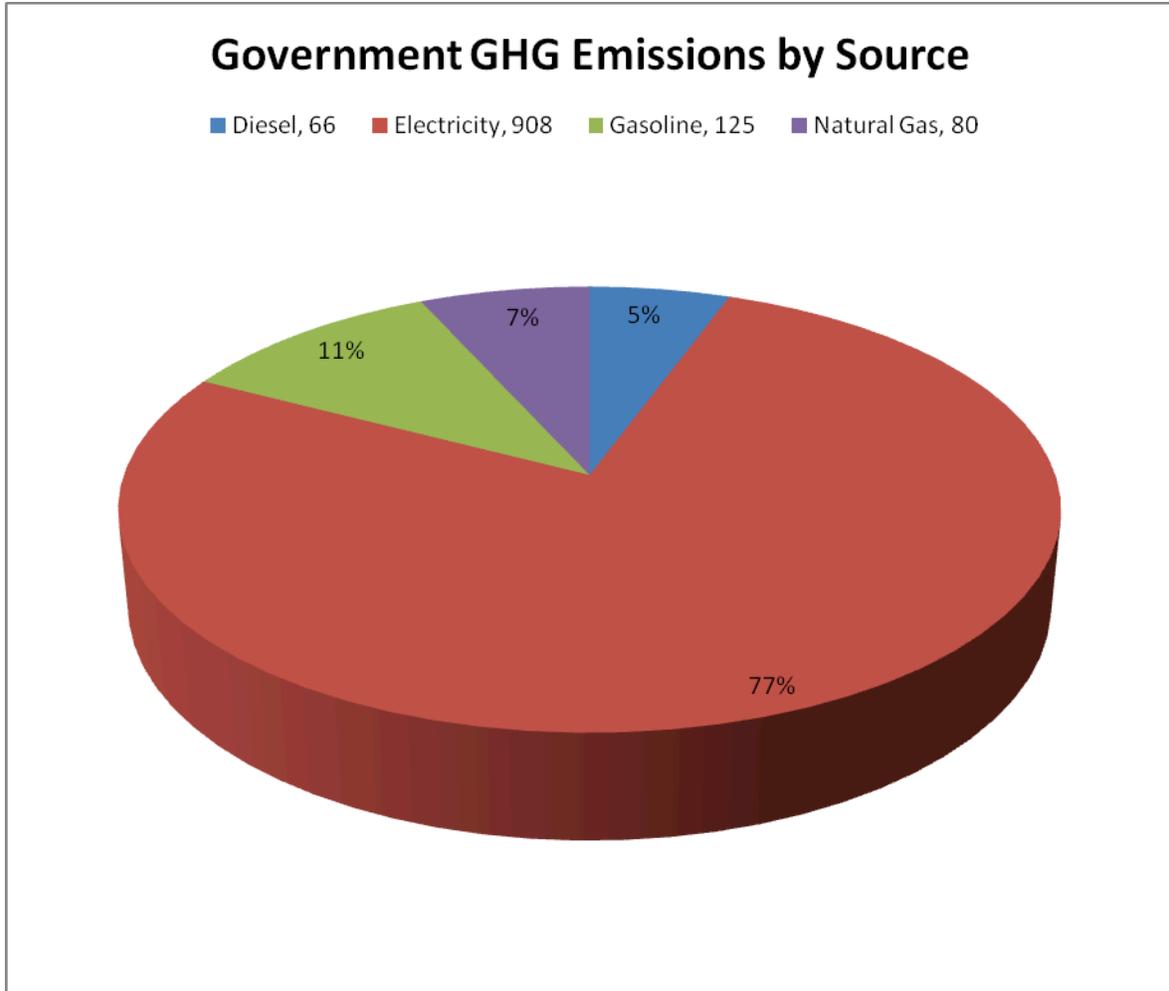
In 2008, Wilkins was responsible for approximately 96,737 tons of GHG emissions. Of this, 95,558 tons came from the community sector and 1,179 tons from the government sector.

At the community level, electricity use was accountable for 53% of the greenhouse gas emissions, followed by gasoline, natural gas, paper products, and food waste at 28%, 16%, 2%, and 1% respectively.



**Figure 17: Community Emissions by Source**  
*Source: CACP Output*

Within the government sector electricity use was accountable for 77% of GHG emissions, followed by gasoline, natural gas and diesel at 11%, 7%, and 5% respectively.



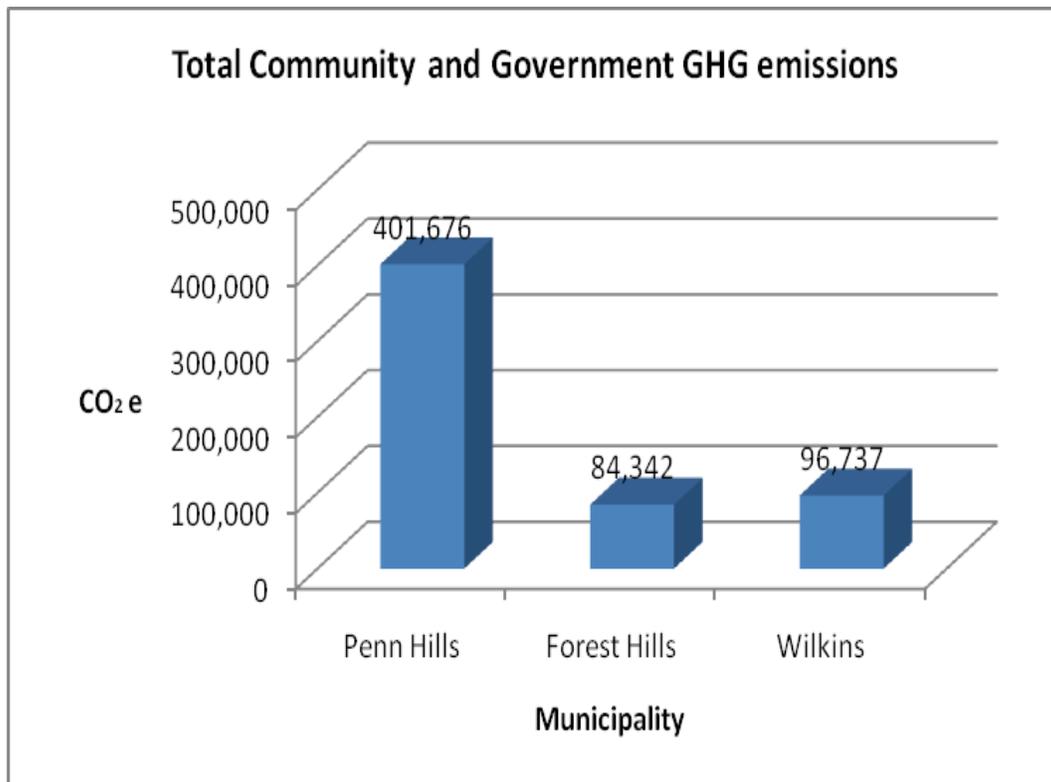
**Figure 18: Government Emissions by Source**  
*Source: CACP Output*

### 3. Forest Hills, Wilkins, and Penn Hills

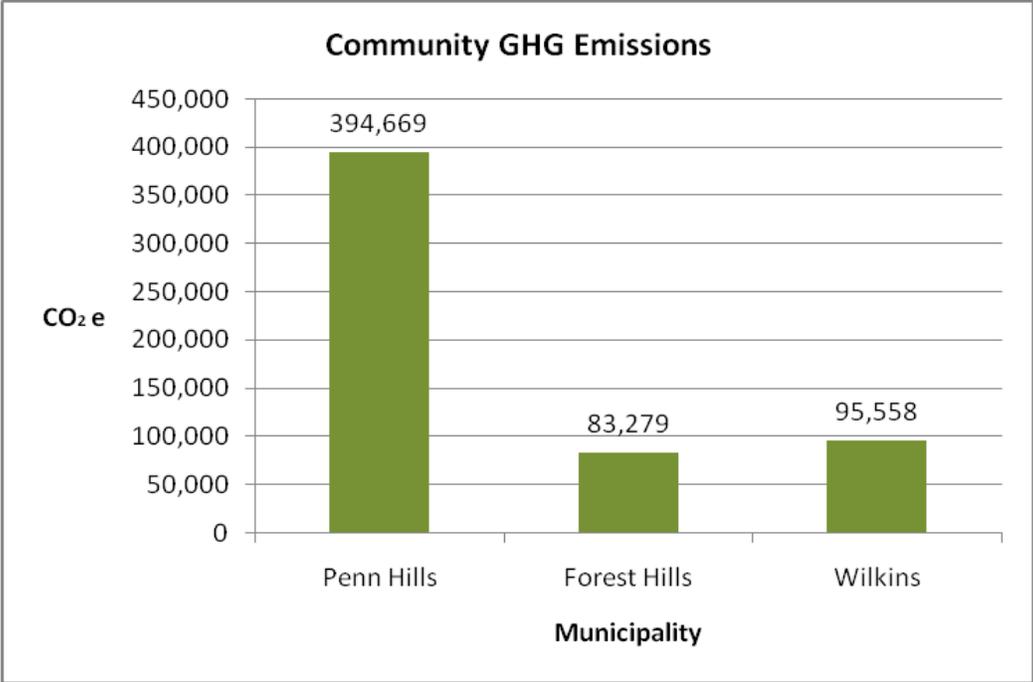
Of the three municipalities covered under the PADEP grant to Wilkins, Penn Hills has the greatest GHG emissions: 401,676 CO<sub>2</sub>e tons compared to 96,737 CO<sub>2</sub>e tons for Wilkins and 84,342 CO<sub>2</sub>e tons for Forest Hills. In terms of per capita community emissions, however, Wilkins is the largest emitter, with 13.81 CO<sub>2</sub>e tons per person, Forest Hills at 12.19 CO<sub>2</sub>e tons, and Penn Hills at 8.43 CO<sub>2</sub>e tons. Reasons for such differences include:

