

Warrenville Energy and Emissions Profile

This profile provides energy consumption and greenhouse gas emissions data analyzed specifically for Warrenville. It is designed to give you information about how energy is consumed by your entire community. Use this report to prioritize strategies for energy efficiency and conservation and measure their progress.

The Value of Your Profile

Your profile includes annual citywide electricity and natural gas consumption, vehicle miles traveled, and a greenhouse gas emissions profile. Having this aggregate baseline data at the local level is important because it makes it possible to accurately benchmark energy use. Simply put, you cannot measure energy savings without first knowing your actual energy consumption. Further, pinpointing your community's energy trends will help you target the most effective programs to reduce energy use and costs.

About the Project

Your community's profile is part of a larger project called the Municipal Energy Profile Project (MEPP). The goal of MEPP is to provide all municipalities in the seven-county Chicago metropolitan region¹ with an energy and emissions profile and corresponding tools and resources to help each community best utilize the information presented in the profile.²

At the regional level, MEPP helps municipalities obtain a crucial starting point to discuss energy issues within their community. The communities in the Chicago metropolitan region will be better equipped to tap into existing regional and state resources while positioning the region for ongoing funding towards building a sustainable future.

This project is funded by the Illinois Clean Energy Community Foundation and relies on support from ComEd, Nicor, Peoples Gas, North Shore Gas, and Illinois Department of Transportation.

What's in Your Energy and Emissions Profile?

Introduction sections have been included before each dataset to familiarize readers with a few key concepts.

Section 1: Using Your Profile

Section 2: Electricity Consumption in Warrenville

Section 3: Natural Gas Consumption in Warrenville

Section 4: Transportation - Vehicle Miles Traveled in Warrenville

Section 5: Emissions Profile for Warrenville

¹ The seven counties in the region include Cook, DuPage, Kane, DuPage, Lake, McHenry and Will.

² CNT Energy is providing a MEPP guidebook; workshops and free technical assistance.

Section 1: Using Your Profile

While many municipalities have begun to identify strategies that impact municipal operations, recent funding opportunities provide an unprecedented opportunity to adopt broader community-wide strategies that will help residents and business owners reduce energy use and costs. The aggregate data and information provided in this profile can help in strategy development in the following ways:

- 1) **Baseline Metrics**: Serves as a starting point from which to measure the progress of strategies and programs.
- 2) **Accurate Data and Measurements**: Provides a more accurate picture of your community's average energy consumption based on actual utility data instead of national or regional averages. This will help you better calculate the potential for strategy savings, both individually and at scale.
- 3) **Data Indicators**: May assist in identifying some areas for targeting strategies. For example, a municipality whose average household energy consumption is significantly higher than the county may want to investigate the reasons why and identify potential residential energy saving strategies. (e.g. Is our average higher due to larger houses? Is it because we have an older, less efficient housing stock?)

More detailed examples are provided in the Guidebook for the Municipal Energy Profile Project.

Guidebook for the Municipal Energy Profile Project

To further investigate how you might use this profile, CNT Energy invites you to review the Guidebook for the Municipal Energy Profile Project; available at www.cntenergy.org. The Guidebook includes the following topics:

- Understanding your profile
- Municipal energy strategies
- Community-wide energy strategies
- Funding resources and technical assistance
- Glossary of energy terms and acronyms

Technical Assistance

Through the early part of 2011, CNT Energy will continue to provide free technical assistance to help communities understand their profile and provide information and resources for specific energy-related issues in their communities. For more information, please contact us:

