

City of Franklin, Tennessee

Local Government Operations Inventory and Community Analysis



HISTORIC
FRANKLIN
TENNESSEE



Local Government and Community Inventory for Franklin, Tennessee

This report was produced at the request of the Sustainability Commission.

Published August 2010

Electricity, natural gas, and fuel consumption for municipal operations and for the Franklin community as a whole are described herein.

The following goals have been set forth in the 2009 Sustainable Community Action Plan:

Energy Action 2 seeks to reduce total Citywide usage by 20% per capita by 2014.

Energy Action 3 proposes a 7% reduction of greenhouse gas emissions by 2014.



The following organizations and departments made important contributions:

ICLEI Local Governments for Sustainability
Franklin Sustainability Commission
Franklin Energy Committee
City of Franklin Planning & Sustainability Department
City of Franklin Purchasing Department
City of Franklin Finance Department
City of Franklin MIT department
Middle Tennessee Electric Membership Corporation
Atmos Energy



Table of Contents

	<u>Page Number</u>
I. Key Points	5
II. About ICLEI Local Governments for Sustainability	6
III. Overview of Process	7
IV. Local Government Operations Inventory	8
II. Map of City Facilities	9
III. Total Cost	10
IV. Electricity Cost & Usage	11
V. Outdoor Lighting	12
VI. Fleet Fuel Usage	13
VII. Employee Commute	14
VIII. Total GHG emissions	15
V. Community Inventory	16
II. Community GHG Emissions	17
III. Energy Usage	18
IV. Natural Gas Consumption	19
V. Transportation Costs	20
VI. Community GHG Forecast	21
VI. Reduction Target	22

I. Key Points from 2008

The Waste Water Treatment Plant consumed 47% of all municipal electricity in 2008

All six fire departments combined used over 50% less energy than City Hall

Outdoor lighting made up nearly 25% of all municipal energy usage

The total energy cost to the city was approximately \$4.0 million

II. What is ICLEI? International Council for Local Environmental Initiatives

The International Council for Local Environmental Initiatives, better known as ICLEI Local Governments for Sustainability, is an international non-profit membership association of local governments dedicated to climate protection and sustainable development. The organization was established in 1990 with more than 200 local governments from 43 countries and has grown to over 1,100 members internationally.

ICLEI USA was founded in 1995 with a small group of local government members and has grown to a vibrant network of over 600 local governments taking significant action to quantify and reduce their greenhouse gas emissions while improving overall community sustainability. The mission of ICLEI USA is to build, serve, and support a movement of local governments to advance reductions in greenhouse gas emissions and achieve tangible improvements in local sustainability.

ICLEI provides programs, tools, software assistance and technical and policy expertise to help local governments quantify and reduce their greenhouse gas emissions (icleiusa.org).

ICLEI's Cities for Climate Protection® (CCP) Campaign consists of five milestones:

Milestone 1. Conduct a local inventory and forecast of greenhouse gas emissions

Milestone 2. Adopt an emissions reduction target

Milestone 3. Draft an action plan to achieve the target

Milestone 4. Implement the action plan

Milestone 5. Evaluate, report on progress, and update plans



III. Overview of Process

At first glance, reporting greenhouse gas emissions is neither a typical exercise for the City of Franklin, nor something that has historically been defined as a municipal priority. But, mitigating the sources of greenhouse gas emissions can improve air quality, reduce traffic, improve the efficiency of municipal operations, decrease operating and maintenance costs, and improve quality of life.

The ICLEI **Clean Air and Climate Protection Software (CACPS)** was used to calculate GHG emissions from City operations including: buildings and facilities, vehicle fleet fuel consumption, employee commute, street lighting, and wastewater and water delivery services. The software was also used to establish a baseline for community-wide emissions.

Atmos Energy provided data on natural gas usage, MTEM generated the total electricity usage, the City of Franklin Finance Department supplied information regarding specific meter numbers, TDOT supplied Vehicle Miles Traveled, a City of Franklin employee survey revealed information regarding commuting patterns, and the Purchasing Department made fleet fuel usage available.

The CACPS is a user-friendly, Windows-based application that converts community-wide and municipal operations energy usage into greenhouse gas and criteria air pollutant emissions. It greatly simplifies the process of performing the emissions analysis, and serves as a great planning tool to calculate the energy, financial, greenhouse gas and air pollutant savings resulting from mitigation measures.

Energy Usage data was gathered for the City's baseline inventory year--Calendar Year (CY) 2008 and then converted into emissions from the three major GHGs – carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) - through the use of activity and equipment-specific emission factors in the CACPS tool. In this report, greenhouse gases are measured in tons of CO₂ equivalent (CO₂ eq.).

This report documents municipal and community wide energy consumption data for Calendar Year 2008 along with the resulting GHG emissions. This process is designed to be replicable and should be repeated in the future to demonstrate improvement. The next step in the ICLEI process is to establish an emissions reduction target and a corresponding plan to advance sustainable operations.