- The fact that only Penn Hills has a wastewater facility (Plum Creek);
- The respective communities are made up of less or more efficient buildings;
- The presence of more or less industrial activity.

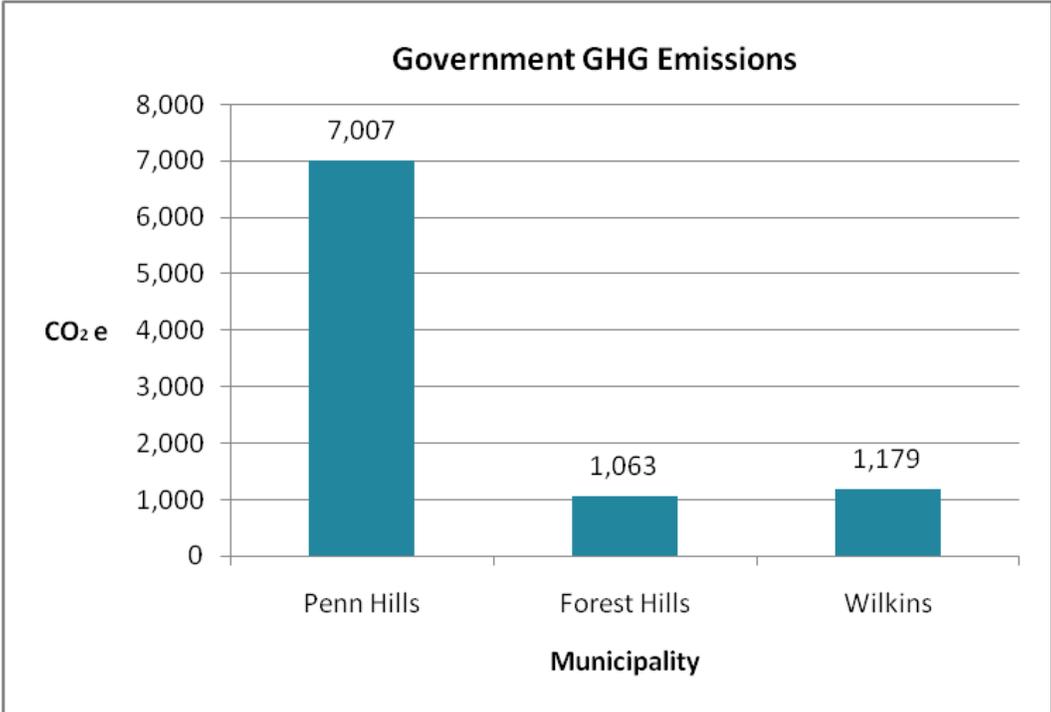
An accounting factor also exists, namely the availability of more detailed information on emissions sources.



**Figure 19: Community and Government Emissions**



**Figure 20: Community Emissions**



**Figure 21: Government Emissions**

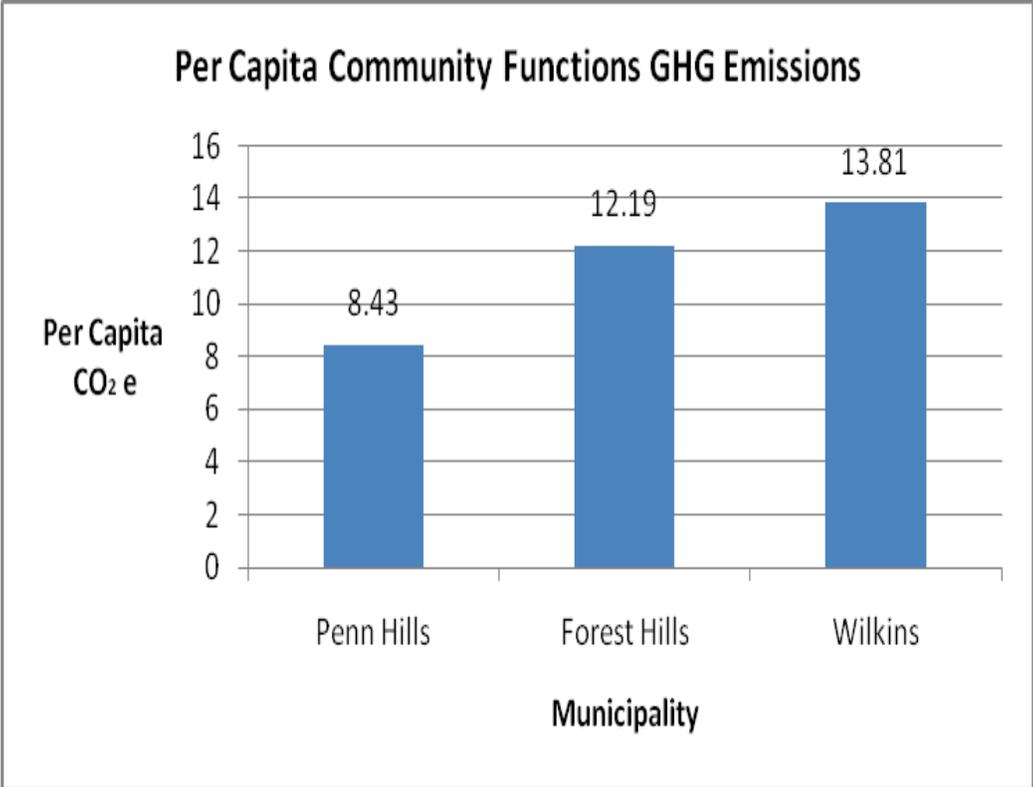


Figure 22: Per Capita Community Emissions

#### IV. Proposed Emissions Reduction Measures & Policies

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Numerous opportunities exist at both the municipal and community levels to reduce GHG emissions and reduce costs. The following emissions reductions steps have been categorized by sector and source type, and further divided into projects with no startup costs, projects requiring small amounts of internal funding, and projects requiring larger external sources of funding such as grants.

##### *Energy Audits*

An energy audit aims to prioritize energy use reduction measures in a building, process, or system in terms of the cost effectiveness of energy efficiency investments. Energy flows are surveyed with the goal of reducing the amount of energy used by the system without negatively affecting system performance. An audit can identify upgrades that can save energy, money, and carbon emissions. If an energy audit has already been done and the facility has undergone some major changes, then an updated energy audit may be appropriate. Detailed information about types of energy audits is available on the Energy STAR website.<sup>44</sup>

The GHG emissions inventory of Allegheny County operations showed such actions as decommissioning buildings, using steam energy traps, and installing programmable thermostats as having significant internal rates or return (IRR) on invested capital. The following table shows IRR of a range of actions suggested for County operations.

