

**City of Fort Wayne
Baseline Energy Usage Report**

**City Baseline 2003
Community Baseline 1999**

Energy & Environmental Services Department

October 2nd, 2007

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Executive Summary

The City of Fort Wayne has prepared a baseline of energy use and associated emissions to the atmosphere that includes both the City's operations, industrial, commercial and residential.

A baseline is defined as a measurement, calculation, or location used as a basis for comparison. This baseline of energy use and emissions was developed to establish the quantities of energy, electricity, natural gas and liquid fuels, which the City was using in the baseline year. This information will be used to track the progress of energy conservation, the impact of using renewable sources, and to determine our carbon footprint.

This baseline is the first ever compilation of energy usage data for Fort Wayne and, as such, was a learning process for us. This document will be revised as additional or better data becomes available and the protocols for estimating emissions are refined.

The baseline years compiled in this report are 1999 for community estimates and 2003 for City operations. We have included in this baseline document some forecasts for future years.

Highlights:

Focusing on electricity use will produce larger reductions in carbon dioxide and will reduce mercury, fine particulate matter and other products of combustion more than equivalent reductions in the use of natural gas, due to the very high percentage of electricity from coal fired power plants.

The largest use of energy, as a percent of the total, by City government is building operation, accounting for 35%

Water and wastewater treatment and pumping is second at 24%

By fuel type the City uses 36% in electricity. Second is gasoline at 25% followed closely by 24%.

Energy Data Collection and Analysis

Two software packages were used to analyze the City of Fort Wayne's energy use. The first one was created by EPA's Energy Star program and is called Portfolio Manager. The Building Portfolio tracks energy use of each individual city owned building allowing monitoring of performance and cost information, viewing improvements to past performance, and share building data with others inside and outside the City. This program also gives each building an energy performance rating on a scale of 1 – 100 relative to similar buildings nationwide. The ratings account for weather variations as well as key physical and operating characteristics (such as number of occupants and hours of operation). Buildings that receive a rating of 75 or better may qualify for the ENERGY STAR labeling that you see on many appliances and computers. Information entered into this software includes building name, location, monthly energy usage, and total floor space. Energy use data was collected from AEP and NIPSCO and building information was provided by Dan Brenner, City Facilities Manager.

The second software package used was created by the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO), the International Council for Local Environmental Initiatives (ICLEI), and Torrie Smith Associates called the Clean Air and Climate Protection (CACCP) Software. This software takes data entered on energy use and energy use reductions and converts it to emissions of greenhouse gases and criteria pollutants (please note that emissions resulting from electricity consumption are emitted at the source of production). This software collects data from both government and community sectors for all types of energy use – not just buildings – including transportation and waste management. After the baseline inventory is created future years can be forecasted based on expected growth to obtain a “business as usual” scenario, and measures to reduce emissions can be evaluated. Data for this software was collected from a large variety of sources and many assumptions were made due to lack of availability of city specific data. The sources used and the assumptions made for each sector are discussed in the following sections. Also, the assumptions made in forecasting are listed in the following sections.

Community Baseline and Forecasts

General Info

Following are several statistics relating to the Fort Wayne community that complement the remainder of the report (1999 data):

- Residential
 - 46,085 households
- Commercial
 - 82,432,000 sq ft of space
 - 92,800 employees
 - 7,225 establishments
- Industrial
 - 39,416,000 sq ft of space
 - 104,900 employees
 - 1285 establishments

Baseline

For the community baseline, data was found to be most available for the year of 1999. Several sources were used including: Fort Wayne Census data, INContext reports, the BTS Transportation Profile for Indiana, Bureau of Transportation, the City's solid waste department, and an USEPA solid waste report and GM Methane recovery report. The transportation and waste sectors contain exact quantitative data, but the residential, commercial, and industrial sectors energy use data proved difficult in finding exact quantitative data and had to be calculated using assumptions and state information. Based on the total number of households in Fort Wayne and an estimated energy use per Indiana household the community energy use was estimated. From this number and a breakdown of energy use by sector and fuel type for the state of Indiana estimations were made for the commercial and industrial sectors. Information entered into the ICLEI software includes: electricity and natural gas usage for the residential, commercial, and industrial sectors; vehicle miles traveled for the City of Fort Wayne; and amount of waste sent to landfills and estimated breakdown of waste and estimated percent of methane recovery. After entering this information the software calculates greenhouse gas emissions and criteria air pollutant emissions for each sector. Following are several graphs and charts displaying the results calculated by the software and a brief summary of the results.