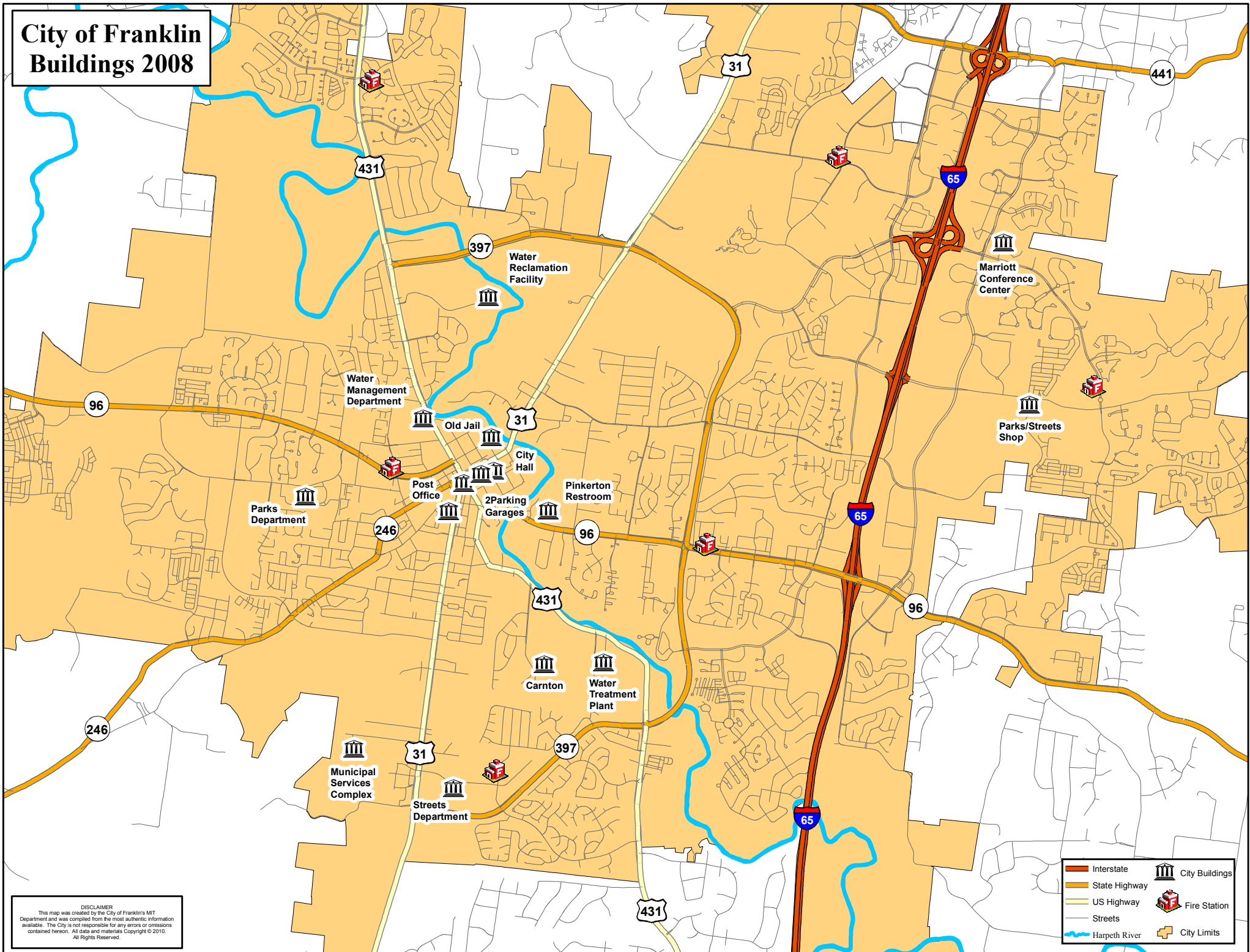
IV. City of Franklin

Local Government Operations Inventory for CY 2008

Documenting Municipal Energy Usage
&
Municipal Greenhouse Gas Emissions



City of Franklin Buildings 2008

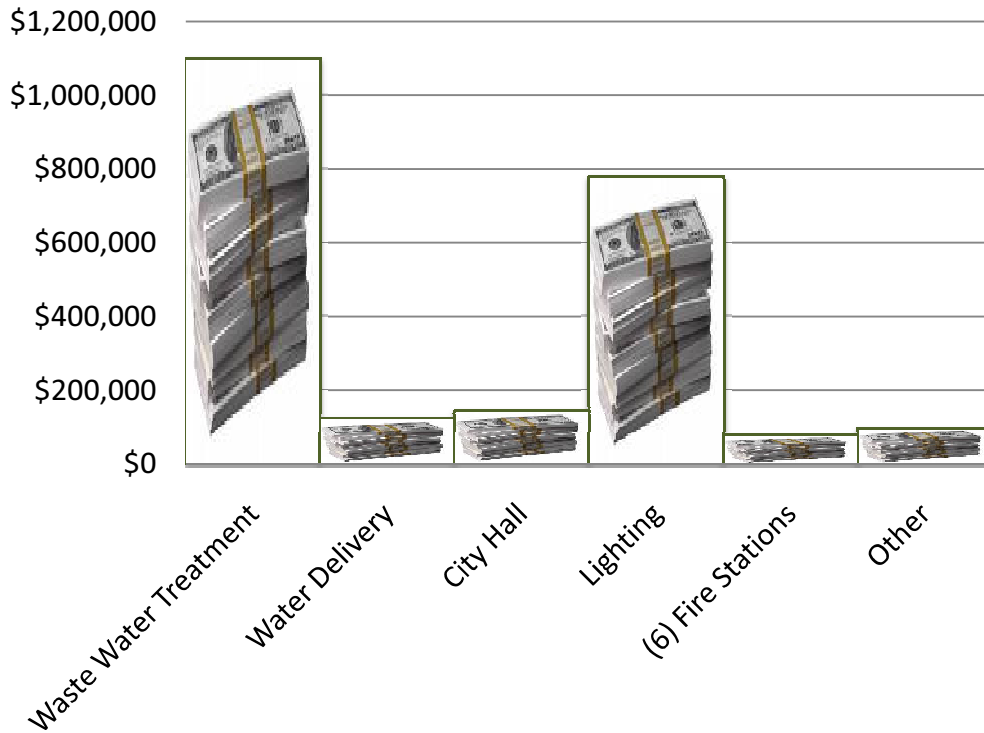


DISCLAIMER
 This map was created by the City of Franklin's MIT Department and was compiled from the most authentic information available. The City is not responsible for any errors or omissions contained herein. All data and materials Copyright © 2010. All Rights Reserved.