<b>Recommended Step</b>	<b>Internal Rate of Return(IRR)</b>
Upgrade Steam Energy Traps	34%
Implement Energy Management System	40%
Make Lighting Improvements	19%
Decommission Buildings	427%
Install New LED Lighting	-3%
Install Lighting Controls	7%
Install Programmable Thermostats	24%
Retrofit Exit Signs (per sign)	112%
Install Vending Machine Misers	112%
Install Steam Traps/Pipe Insulation	95%

IRR of three major changes are:

- LED Traffic Signal Retrofit 24%
- Municipal Wide Lighting Upgrade 47%
- Municipal Building Boiler Upgrade -9%

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<sup>44</sup> [http://www.energy.ca.gov/reports/efficiency\\_handbooks/400-00-001C.PDF](http://www.energy.ca.gov/reports/efficiency_handbooks/400-00-001C.PDF)

## A. Recommendations for Reductions of Municipal-Level Emissions

### **Lighting**

#### *No funding required*

- Turn off lights and other equipment when not in use. Computers and other electronic equipment consume considerable amounts of electricity, even in standby mode. Turning equipment off can reduce electricity use, saving money on utility bills and cutting greenhouse gas emissions.
- Adjust lighting levels if possible. Many offices use more lighting than necessary for ample vision, especially when adequate window light exists. This 'over-lighting' can cause headaches, glare and eyestrain, while increasing utility costs. Wilkins should Lighting needs should be assessed for possible scale-down.

#### *Modest internal funding required*

- Replace incandescent light bulbs with quality compact fluorescent lamps (CFLs). Energy efficient CFLs cost 75 percent less to operate and last 10 times longer. Install occupancy sensors for lighting systems. Occupancy sensors detect movement and automatically turn off the lights when no one is present.
- Upgrade exit signs. Since exit signs stay on at all hours, upgrading to an energy efficient model (such as an Energy STAR certified product) can produce significant savings on electricity and maintenance costs.
- Upgrade ballasts. Newer solid-state electronic ballasts are far more energy-efficient than older, magnetic ballasts.

### **Building and Facilities**

#### *No funding required*

- Set targets for reducing municipal energy consumption in buildings (e.g., 20 percent reduction in energy consumption by 2015).
- Clean High Volume Air Conditioning systems once per month. Equipment filters can accumulate high quantities of dust and debris, particularly during peak heating and cooling seasons. Cleaning these filters will not only optimize system performance, but also cut energy usage while improving indoor air quality.
- Control direct sunlight to moderate temperatures. Allowing sunlight in the winter months and blocking it during the summer will help to moderate temperature within comfort ranges while lessening the energy burden of the system.

#### *Modest internal funding required*

- Enter into an annual Heating, Ventilating, and Air Conditioning (HVAC) system maintenance contract. Having the system serviced before the start of the heating and cooling seasons will help maintain optimum performance.
- Install programmable thermostats. Setting thermostats to automatically reduce energy use during unoccupied periods can greatly reduce utility bills. Manual control can be used for special events and other unusual situations.
- Use fans to circulate air when outside temperatures are comfortable. Fans use far less electricity than air conditioning.
- Increase insulation and plug insulation gaps. Significant amounts of heating or cooling can escape through even the smallest of gaps in a building's exterior windows and doors and general "envelope." Even simple weather stripping and caulking will prevent leaks and reduce energy usage.
- Purchase Energy STAR certified products. The Energy STAR program allows consumers to purchase the most energy efficient computers, printers, copiers, windows, thermostats, and other appliances and equipment.
- Install insulation blankets around water heaters that are older than seven years that use more energy to maintain water temperature.
- Fix leaky faucets, showerheads, pipes, and other water using equipment. This can prevent waste of many gallons of water over time.
- Install water-saving faucets, showerheads, and toilets to reduce water consumption without compromising water pressure.
- Adopt an energy efficiency procurement policy for municipal purchasing. Adopt a green building ordinance for new and existing municipal buildings.
- Purchase green tags/renewable energy certificates.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Retrofitting government buildings can save the municipality money, reduce maintenance burdens, improve comfort, and reduce greenhouse gas emissions. Cost savings and emission reductions accrue immediately due to reduced electricity and natural gas consumption.

**Example**  
Use the Energy Star's Portfolio Manager software program, a free online tool that tracks and benchmarks energy performance for a municipal's buildings:

[http://www.energystar.gov/index.cfm?c=evaluate\\_performance.bus\\_portfoliomanager](http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager)

A savings of one million kWh reduces emissions by over 245 tons CO<sub>2</sub>e. For every 1,000 therms of natural gas that is saved, the jurisdiction is achieving an emissions reduction of 6 tons CO<sub>2</sub>e.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

*External funding required*

- Conduct energy retrofits in municipal buildings.
- Install solar thermal water heating systems on municipal buildings.
- Install solar photovoltaic (PV) electricity systems on municipal buildings.

**Waste**

*No funding required*

- Implement a duplex copying/printing policy in municipal office buildings.
- Increase recycling in municipal facilities.

*Modest internal funding required*

- Revise franchise agreements as franchises are renegotiated to include language that maximizes waste diversion. (See StopWaste.Org for best practices.)

**Transportation**

*No funding required*

- Offer flex-time and telecommuting to employees.
- Discourage idling, especially for school buses. Turning the engine on uses about as much gas as 10 seconds of idling. Any period of idling longer than 10 seconds should be replaced with simply turning the engine off.
- Retire under-used vehicles.
- Promote carpooling, and the use of mass transit by municipal employees.

*Modest internal funding required*

- Retire old vehicles.
- Promote use of energy efficient light bulbs.
- Allow flex time and telecommuting by municipal employees.
- Implement employer trip-reduction ordinances.

*External funding required*

- Purchase hybrids and/or smaller, more fuel efficient fleet vehicles.
- Utilize fuel efficient vehicles for parking enforcement.
- Utilize alternative fuels such as biodiesel in vehicle fleet and heavy equipment.<sup>45</sup>

**B. Recommendations for Reductions of Community-Level Emissions**

**Residential, Commercial, and Industrial**

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<sup>45</sup> Converting 10 city-owned heavy trucks to B100 biodiesel would reduce emissions by approximately 190 tons annually.

*No funding required*

- Clean climate control systems once per month. Climate control systems filters can accumulate high quantities of dust and debris, especially during the peak heating and cooling seasons. Cleaning these filters would not only optimize climate control system performance, but would also cut energy usage and improve indoor air quality.
- Control direct sunlight to moderate temperatures. Allowing sunlight in the winter months and blocking it during the summer will help to moderate temperature. This will reduce the energy burden of climate control systems.
- Close exterior doors while running climate control systems.
- Turn off lights and other equipment when not in use. Computers and other electronic equipment consume considerable amounts of electricity, even in standby mode. Turning equipment off can reduce electricity use, saving money on utility bills and cutting greenhouse gas emissions.
- Adjust lighting levels if possible. Many homes use more lights than necessary for ample vision, especially when adequate window light exists. This 'over-lighting' can cause headaches, glare and eyestrain, and increases utility costs.
- Reduce hot water temperature. Many water heaters have maximum temperatures that far exceed home needs. Set the water heater to 110-120 °F to reduce energy requirements and prevent scalding.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

On average, an ENERGY STAR qualified light bulb can reduce emissions by 450 pounds over its lifetime. Such lighting requires at least 65 percent less energy than an incandescent lighting- and generates 70 percent less heat, using hardware that lasts up to 10 times longer. On average, an ENERGY STAR qualified light bulb can save up to \$30 in electricity costs over the lifetime of the bulb.

Currently available sources of renewable energy include solar, wind, biomass and geothermal. Renewable energy offers the potential of a clean, decentralized energy source that can significantly impact the municipality's greenhouse gas emissions.

**Example**      **Example**

Launch a "Solar Wilkins" program informing the community about solar photovoltaic electricity, solar thermal water heating, solar contractors, and financing. If Wilkins were to set a goal of at least 1,000 community members committing to changing just one bulb, the emissions reduction achieved will equate to approximately 2560 tons (PV) panels can generate approximately 2,000 kWh of electricity per year and annual emissions reduction of about 0.5 ton CO<sub>2</sub>e. PV panel installations cost \$7-10 per watt depending on system size and availability of product. Solar thermal hot water systems provide pre-heating of water that is conveyed to and further heated in conventional water heaters.

Cost savings have a payback period of 10-15 years.