Lindy Wordlaw, Senior Planner
773-269-4012 ▪ lindy@cntenergy.org

Kimberly Loewen, Planner
773-269-4089 ▪ kloewen@cntenergy.org



Section 2: Electricity Consumption in Warrenville

Electricity

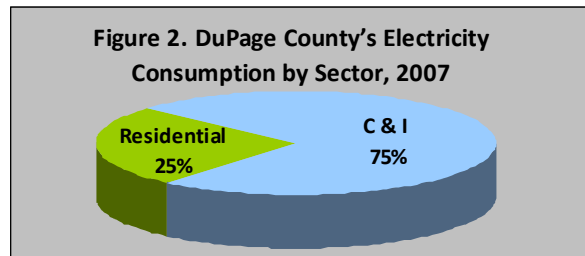
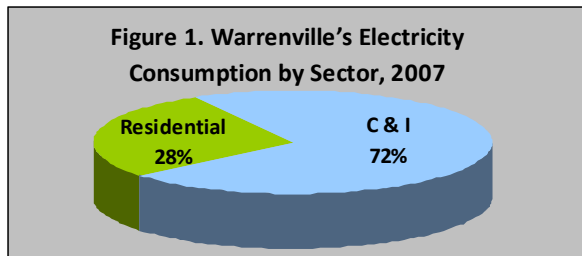
Electricity consumption in both the residential and commercial/industrial (C & I) sectors is currently increasing nationwide. Growth in consumer electronics and information technology equipment, as well as an increase in home size and air conditioning use are prominent reasons for consumption increases in the residential sector. In the commercial/industrial sector, increasing consumption is driven by telecommunication and network equipment along with specialized technologies such as medical imaging advancements.³ Electricity is measured in kilowatt (kWh) hours.

Total Consumption

In 2007, the amount of electricity consumed in Warrenville was 158 million kWh (Table 1). 28% of the city's electricity consumption occurred in the residential sector; the remaining 72% was consumed in the C & I sector. Figure 1 and Figure 2 compare electricity consumption by sector in Warrenville and DuPage County⁴.

Table 1. Total Electricity Consumption (kWh), 2007

	Warrenville	DuPage County
Residential	43,857,364	3,046,756,030
C & I	113,917,275	8,931,290,066
Total	157,774,640	11,978,046,096



Residential Consumption and Costs

In the residential sector, the city's average annual consumption per household is 9,143 kWh. Factors that affect electricity usage include square footage, presence and efficiency of air conditioning, efficiency of lighting, appliances and systems, and occupant behavior. Table 2 compares city's average annual consumption and cost per household to that of the county.

Table 2. Residential Electricity Consumption & Costs, 2007

	Warrenville	DuPage County
Number of Households	4,797	338,050
Average kWh per Household	9,143	9,013
Average Annual \$ per Household*	\$984	\$970

*Calculated using average residential sales per kWh (ICC Utility Sales Statistics 2007)

³ Energy Information Administration: "Miscellaneous Electricity Services in the Buildings Sector", AEO2007 <http://www.eia.doe.gov/oiaf/aeo/otheranalysis/mesbs.html>

⁴ For municipalities located within more than one county, the county that contains the largest area of the municipality was used for comparison purposes for this report.

Section 3: Natural Gas Consumption in Warrenville

Natural Gas

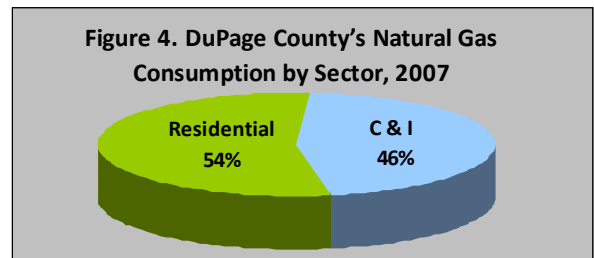
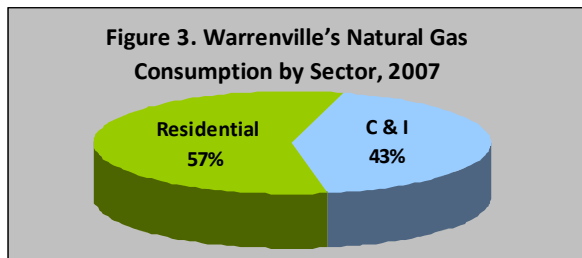
In Northern Illinois, natural gas is the primary space heating fuel. In addition to space heating, natural gas is commonly used for hot water heaters, clothes dryers, and cooking in the residential sector. However, natural gas consumption has been decreasing slightly over time in both the residential and commercial/industrial sectors as homes and buildings become more efficient and de-industrialization occurs. Natural gas is measured in therms.