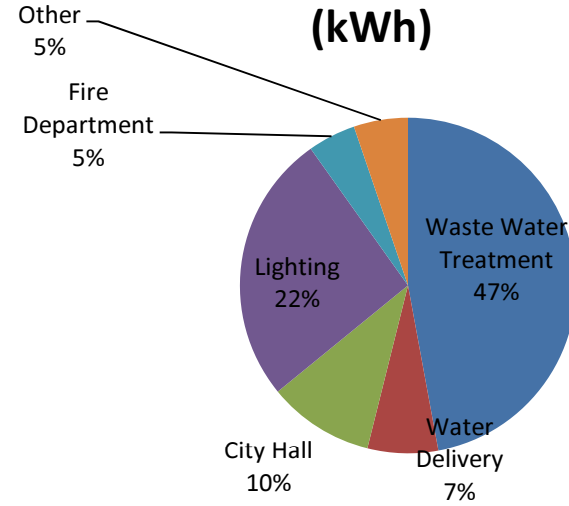
- Interstate
- State Highway
- US Highway
- Streets
- Harpeth River
- City Buildings
- Fire Station
- City Limits

Electricity Cost & Usage

Electricity Cost 2008



Total Electricity Usage 2008 (kWh)

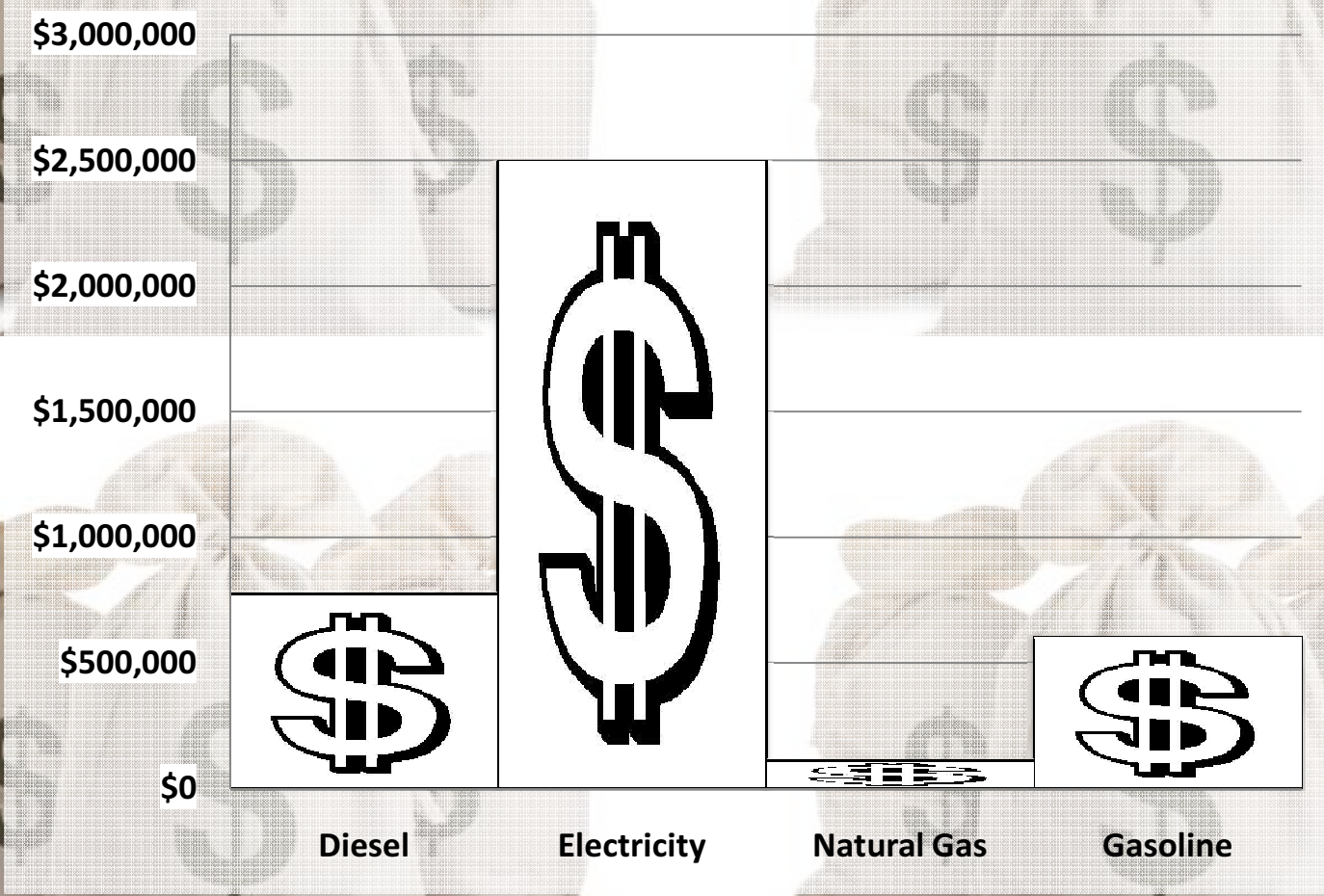


Waste Water Treatment and Street Lighting serve as the City's two most significant energy consumers.

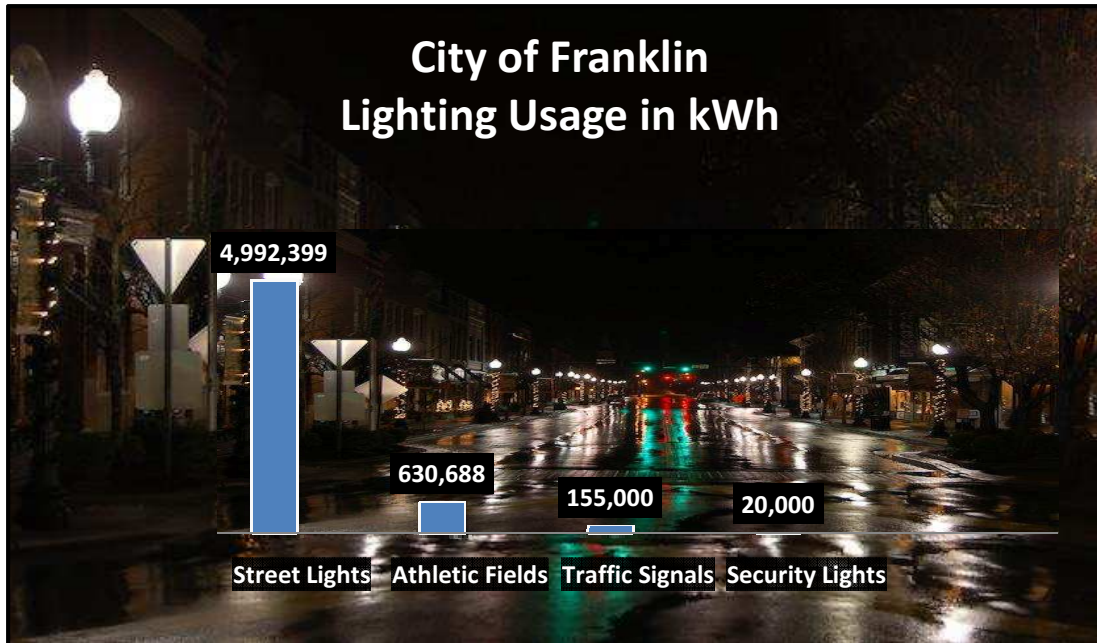
Total energy CY 2008 usage=21,000,000 kWh
Estimated Total CY 2008 Electric Expenses=\$2.5 million



Energy Expenditures CY 2008



City of Franklin Lighting



Lighting makes up nearly a quarter of all City of Franklin GHG emissions.