The Database for State Incentives for Renewable Energy (DSIRE) contains more information:  
<http://www.dsireusa.org/>

*Source: StopWaste.org*

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

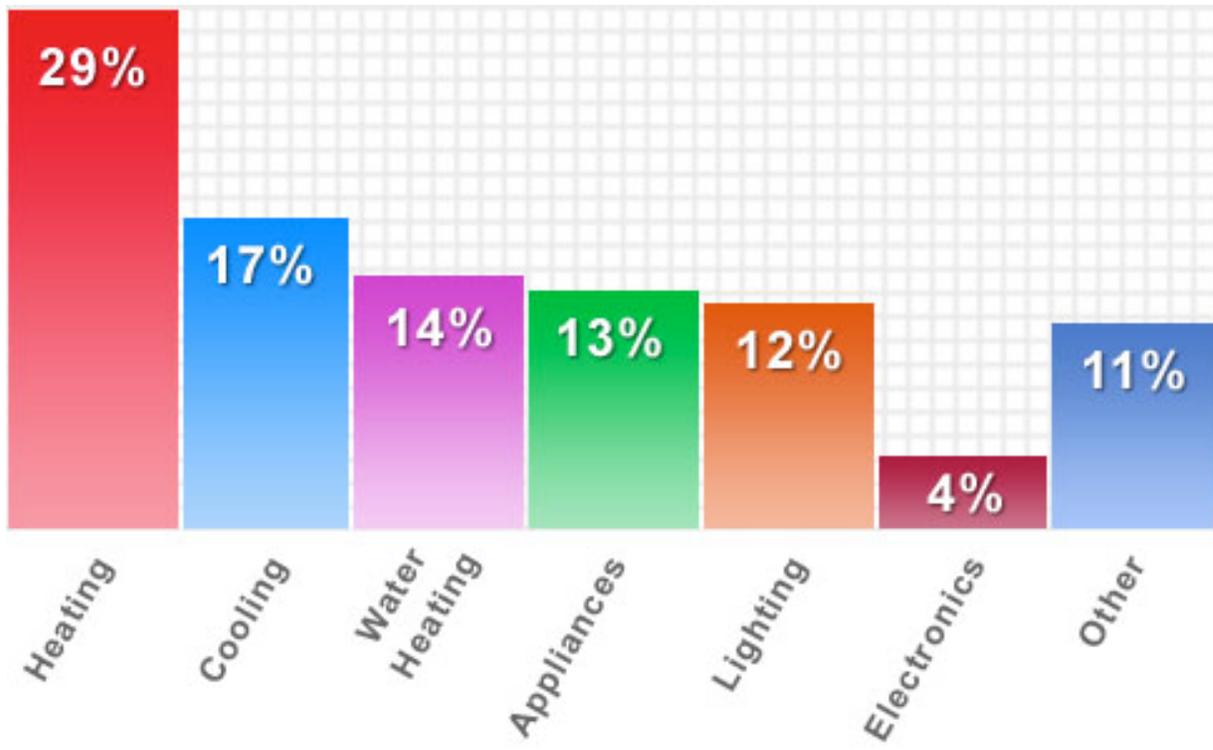
*Modest investment required*

- Enter into a HVAC annual maintenance contract for climate control systems to maintain optimum system performance at the start of heating and cooling. Install programmable thermostats. Setting thermostats to automatically reduce energy use during unoccupied periods can greatly reduce utility bills. Manual controls can be used for special events and other unusual situations.
- Increase insulation and plug insulation gaps. Significant amounts of heating or cooling can escape through even the smallest of gaps in a building's exterior windows and doors

and general “envelope.” Even simple weather stripping and caulking will prevent leaks and reduce energy usage.

- Purchase Energy STAR certified products. The Energy STAR program allows consumers to purchase the most energy efficient computers, printers, copiers, windows, thermostats, and other appliances and equipment.
- Replace incandescent light bulbs with quality compact fluorescent lamps (CFLs). Energy efficient CFLs cost 75 percent less to operate and last 10 times longer.
- Seal ducts. About 20 percent of the air that moves through an average duct system is lost through poorly sealed connections. Duct sealant commonly available at hardware stores can be used for exposed ducts. Insulating ducts can also help improve the effectiveness of climate control systems.
- Install insulation blankets around water heaters that are older than seven years that use more energy to maintain water temperature.
- Install water-saving faucets, showerheads and toilets to reduce water consumption without compromising water pressure.
- Promote water conservation through technology modification. Fix leaky faucets, showerheads, pipes and other water using equipment. This can prevent waste of many gallons of water over time.
- Adopt and enforce green building ordinances.
- Adopt and implement residential and commercial energy conservation ordinances.
- Offer incentives for the installation of solar hot water heaters and solar swimming pool heaters.
- Implement a low-income weatherization program.
- Establish a revolving energy fund to provide initial capital for new energy efficiency retrofit projects.
- Purchase green tags/renewable energy certificates.

Almost half of the energy used in a home goes to heating and cooling, so smart decisions about heating, ventilating, and air conditioning (HVAC) systems can save money on utility bills. The following figure shows respective shares of energy use by household systems.



**Figure 23: “Where Does My Money Go?”**

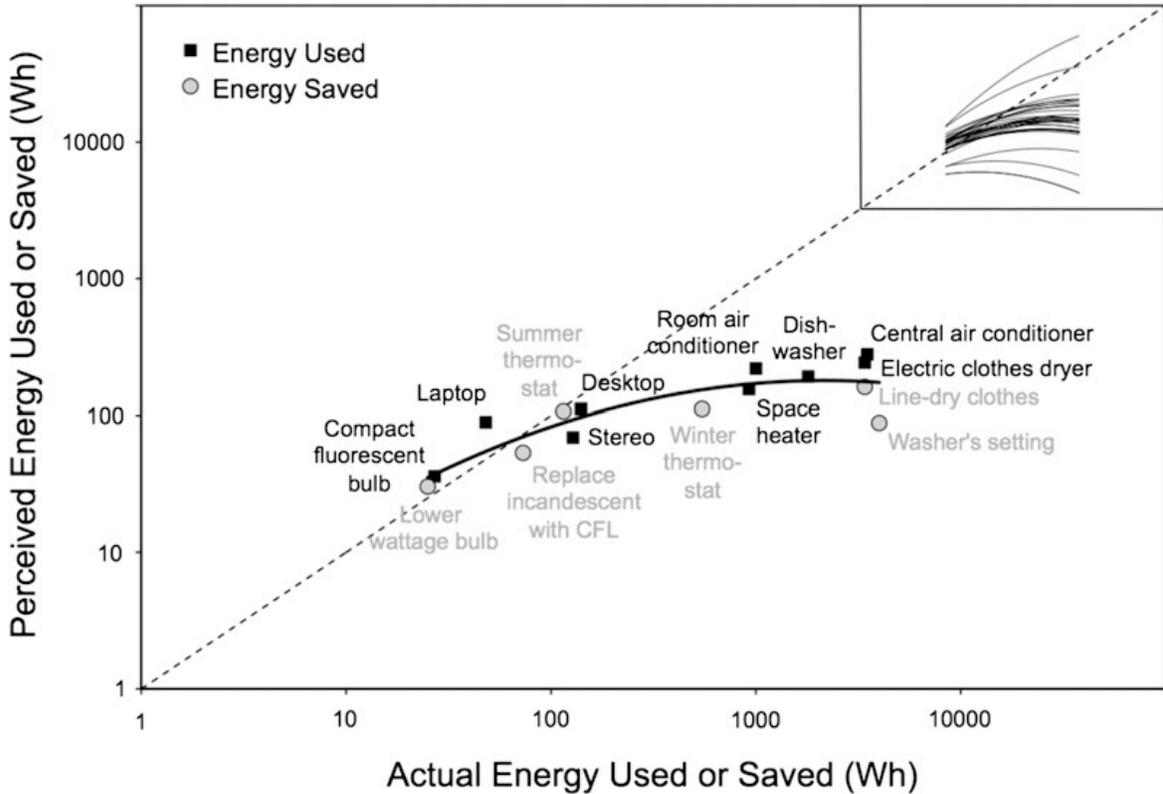
**Annual Energy Bill for a Typical Single Home is approximately \$2,200.**

Source: *Typical House Memo*, Lawrence Berkeley National Laboratory, 2009 and *Typical house\_2009\_Reference.xls spreadsheet*.<sup>46</sup>

According to findings reported in the article “Public Perceptions of Energy Consumptions and Savings” (*Proceedings of the National Academy of Sciences*, July 12, 2010), households could reduce their energy consumption by 30% simply by changing the selection and use of household technologies. The article notes that household members are often unaware that changing their use of technology and changing actual equipment saves more energy reducing the use of inefficient equipment. For example, desktop computers consume more energy than laptop computers; changing the water temperature settings on the washing machine saves more energy than line drying of clothes; and central air conditioners consume three times more

<sup>46</sup> [http://www.energystar.gov/index.cfm?c=products.pr\\_where\\_money](http://www.energystar.gov/index.cfm?c=products.pr_where_money)