Figure 1

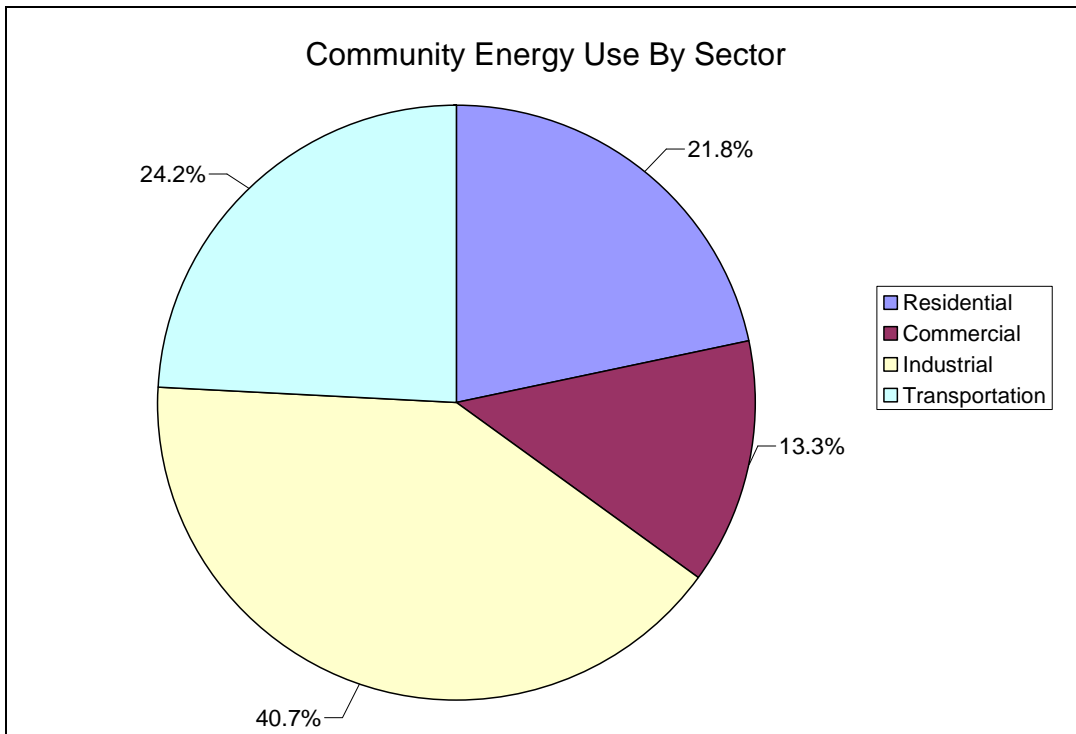


Figure 2

1 tonne = 1.1 tons

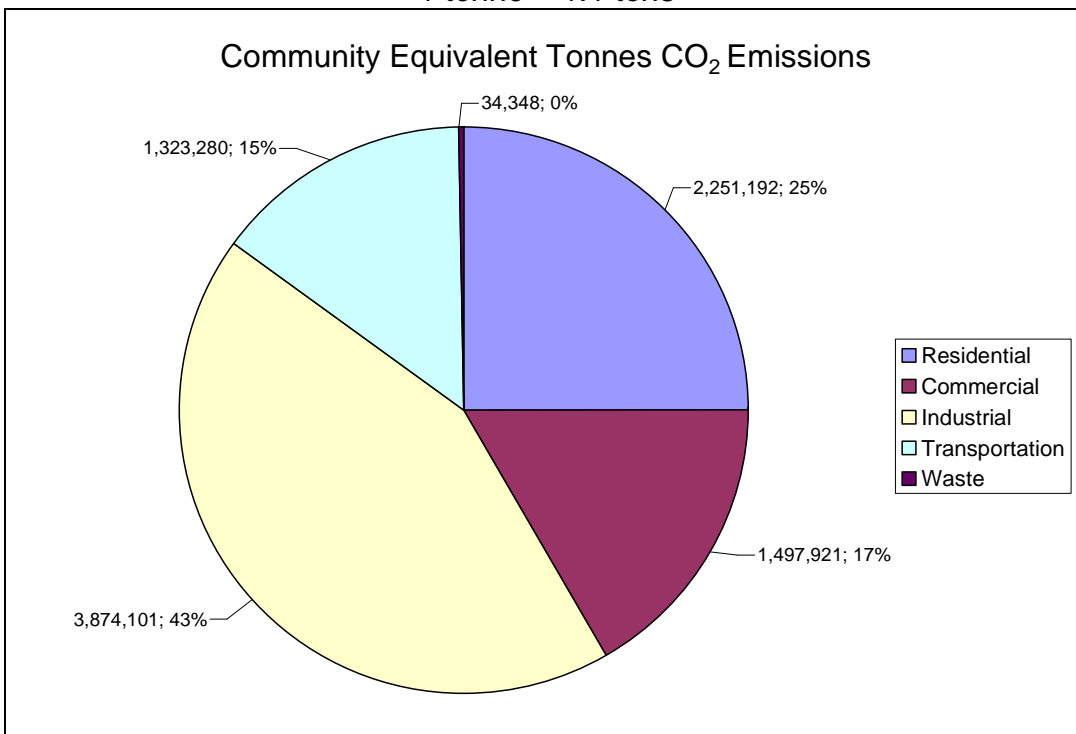


Figure 3

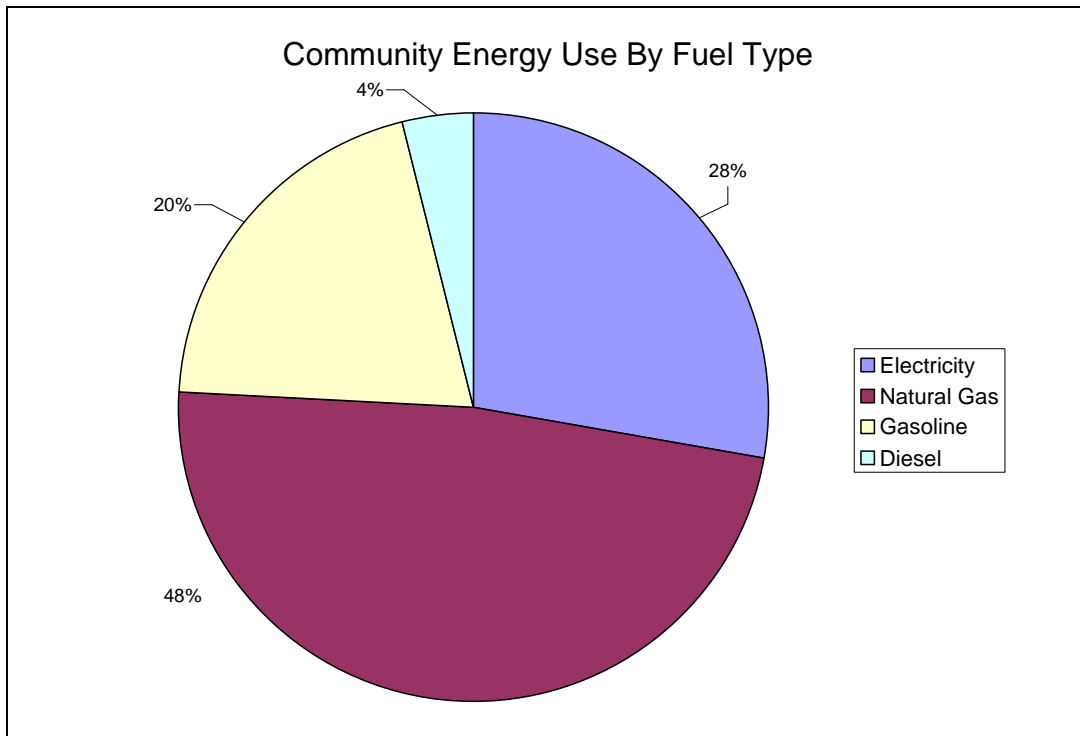


Figure 4

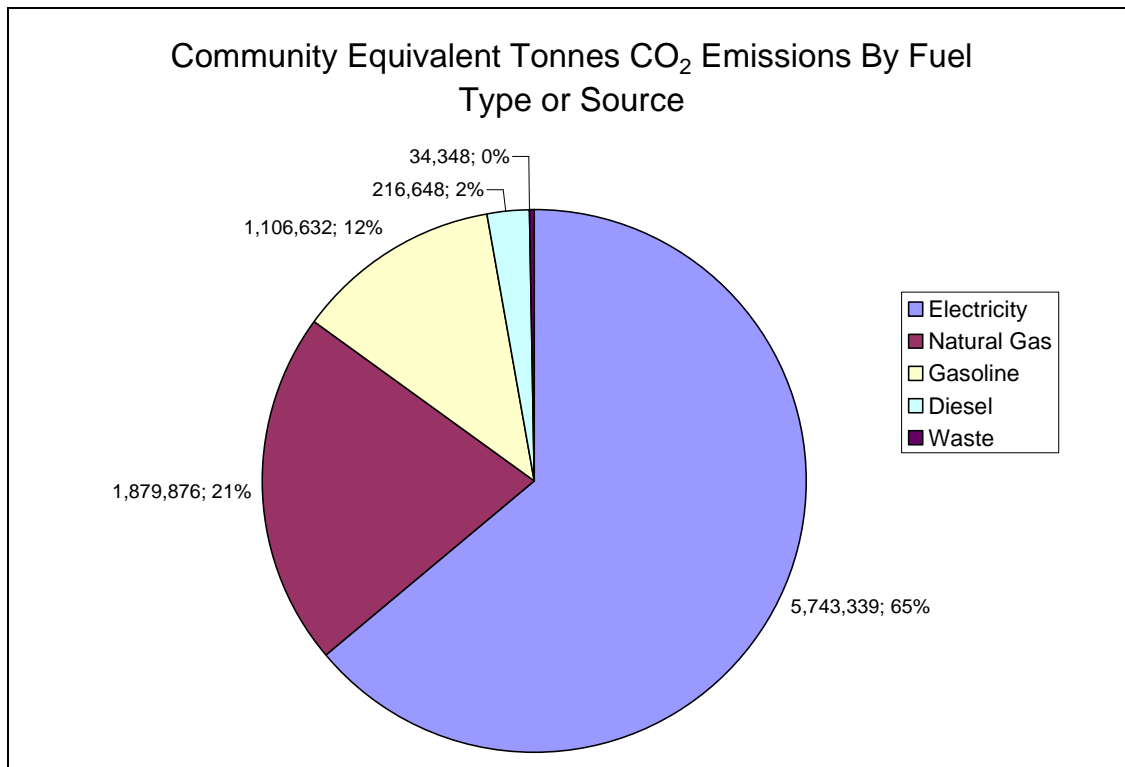


Figure 5

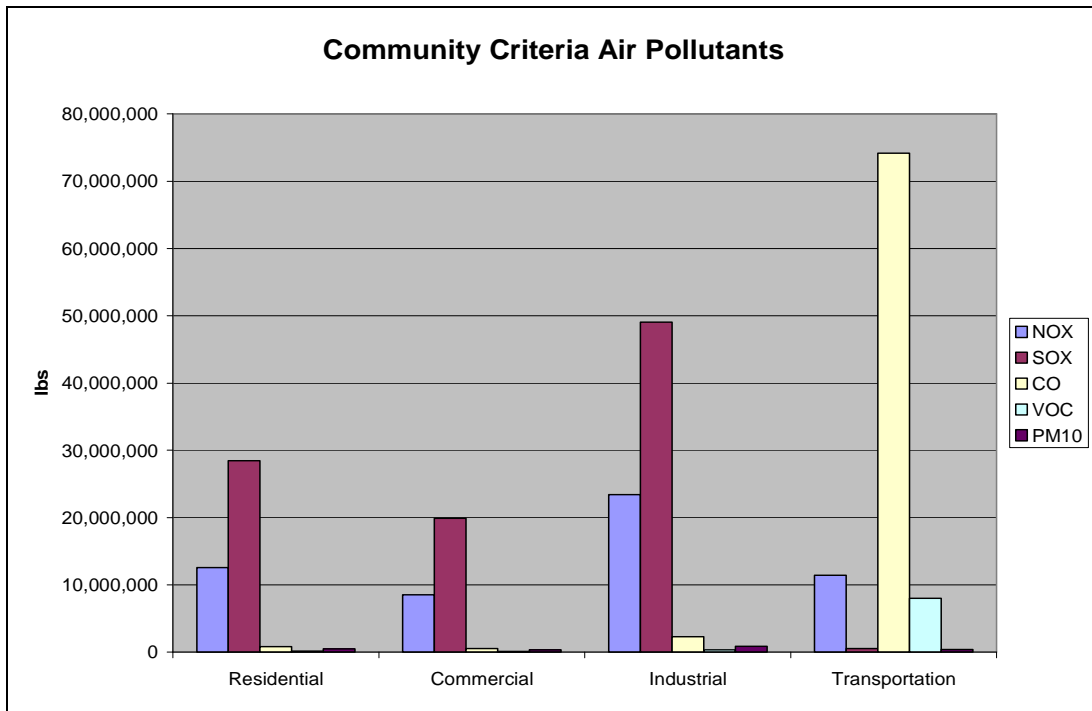


Figure 1 shows that the biggest energy user in the community is the industrial sector, transportation and residential are about half of that, and commercial uses about a third of the industrial energy. Figure 2 shows a similar distribution in regards to greenhouse gases emitted by each of the sectors, again with the industrial sector being the greatest emitter. Natural gas accounts for approximately 50% of the energy use derived from fuel in the community, with electricity and gasoline accounting for about half that amount, and diesel accounting for about 4% as shown in Figure 3. Comparing Figure 3 with Figure 4, one can see that while electricity accounts for about 30% of the total energy usage in Fort Wayne, it emits 65% of the greenhouse gases. Natural gas accounts for 21% of the greenhouse gas emissions (while it accounts for almost half of the energy used). In Figure 5, it can be seen that two of the leading criteria pollutants in the area are NO_x and SO_x which are the result of energy use in the residential, commercial, and industrial sectors (electricity and natural gas). Another major pollutant is carbon monoxide (CO) from the transportation section, the result of incomplete combustion of gasoline and diesel.