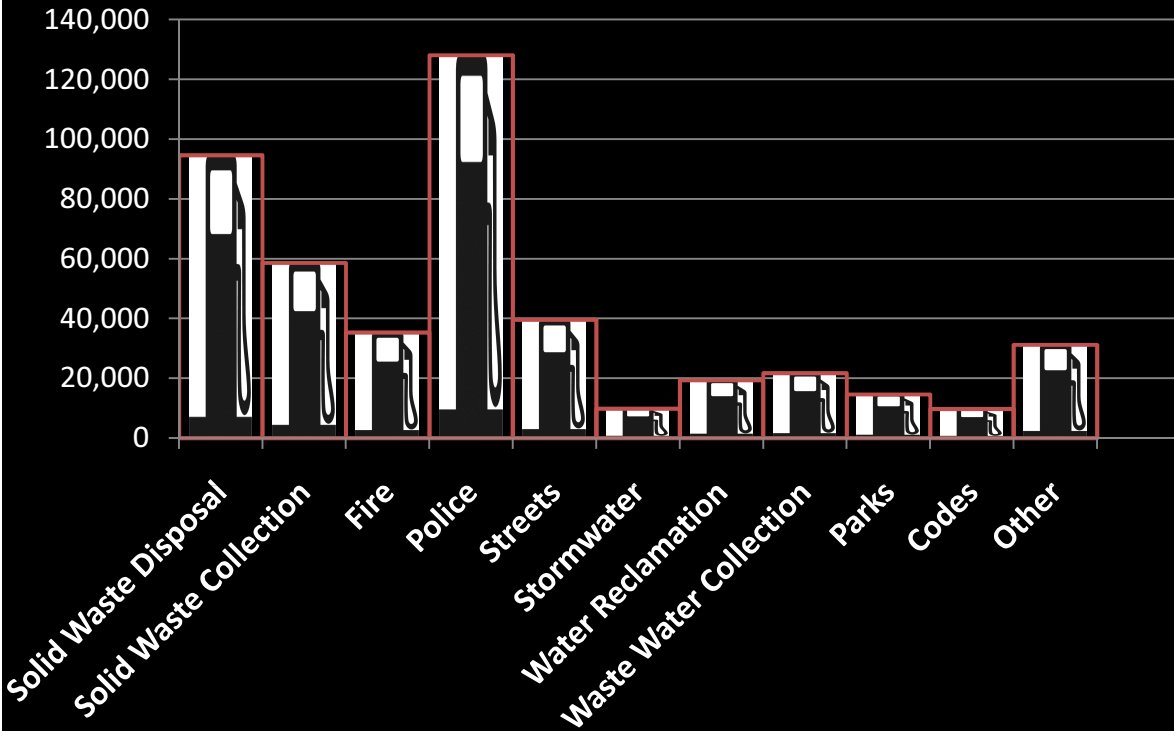
Every traffic signal has been converted to LED lighting which has resulted in low energy usage and a minimal operating cost.

Athletic Field lighting at Jim Warren Park is currently being upgraded to more efficient technology which will further reduce usage and associated costs.

Replacing existing street lights with LED, induction, or other efficient lighting will further decrease operating and maintenance costs as well as GHG emissions.

City of Franklin Fleet Fuel Usage

All Pacific Pride Fuel Usage by Department CY 2008 in Gallons



Total City of Franklin Fuel Usage		
Year	Gallons	Cost
2007	446,738	\$990,514
2008	462,711	\$1,375,953
2009	450,994	\$823,599

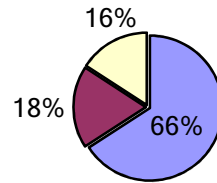


City of Franklin Employee Commute in CY 2008

Where Employees Lived in 2008	Response Percent
Franklin	30.0%
Brentwood	3.0%
Nashville	4.0%
Thompson Station	5.5%
Spring Hill	20.0%
Columbia	5.0%
Murfreesboro	4.5%
Fairview	4.5%
Other	23.5%

Percent Satisfied with the time it takes to get to work?

■ Yes ■ No □ No preference



Time Spent Commuting (One way)

Time	Percent
0-5 Minutes	5.0%
5-10 Minutes	12.5%
10-15 Minutes	12.5%
15-20 Minutes	8.5%
20-25 Minutes	14.0%
25-30 Minutes	10.0%
30-35 Minutes	7.5%
35-40 Minutes	7.5%
40-45 Minutes	11.5%
45+ Minutes	11.0%

Miles Traveled to Work	Response Percent
0-2 miles	7%
2-5 miles	17%
5-10 miles	7%
10-15 miles	19%
15-20 miles	14%
20-30 miles	19%
30+ miles	17%

Has your commute changed since 2008?