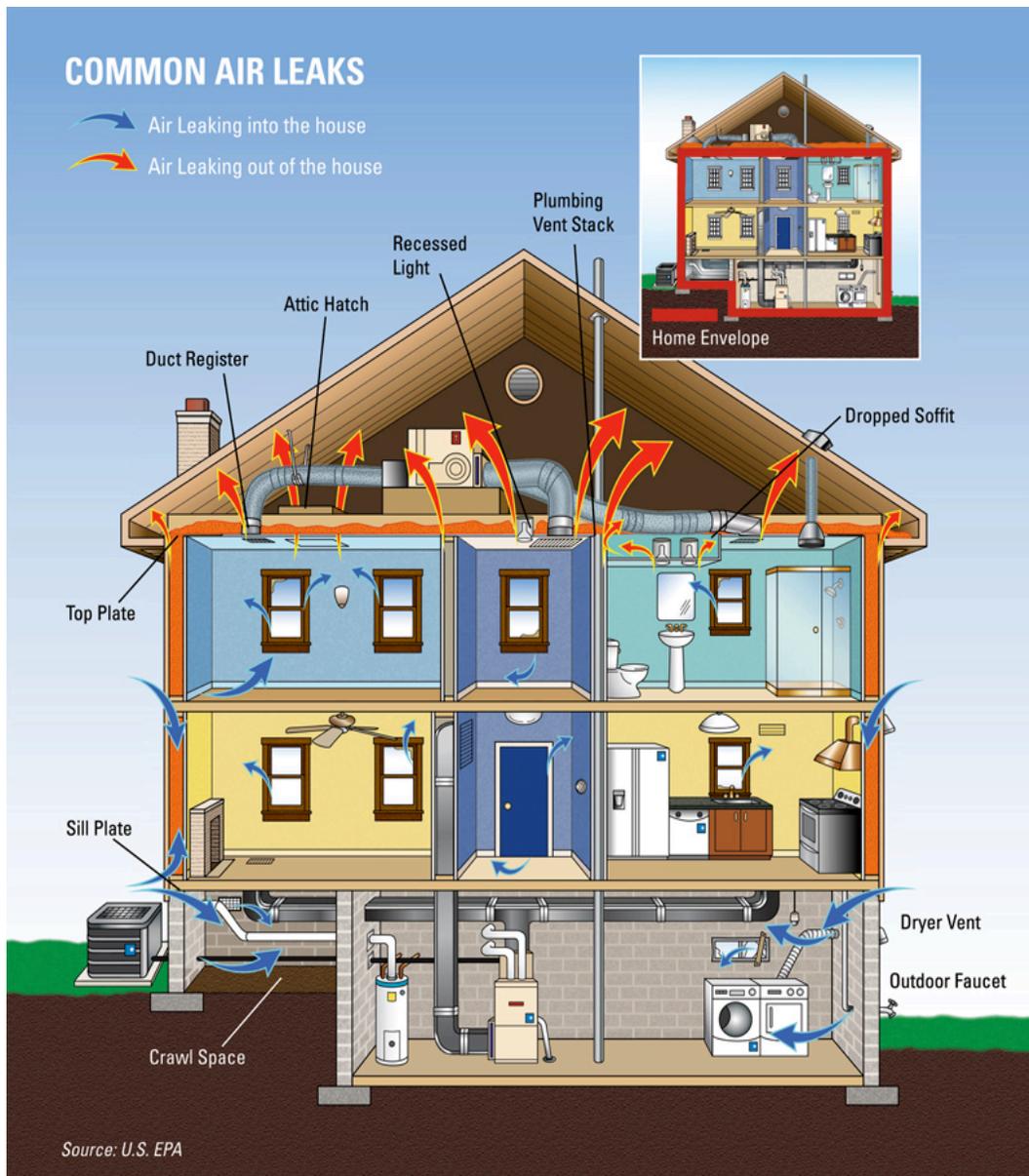
energy than room air conditioners. The graph below presents a comparison of mean perceptions of energy used or saved and actual energy used or saved for 15 devices and activities based on a survey conducted among 505 participants.<sup>47</sup>



Courtesy:  
 "Public Perceptions of Energy Consumption and Savings"

"Green" remodeling can be accomplished using Energy STAR recommended systems and appliances that reduce energy bills, improve comfort, and help to protect the environment.

<sup>47</sup> <http://www.pnas.org/content/early/2010/08/06/1001509107.full.pdf+html>



**Figure 24: Common Air Leaks in a Home**  
 Source: Energy STAR<sup>48</sup>

### Transportation

#### No funding required

- Lobby for increased CAFE standards.
- Lobby for tiered vehicle registration fees based on vehicle fuel efficiency.

<sup>48</sup> [http://www.energystar.gov/ia/home\\_improvement/images/house-leaks-with-text-800.jpg](http://www.energystar.gov/ia/home_improvement/images/house-leaks-with-text-800.jpg)

- Promote carpooling, ride sharing, telecommuting, and the use of mass transit by the community.
- Promote bicycling.
- Encourage school walking pools.
- Discourage unnecessary idling of vehicles.

*Modest investment required*

- Implement tiered parking rates based on vehicle size and fuel efficiency.
- Change zoning to encourage higher density housing and mixed use development in areas closer to public transit.
- Support high density housing near public transit stops.
- Encourage more smart growth (in fill, jobs/housing balance, centered development).
- Promote community purchases of compact and hybrid vehicles.
- Utilize electric and/or hybrid vehicles in municipal fleet.
- Initiate a community biodiesel purchasing co-op or fueling station.
- Provide high school students with complimentary public transit passes.
- Expand local transit, bus, and or shuttle service in range and/or frequency.
- Encourage alternative fueled vehicles for taxis and school buses.
- Support inter-regional high speed rail.
- Initiate a “vehicle buy back” program for passenger cars produced before 1985.
- Promote the use of alternative fuels/less carbon intensive fuels such as CNG and ethanol.
- Charge a tiered congestion fee based on vehicle fuel efficiency.
- Integrate bus, and bicycle networks.

**Waste**

*Modest investment required*

- Increase participation in commercial and residential food waste collection and composting programs.
- Increase participation in commercial recycling programs for paper, cardboard, and plastic film.
- Increase participation in residential co-collection of yard debris.
- Promote backyard vegetable gardening.
- Educate residents and businesses about the benefits of sustainable landscaping and gardening.

To assist Wilkins in implementing a set of measures that will achieve a reduction in a resource and cost effective manner, ICLEI has prepared an analysis of the potential emission reductions that can be achieved by implementing programs offered by StopWaste.Org.



Reduction can be small, yet significant:

<b>Waste Management Practice</b>	<b>Waste Management Practice</b>	<b>CO<sub>2</sub>e Reduction</b>
Duplex copying and printing (office paper)	2,000 reams	1.9 Tons
Recycle plastic film (LDPE)	1 ton	1.9 tons
Recycle paper (mixed general)	1 ton	4.3 tons
Reusable transportation package	Each reusable pallet instead a wood pallet	800 lbs
Recycled/reuse cardboard boxes	1 tons of cardboard	3.87 tons
Compost food scraps	10 tons	10.9 tons

The Pennsylvania Resource Council is a good resource for guidance and support on reducing waste:

[www.prc.org](http://www.prc.org)



## **V. Conclusion and Future Steps**

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Climate change is an issue of growing concern for communities across the United States and around the world. Wilkins has displayed leadership and foresight in choosing to confront this issue now. By reducing the amount of greenhouse gases emitted by the community, Wilkins

joins hundreds of other American cities and towns in stemming the tide of global warming and the numerous threats associated with it. Meeting the emissions reduction target will require both persistence and adaptability.

#### A. Administration and Staffing

A key element of an effective emissions reduction action plan is assigning and defining management responsibilities for each of the plan's the individual components. It is, of course, critical to coordinate responsibilities with those already in place to most seamlessly fold the Climate Action Plan into the context of existing workloads.

An appropriate person within the staff structure should be assigned overall responsibility for coordinating the implementation of the Climate Action Plan. The staff person and department responsible will vary from jurisdiction to jurisdiction. It is a good idea to establish an interdepartmental committee to ensure effective communication and coordination between those responsible for the program's various elements.

Adequate resources are crucial to implementation of a Climate Action Plan, including funding, adequate staff, and outside assistance. One possible way to augment existing in-house capacity is to use volunteers from the community or interns from local colleges to gather information and perform public outreach.

The Climate Action Plan is an opportunity to renew and reinforce your commitment to existing programs and projects that have the effect of reducing GHG emissions. By identifying these existing activities as key elements in the Climate Action Plan, measures that may have been languishing for one reason or another can be brought back to life.

#### B. Financing and Budgeting

Some emissions reduction opportunities, such as adding more buses or installing a regional light rail system, will require significant up-front investment whose scale or scope is beyond the purview of municipal government, whereas others, such as adjusting automatic lighting schedules in municipal facilities or installing power saving features on existing office equipment, require little or no new funding.

A key strategy is to identify opportunities to use financial resources already within the context of the existing municipal budget. Parking revenues, for instance, might be used to pay for alternative transit improvements, on the grounds that these improvements reduce parking demand. Energy-saving community measures might be funded via fees assessed through utility bills, building permits, etc.