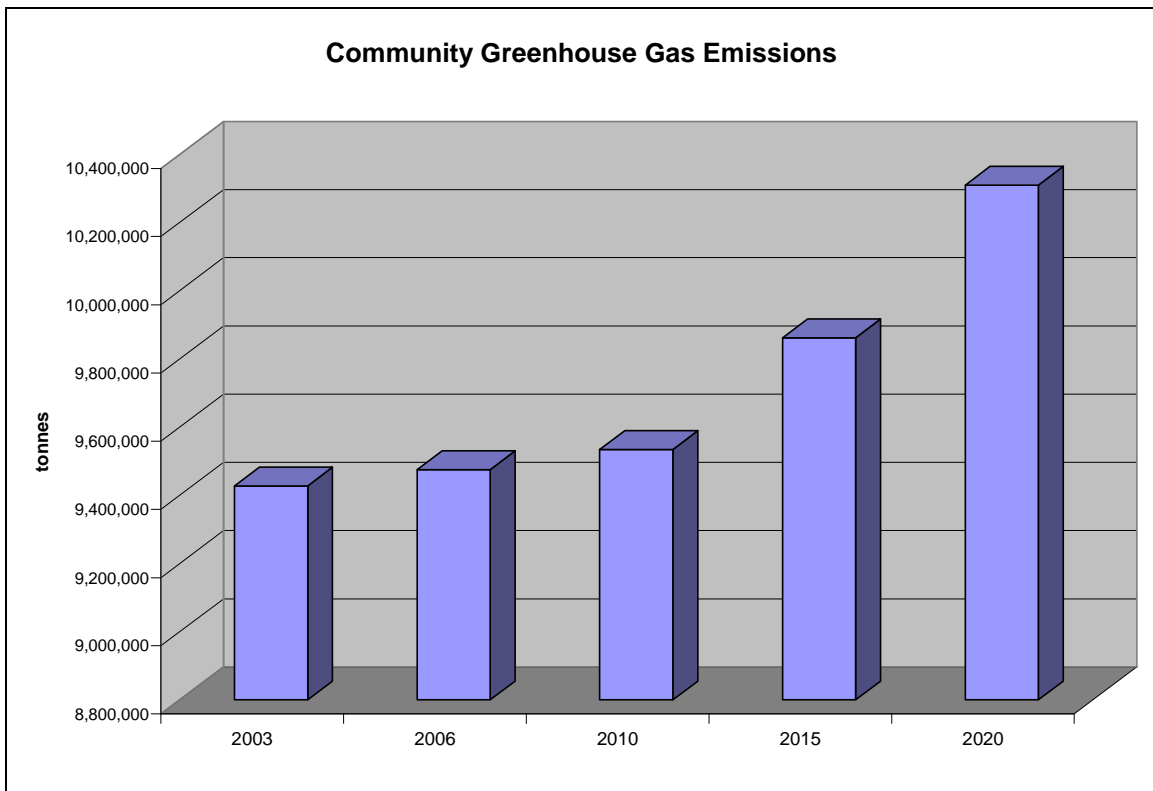
Forecast

Once a baseline is completed in CACP software, growth factors can be applied to estimate future emissions based upon business as usual activities. Following is a chart that displays the growth factors used for each sector – these are on a per year basis and were taken from the same sources mentioned at the beginning of this section.

Residential	0.79%
Commercial	1.24%
Industrial	0.74%
Transportation	0.785%
Waste	0.79%

Once the growth factors are entered for each section the CACP software will estimate energy use and emissions for any year based on the data entered for the baseline year. The following chart shows the results of this forecasting feature.

Figure 6



The scenario depicted above is for a business as usual progression assuming no energy conservation measures are put into place to counteract the growth. Looking ahead, the increase of emissions by Fort Wayne’s community is approximately 1,000,000 tonnes, or a 10% increase.

Government Baseline and Forecasts

General Info

Following are several statistics relating to the City of Fort Wayne that complement the remainder of the report (2006 data):

- Number facilities used in study
 - Animal Control 1
 - Fire 18
 - Fleet Mgmt 2
 - Park 35
 - Police 3
 - Traffic 1
 - City-County/Courthouse 2
 - Water Treatment 1
 - Wastewater Treatment 1
 - Waste 1
 - Street 7

- 33,250 streetlights
- 413 traffic signals
- 1,858 employees

Baseline

The government baseline was created using data from the year 2003. Several internal departments (i.e. lighting) were used for gathering data along with information collected from AEP and NIPSCO for energy use data for the government owned buildings. The majority numbers entered into this section were actual recorded values, estimations were made for the streetlights and traffic signals because these are non-metered. Information that was entered into the ICLEI database includes: electricity and natural gas usage for all buildings; electricity usage by all streetlights and traffic signals; fuel usage by employees for commuting to work; fuel usage by the city fleets; electricity, natural gas, and bio-methane usage by the water and wastewater treatment plants; and the amount of waste collected from each department. As with the community section, after the data is entered the software calculates greenhouse gas emissions and criteria air pollutant emissions for each sector. The information for each sector was also taken and redistributed to determine emissions and energy usage for each of the city's departments. Following are several graphs and charts displaying the results calculated by the software and a brief summary of the results.