Response	Percent
My commute has not changed since 2008	87.5%
My commute is longer than it was in 2008	5.5%
My commute is shorter than it was in 2008	6.5%
I now carpool to work	0.5%

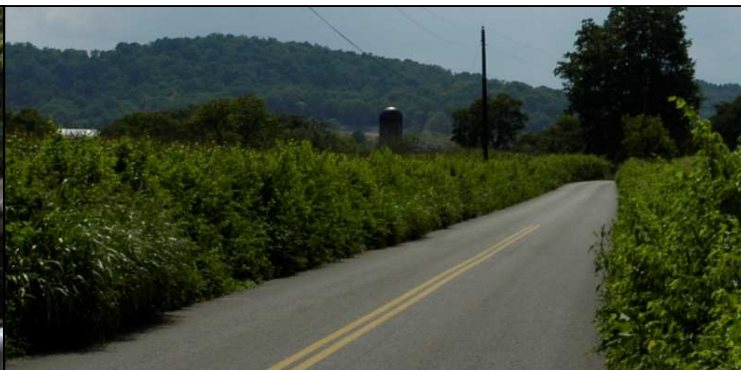
Percent of Employees who worked for the City in 2008

Response	Percent
Yes	97.5%
No	2.5%

How Employees Arrived to Work

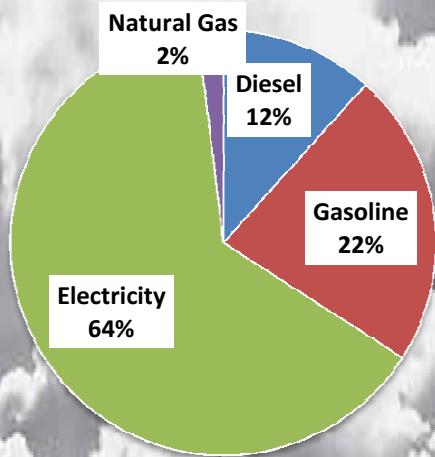
Drive Alone	94.5%
Carpool	5%
Walk	.5%

*207 Employees responded to the survey

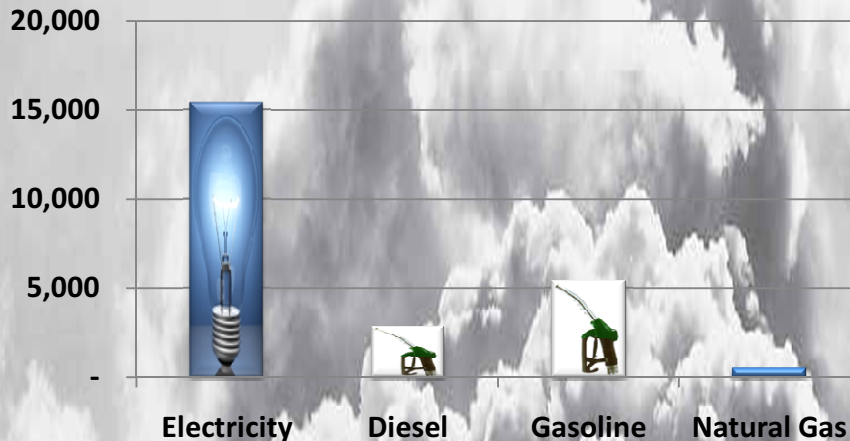


Local Government GHG Emissions

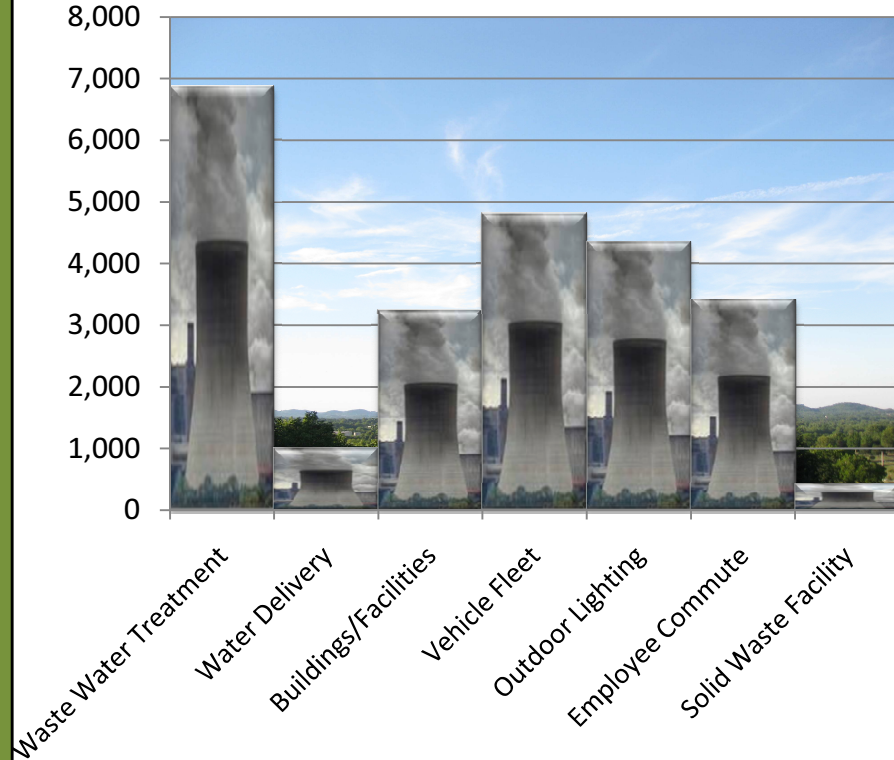
GHG Emissions by Source



City of Franklin GHG Emissions (Tons of CO2 Eq.)



City of Franklin GHG Emissions Summary
Tons of CO2 Eq.



Total Equivalent CO2 Emissions = 24,115 Tons
Total Estimated Energy Cost=\$4 Million
 24,115 Tons=burning 450 railcars worth of coal
 24,115 Tons=amount sequestered by 800 acres of forest

Greenhouse gases are measured in tons of CO2 equivalent using the CACP Software provided by ICLEI where actual energy usage is converted into emissions.