#### C. Developing a Timeline

The schedule for implementing the Climate Action Plan should be arranged so as to achieve its emissions reduction goals by the target year. The timeline must be practical, taking into account the administrative, political, technical, and other issues that the Municipality will face in getting

programs up and running. It must allow time for stakeholder involvement in each phase as appropriate. Yet it should also contain significant near-term steps, pushing the community to build from the momentum created by releasing this plan.

#### D. Public Involvement in the Implementation Process

The process of implementing many of the proposed measures in this Climate Action Plan will necessitate the involvement of community stakeholders, including the public at large. Document intended strategies to increase public involvement.

#### E. Monitoring

A means to measure progress or change is vital to the implementation of any plan. Establishing a system for monitoring the implementation of a Climate Action Plan makes it possible to adjust the plan as opportunities arise. Energy use reductions and waste avoidance figures from proposed measures can be entered into the emissions tracking software as projects are implemented and actual savings are documented. As changes are measured, GHG emissions reductions progress can be reported in other municipal reports.

#### F. Re-Inventorizing

Municipalities are encouraged to re-inventory their greenhouse gas emissions on a regular basis (e.g., every two to three years). The process of conducting follow-on-inventories makes it possible to measure progress toward emissions reduction targets and identify opportunities to integrate new or improved measures into the emissions reduction plan.

## VI. Appendices

**Appendix A: Financing Mechanisms**

**Appendix B: Funding Sources**

**Appendix C: EPA Environmental Accounting**

**Appendix D: Local Government Operations Protocol**  
**Appendix E: Community GHG Emissions in 2008 Detailed Report**  
**Appendix F: Municipal GHG Emissions in 2008 Detailed Report**

**Appendix A: Financing Mechanisms and Institutions<sup>49</sup>**

<b>Financial Mechanism</b>	<b>How Used</b>	<b>How to Access</b>	<b>Advantages</b>	<b>Limitations</b>
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<sup>49</sup> [http://www.reeep.org/file\\_upload/5272\\_tmpphi9Y2c1.pdf](http://www.reeep.org/file_upload/5272_tmpphi9Y2c1.pdf)

<b>Municipal/ State General Budgetary Funds</b>	All types of municipal projects.	Municipal/state government	Independent decision-making power	Limited funds availability; may not be available for large scale projects
<b>Soft loans</b>	Uses below-market interest rates to lower cost of borrowing money.	From municipalities, state, banks (sometimes as part of a program with IFIs), loan funds supported by international organizations and multilaterals.	<ul style="list-style-type: none"> <li>• Interest holidays</li> <li>• Long repayment periods</li> </ul>	Municipalities are unfamiliar with specific procedures and requirements of institutions
<b>Commercial bank loans</b>	Issued by banks, credit unions, finance companies to municipalities at market interest rates	Local and foreign commercial banks	Can be faster than financing tied to government or donor programs.	If municipality lacks credit-worthiness, loans need credit guarantees
<b>Grants</b>	Provided by IFIs, usually through local and international implementing NGOs, international development agencies	Government (state and municipal); donors (usually tied to specific development assistance programs); state banks (to encourage commercial financing and open market for EE finance).	<p>No repayment necessary.</p> <p>Lowers barriers to projects.</p>	Might delay commercialization of EE finance.
<b>Partial Loan Guarantees</b>	Secure a loan in case the borrower defaults.	Special guarantee facilities. Sovereign guarantees offered by the state.	Qualify for a loan from a financial institution that for which otherwise unqualified	Cumbersome financial paperwork

<b>Financial Mechanism</b>	<b>How Used</b>	<b>How to Access</b>	<b>Advantages</b>	<b>Limitations</b>
<b>Performance Contracting</b>	For projects that generate sufficient energy-cost savings to pay project costs.	Contract signed between municipality and an energy service provider such as an energy service company (ESCO), EU Energy Center, NGO, or consulting firm. Financing can be provided through municipality, service provider or third party.	Eliminates the need for the municipality to have the upfront capitol to fund the project.	Savings from the project must be shared with the service provider. Requires sufficient metering to establish a baseline and monitor savings against it.
<b>Leasing</b>	Allows firms to lease assets instead of borrowing and then buy them out later	Private companies wanting to lease DH assets. Equipment manufacturers and distributors wanting to enter a market.	3-20 year maturity; use the equipment now and with the option of paying for it later, making cash available for other use.	In addition to paying to use the equipment, pay additional charges on the lease as well.
<b>Vendor Credit</b>	When purchasing equipment, municipalities pays for it over short-term	Equipment Vendors	Helps build credit history if a municipality is not creditworthy; easier to obtain than loans; widely offered by vendors; no interest	
<b>Municipal Bonds</b>	Raise internal equity for municipality by issuing a bond	Contact investment specialist	Interest rate is likely to be exempt from taxes	Requires lengthy and expensive preparatory work. Incur large debt and risk of default
<b>Revolving Fund</b>	Accumulates savings from EE projects for self-perpetuating investments in more EE projects	NGOs, governments, international donors, municipalities	Self-sustaining after first capitalization;	Requires large upfront investment. Can be cumbersome and expensive to administer. Legislative and institutional barriers may prevent municipalities from accruing savings.

## **Appendix B: Funding Sources**

### **Commonwealth of Pennsylvania**

**Commonwealth Financing Authority (CFA)** was established to administer Pennsylvania's economic stimulus package.

**<http://www.newpa.com/find-and-apply-for-funding/commonwealth-financing-authority/index.aspx>**

**Alternative and Clean Energy Projects:** \$650 million available to Pennsylvania businesses, economic development organizations, and political subdivisions such as counties, municipalities, and school districts. The funding is available in the form of loans, with a match requirement of 1:1 and grants for:

- Clean and alternative energy projects
- High performance energy efficient small business building projects
- Geothermal and wind energy projects
- Alternative energy production projects involving solar technologies.

**High Performance Building Program:** Loans and grants for small businesses and individuals. Used to construct and renovate buildings for primary residence. However, building standards must be documented.

**<http://www.newpa.com/find-and>**

### **Pennsylvania Energy Development Authority**

This is an annual grant program that accepts application from mid April to mid June each year for renewable energy projects costing up to \$10 million. These include solar, wind, hydroelectric, geothermal, and biomass. All projects must contain a research component and provide matching funds. Grants are awarded based on feasibility, quantity of fund matching, associated job growth, and benefit to the environment.

**[http://www.portal.state.pa.us/portal/server.pt/community/peda-move\\_to\\_grants/10496](http://www.portal.state.pa.us/portal/server.pt/community/peda-move_to_grants/10496)**

### **PA Sunshine Program**

A first-come-first-serve program with \$100 million of rebates available for solar, electric and hot water systems. Applicants must use a qualified installer for their solar project. The installer will complete required applications, and rebates will go directly the consumer. Applications have been accepted since May 18, 2009.

**[http://www.portal.state.pa.us/portal/server.pt/community/in\\_the\\_news/10475/pa\\_sunshine\\_solar\\_program/553019](http://www.portal.state.pa.us/portal/server.pt/community/in_the_news/10475/pa_sunshine_solar_program/553019)**

## **Energy Conservation**

Loans and grants to small businesses and individuals. Used for construction and renovation of buildings as primary residence and building standards must be documented.  
<http://www.keystonehelp.com/>

## **Federal Government**

**Renewable Energy Grants:** Grants through the American Recovery and Reinvestment Act of 2009 available to commercial, industrial, and agricultural entities. The amount awarded is 30% of property that is part of a qualified facility, qualified fuel cell property, solar property, or qualified small wind property, and 10% of all other property.

<http://www.treas.gov/recovery/1603.shtml>

**The Database of State Incentives for Renewables and Efficiency (DSIRE)** contains a summary of the program as well as other financial incentives for state, local, utility, and federal governments.

<http://www.dsireusa.org/>

## **Tax credits and rebates for individuals**

The American Recovery and Reinvestment Act (ARRA) of 2009 offers tax credits for homeowners who make energy efficient home improvements, through 2010. The tax credit triples the total available from \$500 to \$1,500 and increases the tax credit to 30% of the cost of each qualified energy efficiency improvement.

<http://ase.org/content/article/detail/2654>

The Commonwealth of Pennsylvania will implement a rebate program to help residents replace older, inefficient appliances with new, non-electric ENERGY STAR<sup>®</sup> qualified and ultra-efficient appliances through the ARRA. The program will end when funds are depleted. Total funds available: \$11,944,000

<http://www.energysavers.gov/financial/70020.html>

[http://www.energystar.gov/index.cfm?c=tax\\_credits.tx\\_index](http://www.energystar.gov/index.cfm?c=tax_credits.tx_index)

The ICLEI website has a source of up-to-date funds available to communities. Three are listed here.