Figure 7

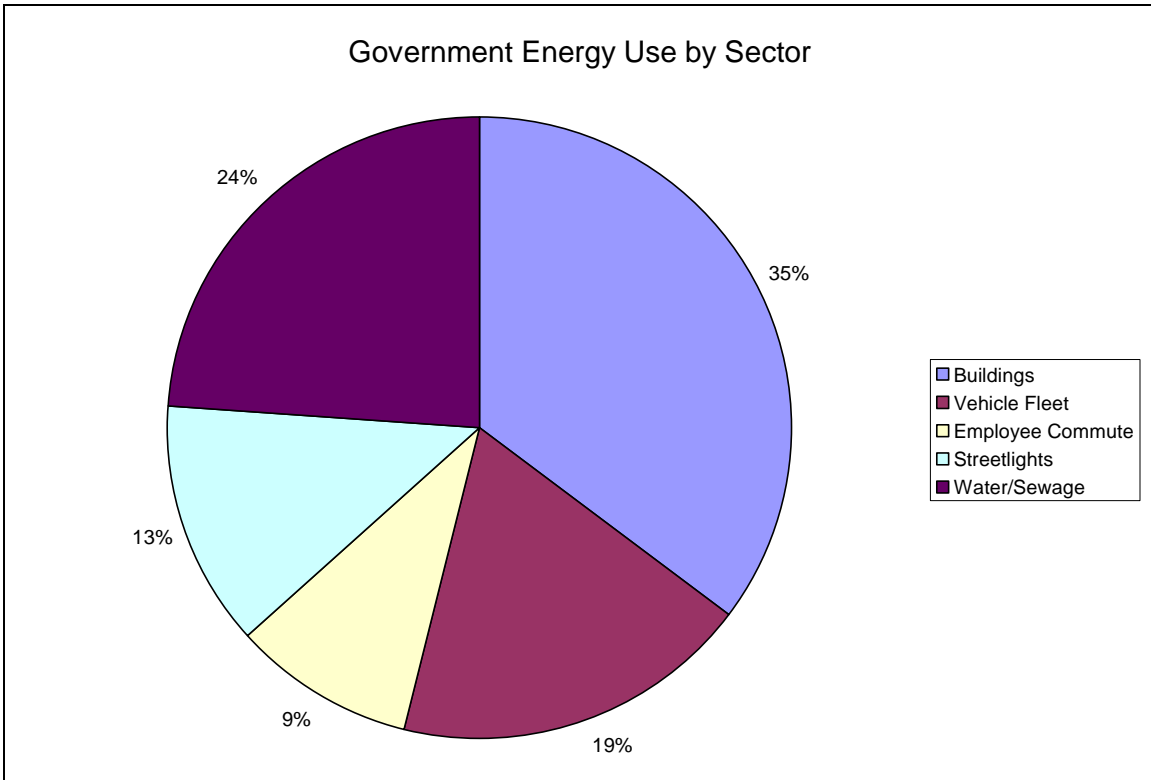


Figure 8

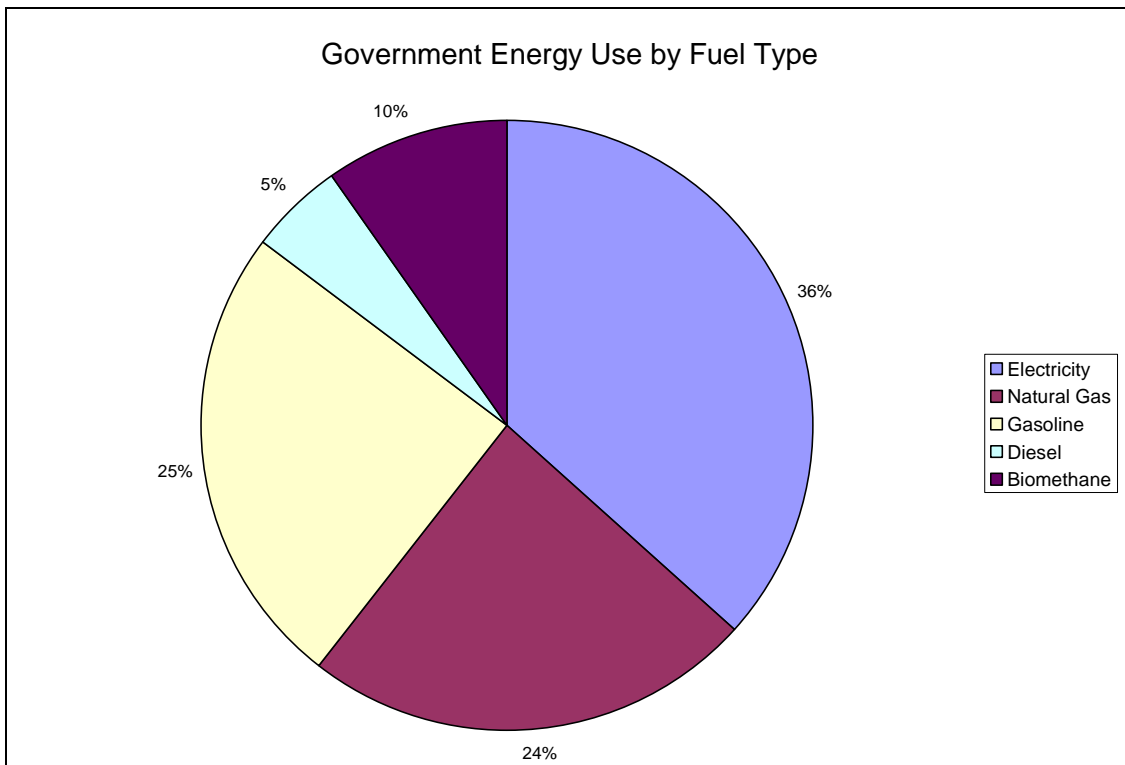


Figure 9

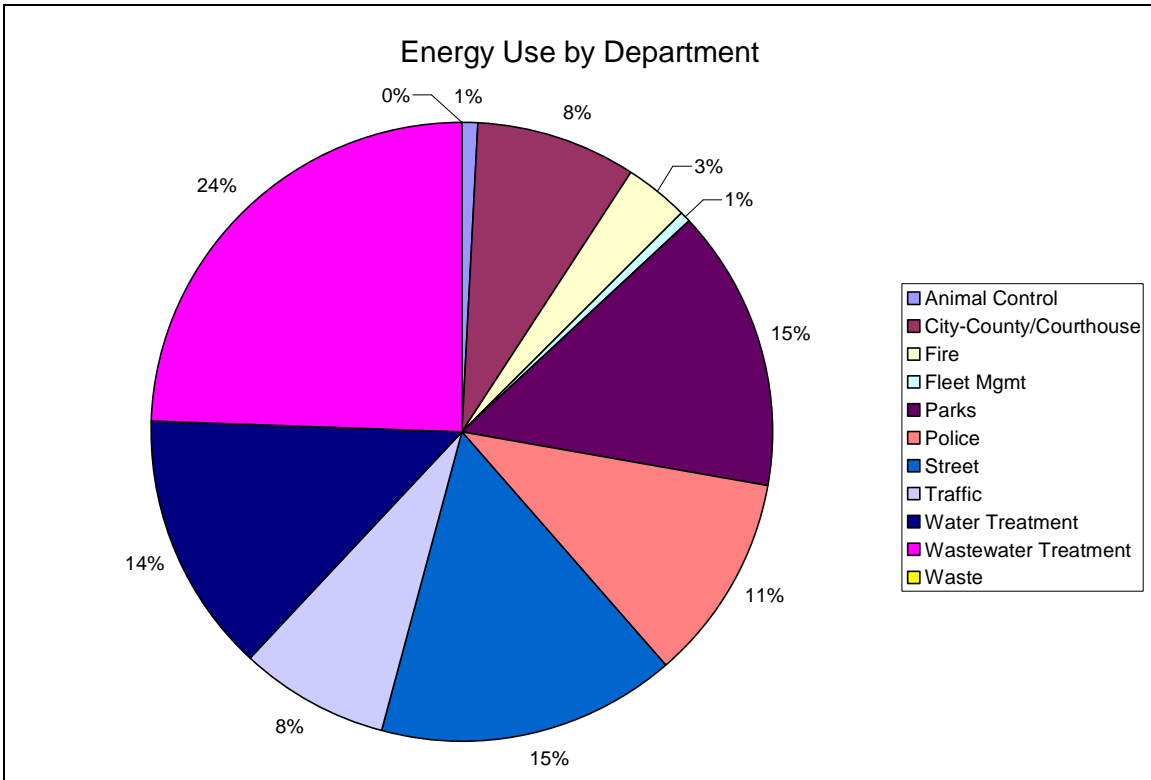


Figure 10

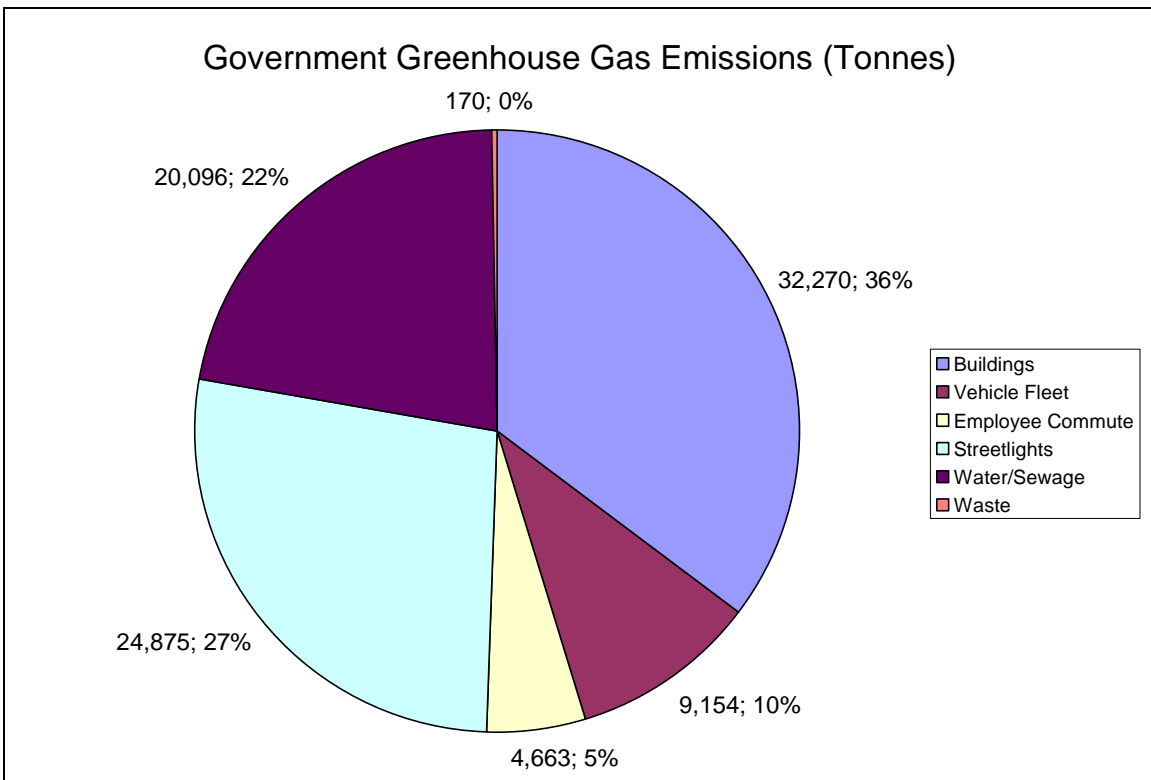


Figure 11

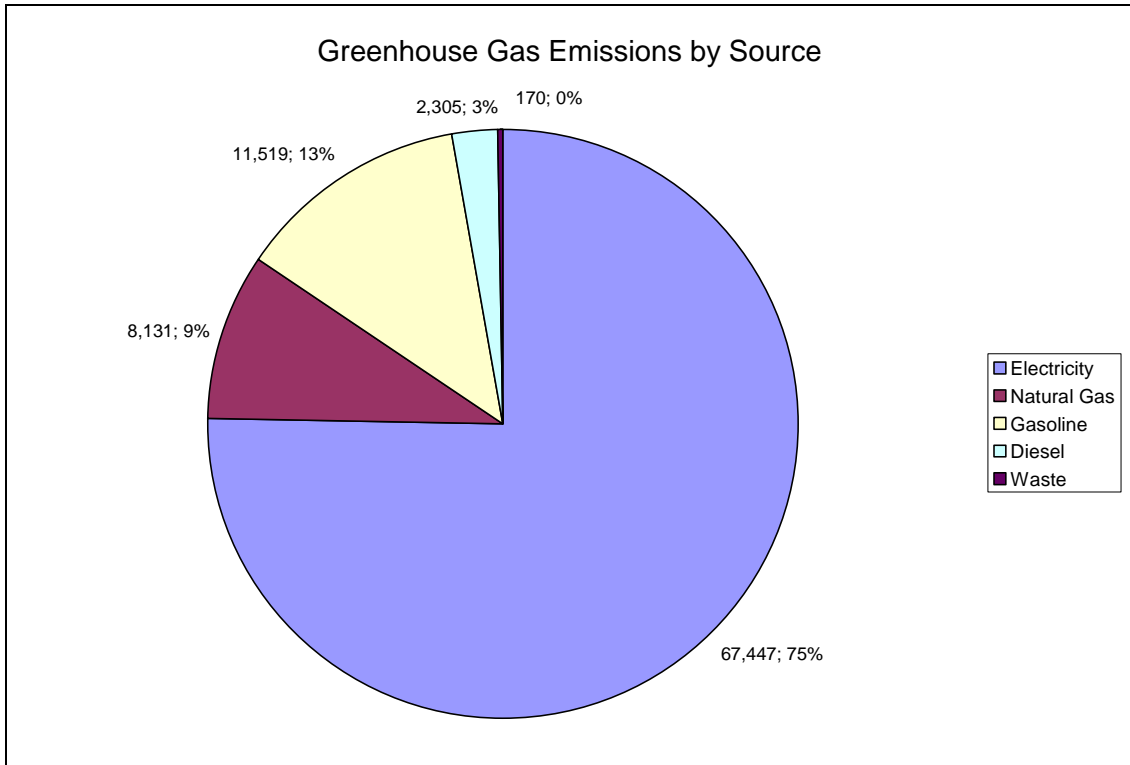


Figure 12

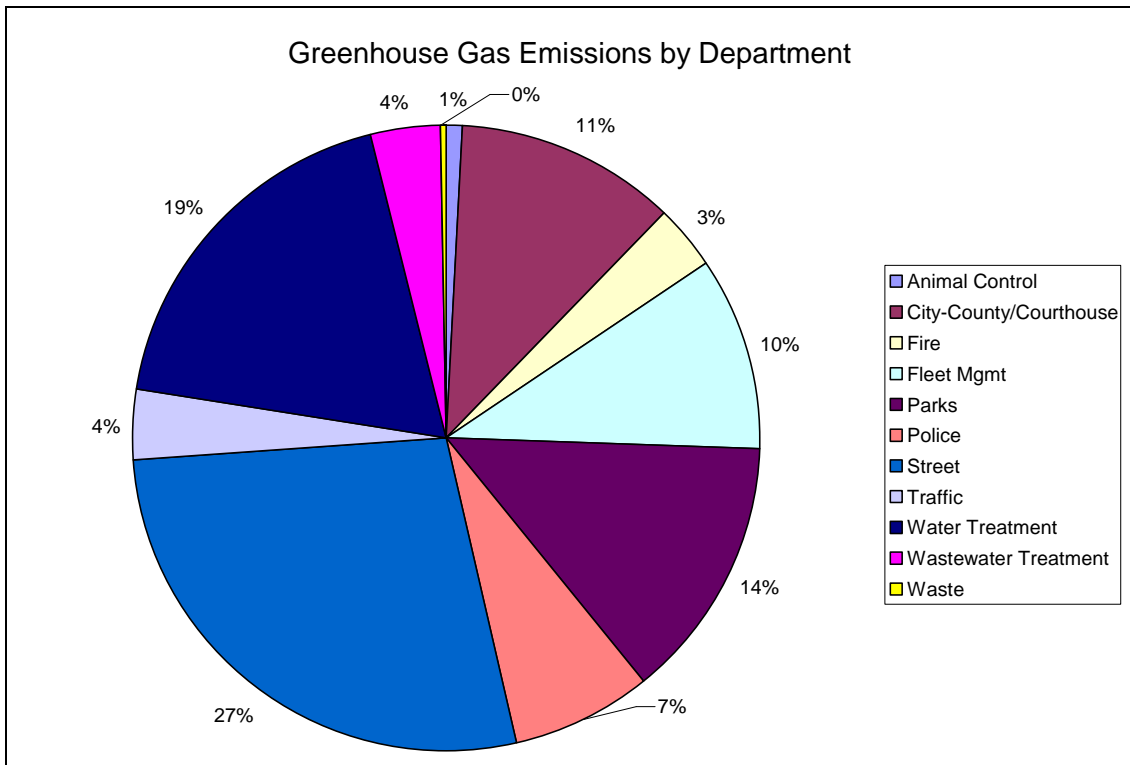


Figure 13

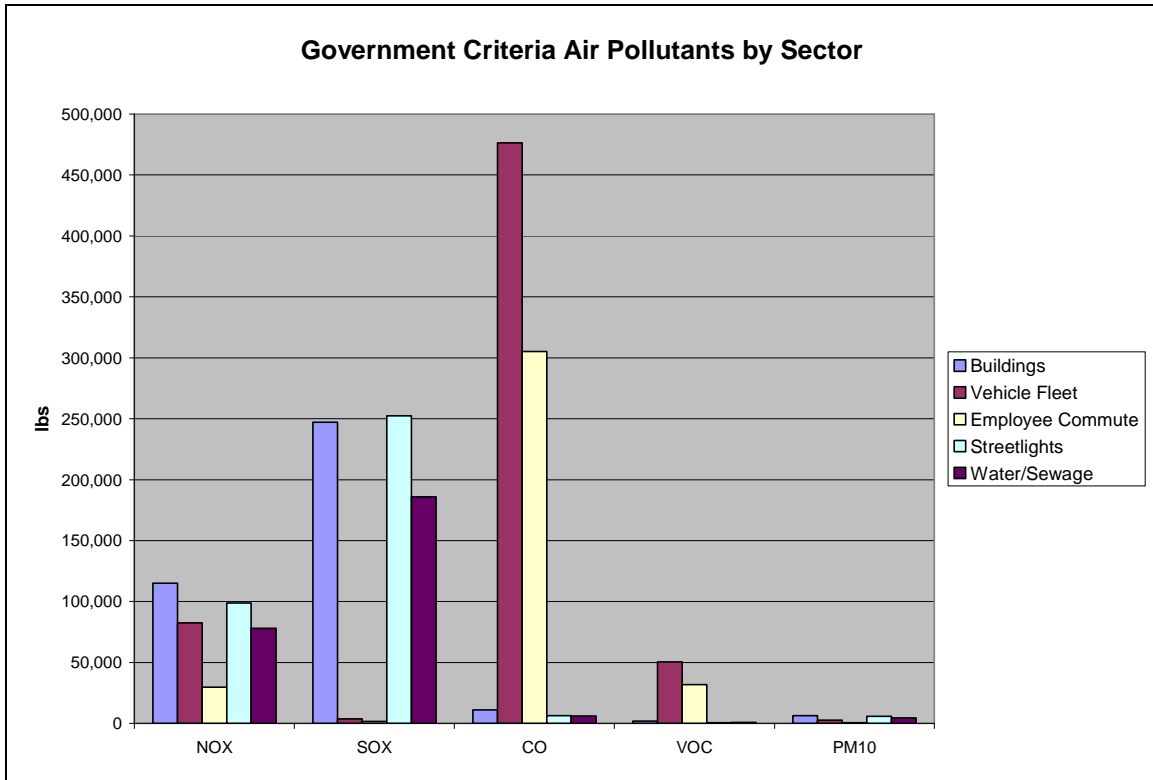


Figure 14

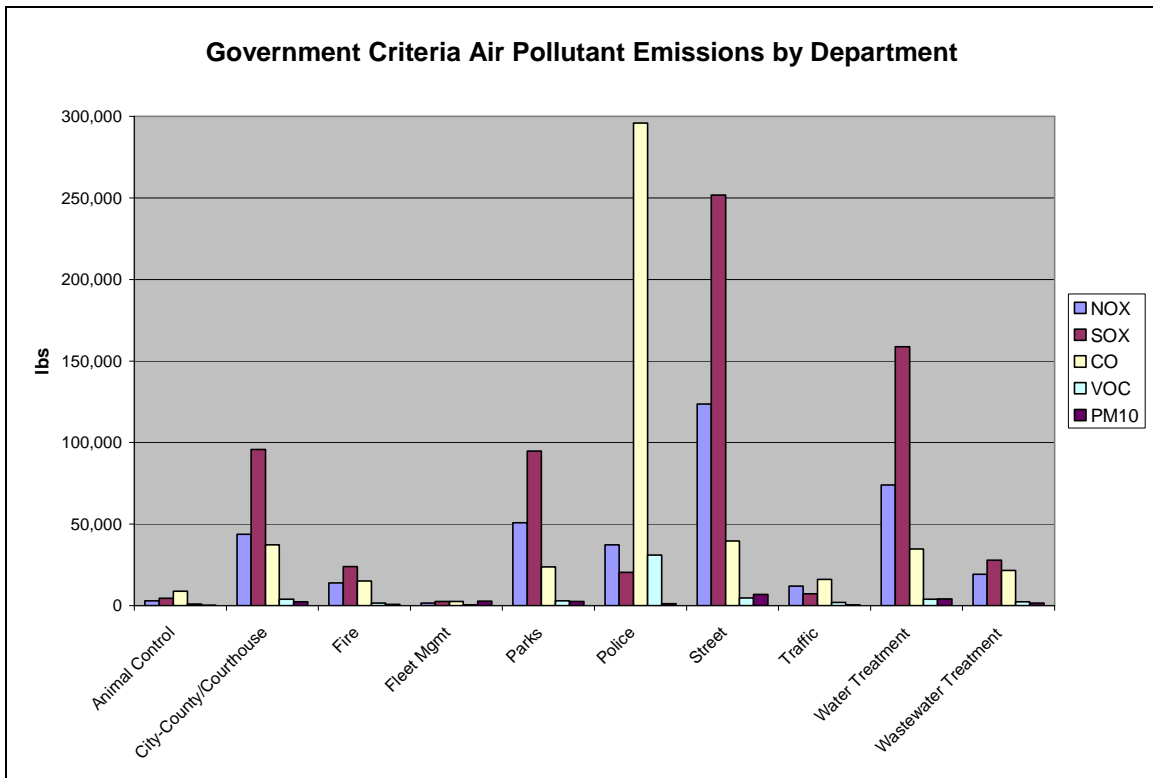


Figure 1 shows that the biggest energy consumer within the government sectors is the buildings, followed by the vehicle fleet, water/sewage, streetlights, and the employee commute. The city's most consumed type of energy is electricity, natural gas and gasoline and a small amount for diesel usage. Looking at Figure 9, the four biggest