V. Franklin Community Analysis

Documenting Energy Usage & Greenhouse Gas Emissions



“Things do not get better by being left alone”

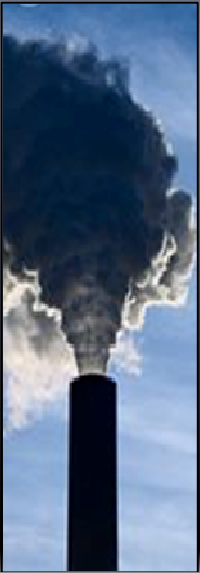
Sir Winston Churchill



Community GHG Emissions

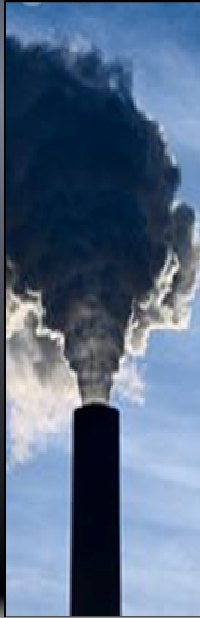
Tons of CO2 Eq. by Sector

304,749



Residential

329,686



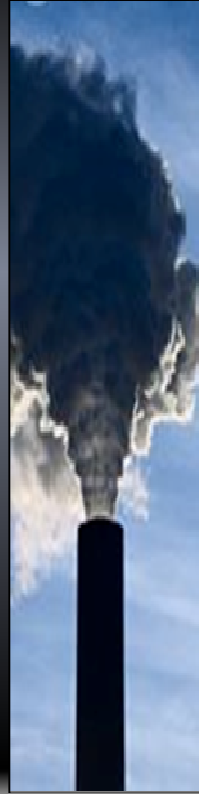
Commercial

90,789



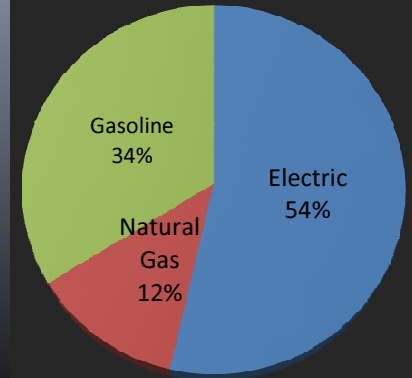
Industrial

424,377



Transportation

Emissions by Source

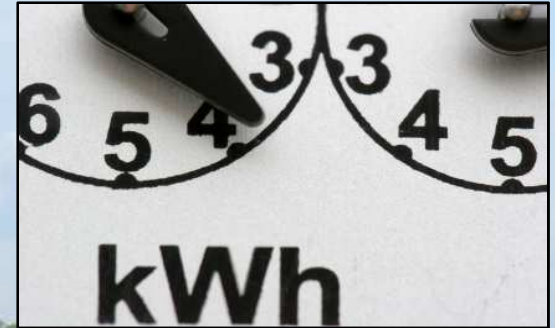
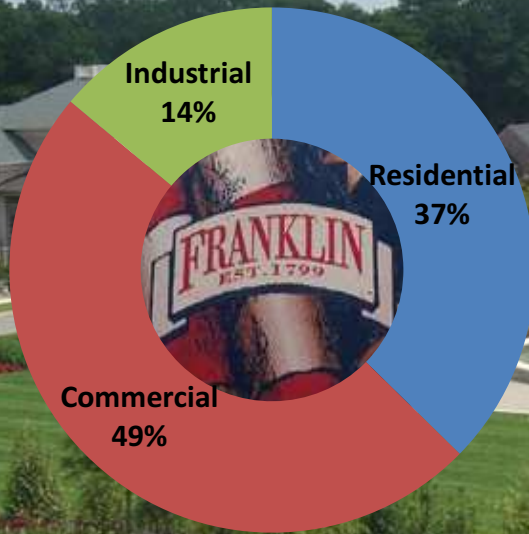


The Future?



Community Electricity Usage and Emissions

GHG Emissions CO2 Eq. By Sector



“Do the common things in life in an uncommon way”