<http://www.icleiusa.org/action-center/affecting-policy/action-center/financing-staffing/funding-grant-opportunities/federal-and-national-funding>

**HUD Sustainable Communities Planning Grant Program:** This grant is available to multijurisdictional and multisectoral consortia of government entities and non-profit partners. It is intended to be used for (1) economic competitiveness and revitalization; (2) social equity, inclusion, and access to opportunity; (3) energy use and climate change; and (4) public health

and environmental impact. Total funds available are \$98 million, and individual awards range from \$100,000 to \$5 million.

**Energy Efficiency:** The Environmental Protection Agency (EPA) targets greenhouse gas emissions reduction through energy efficient homes and buildings through grants. This is available to state and local governments, public and state controlled institutions of higher education, Native American tribal governments, and private institutions of higher education. The total estimated funding \$5,360,000 consisting of approximately 10 grants ranging in value from \$60,000 - \$180,000, and up to 4 large cooperative agreements ranging in value from \$300,000 - \$1,200,000.

**Climate Mitigation:** The Economic Development Assistant (EDA) is allocating a fund as an incentive to mitigate global climate change. The total amount is \$14.7 million and supports projects that foster economic competitiveness while enhancing environmental quality. The money is available to state, local, and tribal governments; public and private institutes of higher education; non-profits.

#### **Technical Assistance**

#### **Environmental Management Assistance Program (EMAP)**

EMAP is a service for small businesses of the federal Small Business Administration and Pennsylvania Department of Commerce provided through Small Business Development Centers Areas of technical assistance include:

- Energy Efficiency & Pollution Prevention
- Clean Energy & Alternative Fuels
- Storage Tanks
- Water Quality

**<http://askemap.org/fundinginformation>**

## Appendix C: Excerpt from USEPA, *An Introduction to Environmental Accounting*<sup>50</sup>

### A. Introduction

The term *environmental accounting* has many meanings and uses. Environmental accounting can support national income accounting, financial accounting, or internal business managerial accounting. This primer focuses on the application of environmental accounting as a managerial accounting tool for internal business decisions. Moreover, the term *environmental cost* has at least two major dimensions: (1) it can refer solely to costs that directly impact a company's bottom line (here termed "private costs"), or (2) it also can encompass the costs to individuals, society, and the environment for which a company is not accountable (here termed "societal costs"). The discussion in this primer concentrates on private costs because that is where companies starting to implement environmental accounting typically begin. However, much of the material is applicable to societal costs as well.

### B. Why Do Environmental Accounting?

Environmental costs are one of the many different types of costs businesses incur as they provide goods and services to their customers. Environmental performance is one of the many important measures of business success. Environmental costs and performance deserve management attention for the following reasons:

- (1) Many environmental costs can be **significantly reduced or eliminated** as a result of business decisions, ranging from operational and housekeeping changes, to investment in "greener" process technology, to redesign of processes/products. Many environmental costs (e.g., wasted raw materials) may provide no added value to a process, system, or product.
- (2) Environmental costs (and, thus, potential cost savings) **may be obscured in overhead accounts or otherwise overlooked.**
- (3) Many companies have discovered that **environmental costs can be offset by generating revenues** through sale of waste by-products or transferable pollution allowances, or licensing of clean technologies, for example.
- (4) Better management of environmental costs can result in **improved environmental performance and significant benefits to human health** as well as business success.
- (5) Understanding the environmental costs and performance of processes and products can promote **more accurate costing and pricing** of products and can aid companies in the **design of more environmentally preferable** processes, products, and services for the future.
- (6) **Competitive advantage** with customers can result from processes, products, and services that can be demonstrated to be environmentally preferable.
- (7) Accounting for environmental costs and performance can support a company's development and operation of an overall **environmental management system**. Such a system will soon be a necessity for companies engaged in international trade due to pending international consensus

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<sup>50</sup> <http://www.epa.gov/oppt/library/pubs/archive/acct-archive/pubs/busmgt.pdf>

standard ISO 14001, developed by the International Organization for Standardization.<sup>51</sup> EPA's work with key stakeholders leads it to believe that as businesses more fully account for environmental costs and benefits, they will clearly see the financial advantages of pollution prevention (P2) practices. Environmental costs often can be reduced or avoided through P2 practices such as product design changes, input materials substitution, process re-design, and improved operation and maintenance (O&M) practices. For example, increased environmental costs may result from use of chemical A (e.g., a chlorinated solvent), but not from chemical B (e.g., an aqueous-based solvent). This is true even though chemical A and chemical B can be substitutable. Another example: some environmental compliance costs are required only when use of a substance or generation of a waste exceeds a defined threshold. A company that can reduce chemical use below such thresholds or employ substitutes for regulated chemicals can realize substantial cost savings from design, engineering, and operational decisions.

In two of the most thorough reports on the subject of pollution prevention in the industrial community, the not-for-profit group INFORM<sup>52</sup> studied 29 companies in the organic chemical industry in 1985 and again in 1992. This research found that chemical "plants with some type of environmental cost accounting program" had "an average of three times as many" P2 projects "as plants with no cost accounting system."<sup>53</sup> The study also showed that the average annual savings per P2 project in production facilities, where data were available, were just over \$351,000, which equaled an average savings of \$3.49 for every dollar spent. Not only were substantial savings and returns on investment documented for P2 projects, but an average of 1.6 million pounds of waste were reduced for each project. Results like these have highlighted the potential benefits of environmental accounting to the business community. For example, responses to a questionnaire administered by George Nagle of the Bristol-Myers Squibb Company at the Spring 1994 Global Environmental Management Initiative (GEMI) Conference showed that corporate professionals are placing a high priority on environmental accounting.<sup>54</sup> Of the 25 respondents to the informal survey, half stated that their company had some form of a tracking system for environmental costs. All but two reported that they believed environmental accounting issues would be more important to their companies in the near future. In addition, the Business Roundtable expects to turn its attention to environmental accounting issues in 1995, and companies of all sizes in the U.S. are beginning to consider implementing environmental accounting in their facilities.<sup>55</sup>

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<sup>51</sup> See ISO 14001: Environmental Management System Specification (Committee Draft, February 1995). ISO 14000 guidance document General Guidelines on Principles and Supporting Techniques (Committee Draft, February 1995) adds that tracking environmental benefits and costs can support the appropriate allocation of resources for achieving environmental objectives.

<sup>52</sup> Cutting Chemical Wastes (1985), INFORM, New York, NY; Environmental Dividends: Cutting More Chemical Wastes (1992), INFORM, New York, NY.

<sup>53</sup> Environmental Dividends, at page 31

<sup>54</sup> "Business Environmental Cost Accounting Survey," Global Environmental Management Initiative '94 Conference Proceedings, p. 243, March 16-17, 1994, Arlington, VA.

<sup>55</sup> See Green Ledgers: Case Studies in Corporate Environmental Accounting, edited by Daryl Ditz, Janet Ranganathan, and Darryl Banks (World Resources Institute, 1995) and Environmental Accounting Case Studies, EPA 742-R-95-00X (forthcoming).

## **Appendix D: Excerpt from *Local Government Operations Protocol*<sup>56</sup>**

### Background

In response to a scientific consensus linking greenhouse gas (GHG) emissions from human activities to global climate change<sup>57</sup>, many local governments are looking inwards to identify opportunities to reduce GHG emissions not only from their communities, but also within their own operations. Local governments can inventory the emissions from their operations in order to track their performance and ensure that their actions reduce GHG emissions. This GHG inventory is the foundation of actions to address climate change. Complete, consistent and accurate measurement enables local governments to assess their risks and opportunities, track their progress, and create a strategy to reduce emissions in a quantifiable and transparent way. The Local Government Operations Protocol (Protocol) is designed to provide a standardized set of guidelines to assist local governments in quantifying and reporting GHG emissions associated with their government operations.

The Protocol was developed in partnership by the California Air Resources Board (ARB), California Climate Action Registry (CCAR), and ICLEI – Local Governments for Sustainability (ICLEI), in collaboration with The Climate Registry and dozens of stakeholders. Through this Protocol, the partners have sought to enable local governments to measure and report GHG emissions associated with government operations in a harmonized fashion. The Protocol facilitates the standardized and rigorous inventorying of GHG emissions, which can help track emissions reduction progress over time and in comparison to GHG reduction targets.