consumers of energy within the city departments are: fleet management (which includes fuel for all city owned vehicles, not separated out by department, waiting on data from fleet management), parks, street, and water treatment (filtration plant). Looking now at greenhouse gas emissions, the largest emitting sectors are the buildings, water/sewage, and streetlights. Figure 11 shows us that 75% of the emissions of greenhouse gases are coming from electricity consumption alone! This supports the previous statement of the biggest emitting sectors, because they are large electricity consumers. The city departments that are the major emitters of greenhouse gases are street, water treatment, parks, and the City-County/Courthouse (City-County/Courthouse, while owned and operated by Allen County, were included due to large City staff use and leasing) buildings; together emitting 78% of the total for the city. Similar to what was seen in the community section the greatest amounts of criteria air pollutants emitted are NO_x, SO_x, and CO – greatest emitters being large consumers of electricity and gasoline.

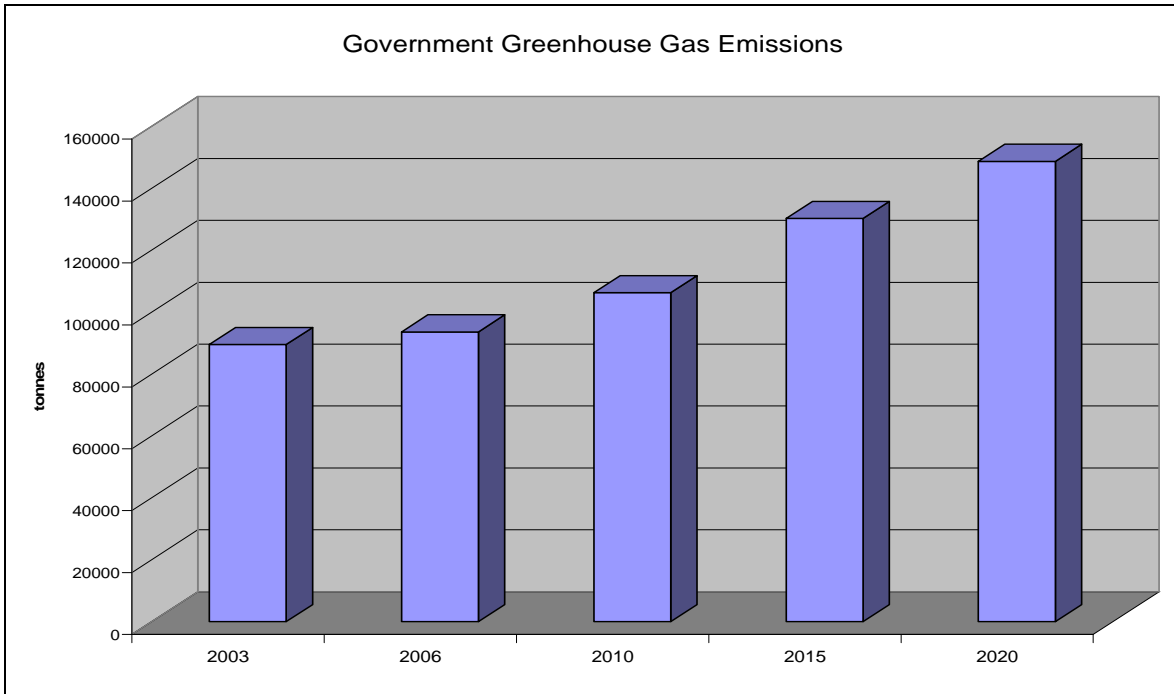
Forecast

Just as with the community section, when the baseline had been completed for the government section, growth factors can be applied to estimate future emissions based on business as usual activities. Following is a chart that displays the growth factors used for each sector – these are on a per year basis and estimated from recent years of energy/fuel consumption and waste disposal data taken from the same sources as the baseline.

Vehicle Fleet	
Gas	4.33%
Diesel	7.61%
Employee Commute	2.42%
Streetlights	3.63%
Water/Sewage	
Electric	-1.53%
Natural Gas	29.4%
Waste	2.42%
Buildings	2.42%

Once the growth factors are entered for each section the CACP software will estimate energy use and emissions for any year based on the data entered for the baseline year. The following chart shows the results of these forecasts for several future or past years.

Figure 15



The scenario depicted above is for a business as usual progression assuming no energy conservation measures are put into place to counteract the growth. Looking ahead, the increase of emissions by Fort Wayne's local government is approximately 59,000 tonnes, or a 66% increase.