George Washington Carver

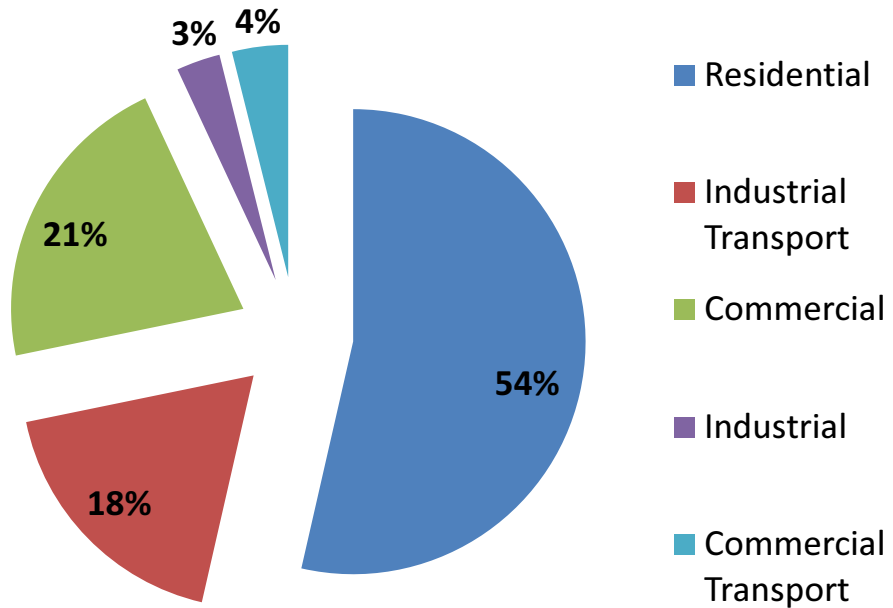


Community GHG Emissions Resulting from Electricity Usage

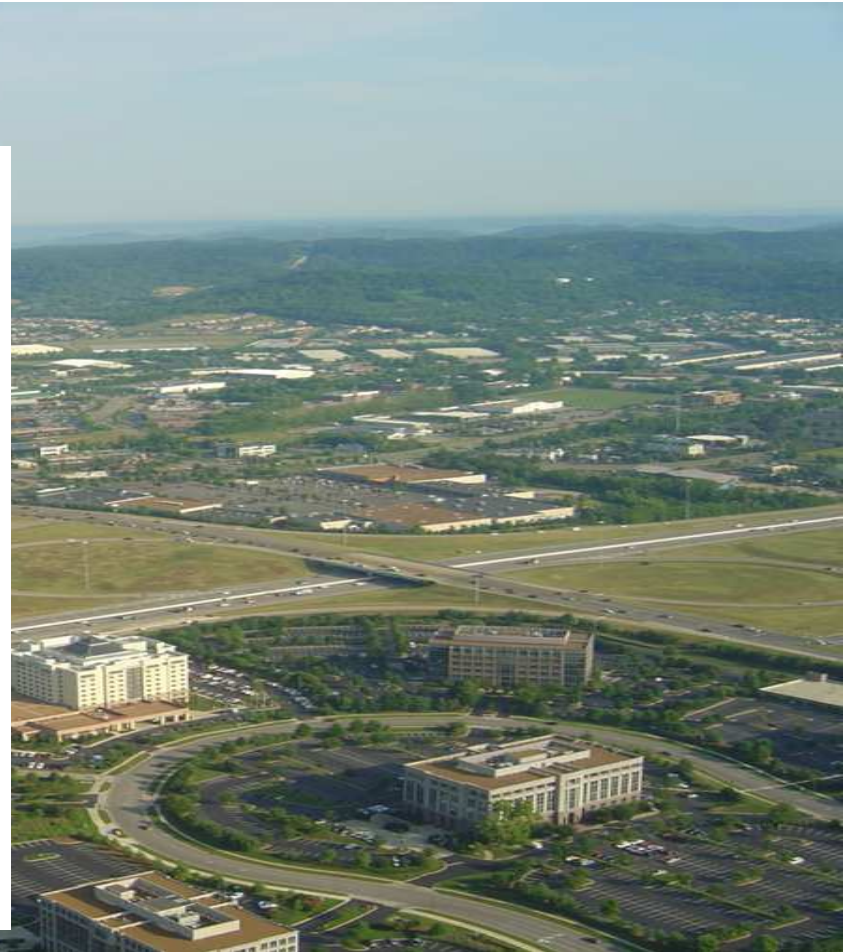
Sector	CO 2	N 2O	CH 4	Equivalent CO 2	Percent	Energy (US Gallons)
Residential	228,432	7,335	7,029	229,642	37%	8,396,510
Commercial	298,323	9,579	9,180	299,904	49%	10,965,510
Industrial	86,060	2,763	2,648	86,516	14%	3,163,319
Total	612,814	19,677	18,857	616,062	100%	22,525,330

CY2008 Electricity Usage	kWh
Residential	305,614,782
Commercial	399,120,553
Industrial	115,137,950

Community Natural Gas Usage



Natural Gas Consumption by Sector CY2008



The usage is divided into 5 "Customer Types." The majority of the customer base is included in the Residential and Commercial Customer Type categories. The other three Customer Types consist of Commercial Transportation Customers, Industrial Transportation Customers and Industrial Customers. These three customer segments are comprised of 30 customers whose usage totals a little over 25 % of the total usage for 2008. Natural gas usage is typically influenced by two external factors: product demand and weather.

CY 2008 Natural Gas Usage	CCF
Residential	12,447,486
Commercial	4,935,820
Industrial	709,348
Commercial Transport	908,623
Industrial Transport	4,229,875

Annual Household Fuel Costs 2000 & 2008

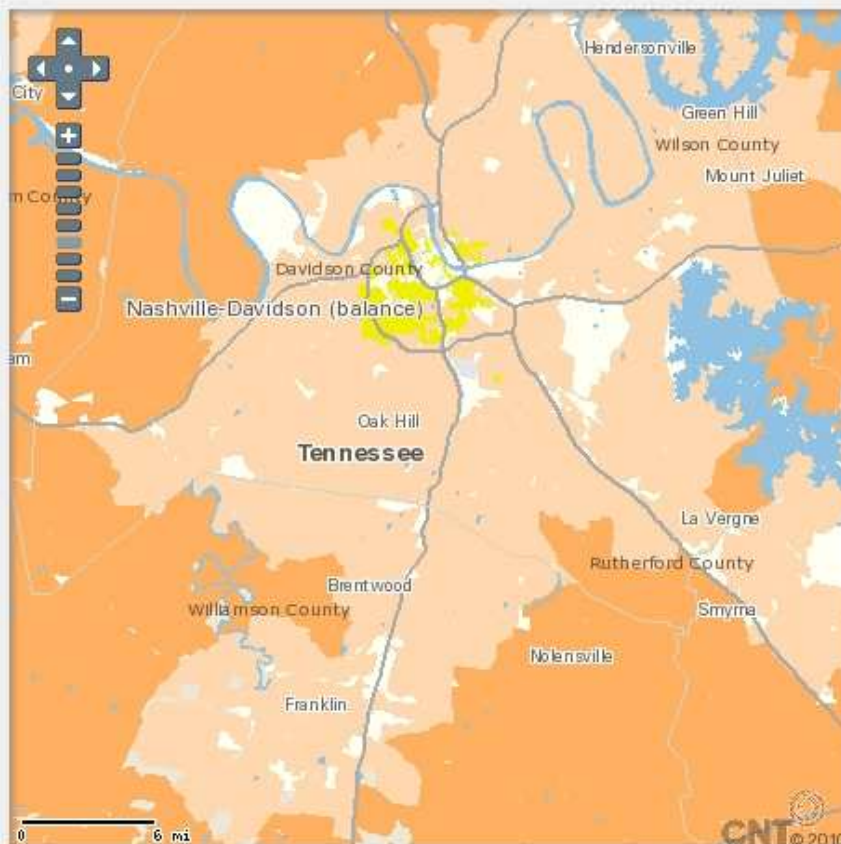
"We must think about making communities that can sustain themselves when unlimited driving is no longer an option."

Parris N. Glendening Former Gov. Of Maryland

Annual Household Gasoline Expenses (\$) - 2000 Gas Price

- Data Not Available
- Less than 900 \$/Year
- 900 to 1,800 \$/Year
- 1,800 to 2,700 \$/Year
- 2,700 to 3,600 \$/Year
- 3,600 \$/Year and Greater