The Protocol provides the principles, approach, methodology, and procedures needed to develop a local government operations GHG emissions inventory. It is designed to support the complete, transparent, and accurate reporting of a local government's GHG emissions. The Protocol guides participants through emissions calculation methodologies and reporting guidance applicable to all U.S. local governments.

### Purpose

The purpose of the Local Government Operations Protocol is to:

- Enable local governments to develop emissions inventories following internationally recognized GHG accounting and reporting principles defined below with attention to the unique context of local government operations;
- Advance the consistent, comparable and relevant quantification of emissions and appropriate, transparent, and policy-relevant reporting of emissions;
- Enable measurement towards climate goals;
- Promote understanding of the role of local government operations in combating climate change; and
- Help to create harmonization between GHG inventories developed and reported to multiple programs.

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<sup>56</sup> <http://www.theclimateregistry.org/downloads/2010/05/2010-05-06-LGO-1.1.pdf>

<sup>57</sup> See Intergovernmental Panel on Climate Change, *The Physical Science Basis*, Fourth Assessment, Working Group I Report, 2007. Local Government Operations Protocol May 2010 PART I Introduction 4

The Protocol is a tool for accounting and reporting GHG emissions across a local government's operations. Reductions in emissions are calculated by comparing changes in a local government's emissions over time. By tracking emissions over time, local governments should be able to measure the GHG reduction benefits from policies and programs put in place to reduce emissions within their operations. The Protocol is not designed for quantifying the reductions from GHG mitigation projects that will be used as offsets. Offsets are discrete GHG reductions used to compensate for (i.e., offset) GHG emissions elsewhere. Offsets are calculated relative to a baseline that represents a hypothetical scenario for what emissions would have been in the absence of the project.<sup>58</sup>

Project based GHG reductions that are to be used as offsets should be quantified using a project quantification method that addresses issues like baseline scenario, additionality, permanence and ownership. This Protocol does not address such issues and is not suitable for calculating reductions to be used as offsets in a voluntary or mandatory GHG reduction system. Furthermore, the Protocol does not include guidance on how to quantify carbon stocks (or "sinks"). Biological stocks of carbon and estimations of project-specific GHG reductions may be reported optionally.

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<sup>58</sup> WRI/WBCSD *GHG Protocol Corporate Standard*, March 2004.

**Appendix E: Detail of Community Greenhouse Gas Emissions in 2008**

	<b>CO 2 (tons)</b>	<b>N O 2 (lbs)</b>	<b>CH 4 (lbs)</b>	<b>Equiv CO 2 (tons) (%)</b>	<b>Energy (MMBtu)</b>
<b>Wilkins Township, Pennsylvania</b>					
<b>Residential</b>					
<i>Residential</i>					
Electricity	18,074	604	429	18,172 19.0	80,224
Natural Gas	32	0	6	32 0.0	548
Subtotal Residential	18,106	604	435	18,204 19.1	80,772
<b>Subtotal Residential</b>	<b>18,106</b>	<b>604</b>	<b>435</b>	<b>18,204 19.1</b>	<b>80,772</b>
<b>Commercial</b>					
<i>Commercial</i>					
Electricity	31,418	1,051	745	31,589 33.1	139,457
Natural Gas	962	4	181	965 1.0	16,450
Subtotal Commercial	32,380	1,054	926	32,554 34.1	155,907
<b>Subtotal Commercial</b>	<b>32,380</b>	<b>1,054</b>	<b>926</b>	<b>32,554 34.1</b>	<b>155,907</b>
<b>Industrial</b>					
<i>Industrial (Elec-20 kWh and over)</i>					
Electricity	955	32	23	960 1.0	4,238
Natural Gas	13,930	53	525	13,944 14.6	238,172
Subtotal Industrial (Elec-20 kWh and over)	14,885	84	548	14,904 15.6	242,410
<b>Subtotal Industrial</b>	<b>14,885</b>	<b>84</b>	<b>548</b>	<b>14,904 15.6</b>	<b>242,410</b>
<b>Transportation</b>					
<i>Personal Vehicle</i>					
Gasoline	26,926	1,017	1,452	27,099 28.4	344,623
Subtotal Personal Vehicle	26,926	1,017	1,452	27,099 28.4	344,623
<b>Subtotal Transportation</b>	<b>26,926</b>	<b>1,017</b>	<b>1,452</b>	<b>27,099 28.4</b>	<b>344,623</b>
<b>Waste</b>					
<i>Residential Disposal Method - Managed Landfill</i>					
Paper Products	0	0	177,543	1,864 2.0	
Food Waste	0	0	41,171	432 0.5	
Plant Debris	0	0	24,249	255 0.3	
Wood or Textiles	0	0	23,503	247 0.3	
Subtotal Residential	0	0	266,465	2,798 2.9	
<b>Subtotal Waste</b>	<b>0</b>	<b>0</b>	<b>266,465</b>	<b>2,798 2.9</b>	
<b>Subtotal Wilkins Township, Pennsylvania</b>	<b>92,297</b>	<b>2,760</b>	<b>269,826</b>	<b>95,558 100.0</b>	<b>823,711</b>
<b>Total</b>	<b>92,297</b>	<b>2,760</b>	<b>269,826</b>	<b>95,558 100.0</b>	<b>823,711</b>

**Appendix F: Detail of Municipal-Level GHG Emissions, 2008**

	CO 2 (tons)	NO 2 (lbs)	CH 4 (lbs)	Equiv CO 2 (tons) (%)		Energy (MMBtu)
<b>Wilkins Township, Pennsylvania</b>						
<b>Buildings and Facilities</b>						
<i>110 Peffer Municipal Building</i>						
Electricity	59	2	1	59	5.0	261
Natural Gas	64	0	12	64	5.5	1,098
Subtotal 110 Peffer Municipal Building	123	2	13	123	10.5	1,359
<i>120 Peffer Rd Community Center</i>						
Electricity	3	0	0	3	0.3	13
Natural Gas	16	0	3	16	1.4	275
Subtotal 120 Peffer Rd Community Center	19	0	3	19	1.6	288
<i>Eastmont Park Road</i>						
Electricity	1	0	0	1	0.1	5
Subtotal Eastmont Park Road	1	0	0	1	0.1	5
<i>James Street</i>						
Electricity	1	0	0	1	0.1	4
Subtotal James Street	1	0	0	1	0.1	4
<i>Miller Street</i>						
Electricity	2	0	0	2	0.2	8
Subtotal Miller Street	2	0	0	2	0.2	8
<b>Subtotal Buildings and Facilities</b>	<b>146</b>	<b>2</b>	<b>17</b>	<b>146</b>	<b>12.4</b>	<b>1,664</b>
<b>Streetlights &amp; Traffic Signals</b>						
<i>Street Lights</i>						
Electricity	790	26	19	794	67.4	3,506
Subtotal Street Lights	790	26	19	794	67.4	3,506
<i>Traffic Signals</i>						
Electricity	48	2	1	48	4.1	213
Subtotal Traffic Signals	48	2	1	48	4.1	213
<b>Subtotal Streetlights &amp; Traffic Signals</b>	<b>838</b>	<b>28</b>	<b>20</b>	<b>842</b>	<b>71.5</b>	<b>3,719</b>

	<b>CO</b> <b>2</b> <b>(tons)</b>	<b>NO</b> <b>2</b> <b>(lbs)</b>	<b>CH</b> <b>4</b> <b>(lbs)</b>	<b>Equiv CO</b> <b>2</b>		<b>Energy</b>
				<b>(tons)</b>	<b>(%)</b>	<b>(MMBtu)</b>
<b><i>Wilkins Township, Pennsylvania</i></b>						
<b>Vehicle Fleet</b>						
<i>Fire Marshall/Code Enforcement</i>						
Gasoline	0	0	0	0	0.0	5
Subtotal Fire Marshall/Code Enforcement	0	0	0	0	0.0	5
<i>Police</i>						
Gasoline	100	3	6	100	8.5	1,277
Subtotal Police	100	3	6	100	8.5	1,277
<i>Public Works</i>						
Diesel	65	0	0	66	5.6	812
Gasoline	24	1	1	24	2.0	304
Subtotal Public Works	89	1	2	89	7.6	1,116
<b>Subtotal Vehicle Fleet</b>	<b>189</b>	<b>4</b>	<b>8</b>	<b>190</b>	<b>16.1</b>	<b>2,398</b>
<b>Subtotal Wilkins Township, Pennsylvania</b>	<b>1,173</b>	<b>35</b>	<b>44</b>	<b>1,179</b>	<b>100.0</b>	<b>7,781</b>
<b>Total</b>	<b>1,173</b>	<b>35</b>	<b>44</b>	<b>1,179</b>	<b>100.0</b>	<b>7,781</b>

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