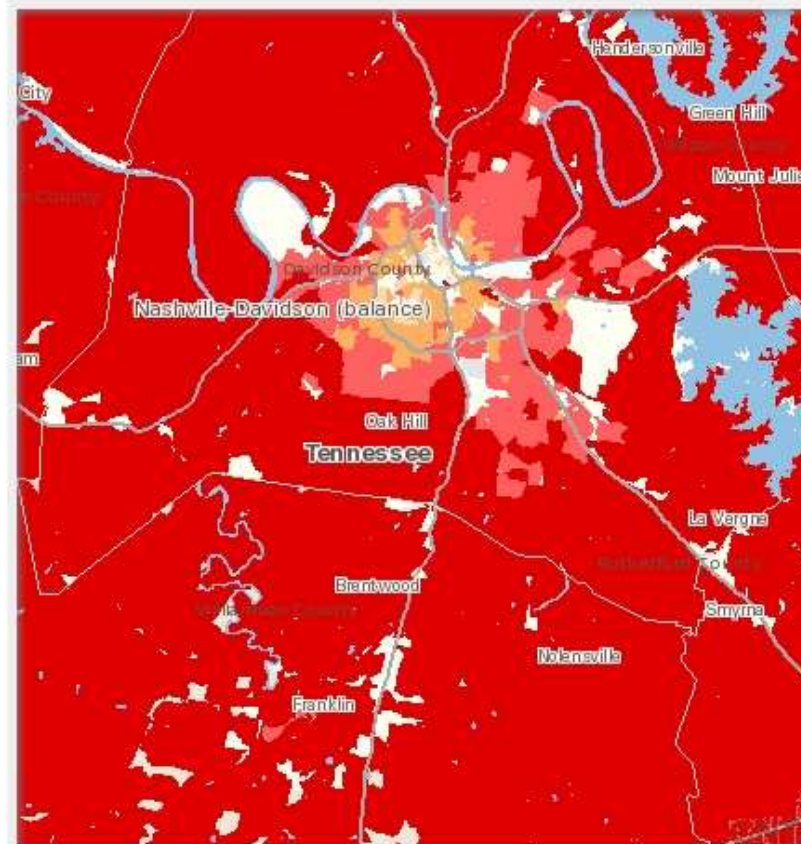
Annual Household Gasoline Expenses are calculated using Vehicle Miles Traveled (VMT) per household, an Average Regional Gas Price from 2000, and an average Fuel Efficiency of 20.3 mpg. This value reflects the average amount that a household spent on gasoline alone in 2000.



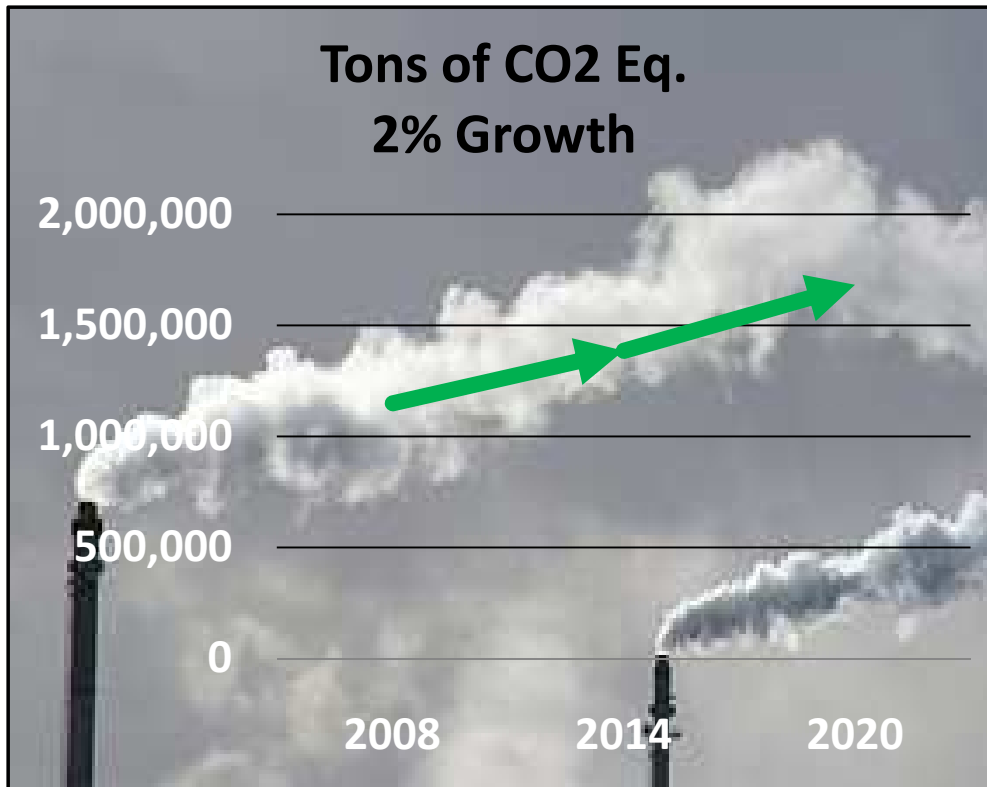
Annual Household Gasoline Expenses (\$) - 2008 Gas Price

- Data Not Available
- Less than 900 \$/Year
- 900 to 1,800 \$/Year
- 1,800 to 2,700 \$/Year
- 2,700 to 3,600 \$/Year
- 3,600 \$/Year and Greater

Annual Household Gasoline Expenses are calculated using Vehicle Miles Traveled (VMT) per household, a 2008 Regional Peak Price, and an average Fuel Efficiency of 20.3 mpg. All values utilized for this calculation are based on 2000 data with the exception of the gas price. Comparing this figure to Annual Household Gasoline Expenses (\$) - 2000 Gas Price illustrates the impact of fluctuating



Community Analysis Forecast



GHG Forecast 2% Growth by Sector
Tons of Eq. CO2

	2008	2014	2020
Residential	304,749	329,686	386,496
Commercial	343,197	371,280	418,122
Industrial	90,789	102,244	115,143
Transportation	424,377	568,706	762,120

Reduction Target

The local government and the community have developed a benchmark for energy usage. Opportunities exist to improve efficiency, lessen dependence on fossil fuels, and reduce utility costs, but residents, businesses, and municipal leaders will need to put forth additional efforts and creativity to achieve a sustainable outcome.

The methods and software used have been well documented, allowing this process to be repeated in the future to track changes in emissions and energy usage. However, if practices and the rate of change remain constant, the results will unlikely be favorable. The Sustainable Community Action Plan sets forth the following targets.

Reduce total community energy usage 20% per capita by 2014.

Reduce community and municipal greenhouse gas emissions 7% by 2014.

“The leaders in the future of environmental protection will be the world’s great cities”

-- Dora Bakoyannis