Total Consumption

In 2007, the amount of natural gas consumed in Warrenville was 8.6 million therms (Table 3). 57% of the city's natural gas consumption occurred in the residential sector; the remaining 43% was consumed in the C & I sector. Figure 3 and Figure 4 compare natural gas consumption by sector in Warrenville and DuPage County.

Table 3. Total Natural Gas Consumption (Therms), 2007

	Warrenville	DuPage County
Residential	4,906,353	313,707,381
C & I	3,663,523	268,672,694
Total	8,569,876	582,380,076



Residential Consumption and Costs

In the residential sector, the city's average annual consumption per household is 1,023 therms. Factors that affect natural gas usage include building size, building age, building envelope efficiency, efficiency of the furnace, boiler and water heater, as well as occupant behavior and building operations and maintenance. Table 4 compares the city's average annual consumption and cost per household to that of the county.

Table 4. Residential Natural Gas Consumption & Costs, 2007

	Warrenville	DuPage County
Number of Households	4,797	338,050
Average Therms per Household	1,023	928
Average Annual \$ per Household*	\$908	\$824

*Calculated using average residential sales per therm (ICC Utility Sales Statistics 2007)

Section 4: Transportation – Vehicle Miles Traveled in Warrenville

Typically, transportation accounts for the second largest portion of energy usage after buildings. For this report, Vehicle Miles Traveled (VMT) was tabulated from travel statistics provided by the Illinois Department of Transportation (IDOT) and scaled to your municipality based on Illinois Environmental Protection Agency (IL EPA) odometer and population data.

Total Consumption

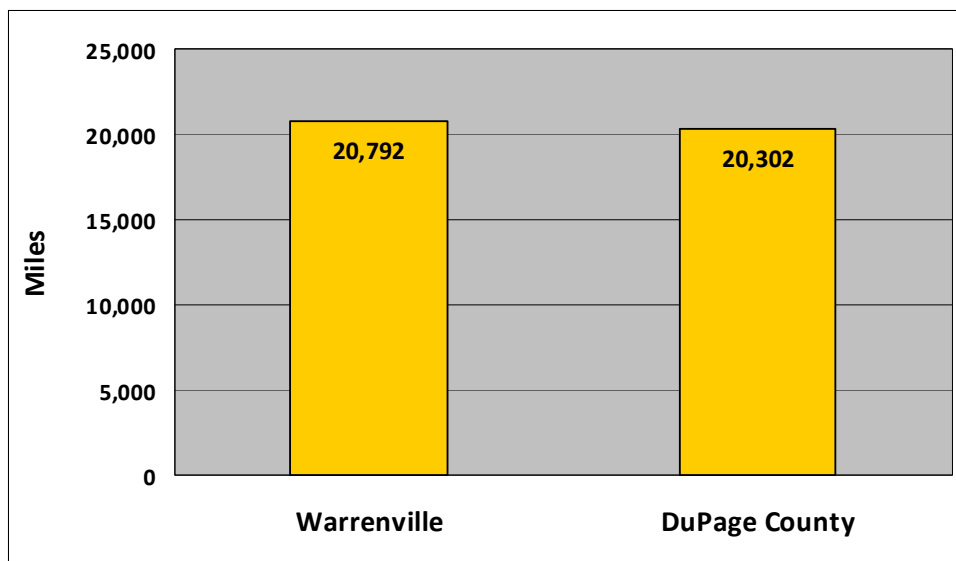
In 2007, total on-road travel on Warrenville roads accounted for 125 million miles (Table 5), which captures trips only within municipal boundaries. Further analysis shows that the average household in Warrenville drove 20,792 miles (Figure 5), totaling 99.7 million miles for all Warrenville households.

Table 5. Vehicle Miles Traveled (VMT), 2007

	Warrenville	DuPage County
Total On-Road VMT	125,473,896	8,633,562,650
Household VMT	99,741,069	6,862,947,547

Factors that affect VMT per household include access to jobs, proximity to businesses and amenities, availability of public transportation, and community walkability. Variations are also influenced by many different demographic factors including income, household size, and workers per household. For example, large households with higher incomes may own multiple cars and drive more. Households situated close to reliable public transit or major employment centers may experience decreased annual VMT because they are not as dependent on cars.

Figure 5. Average Vehicle Miles Traveled per Household, 2007



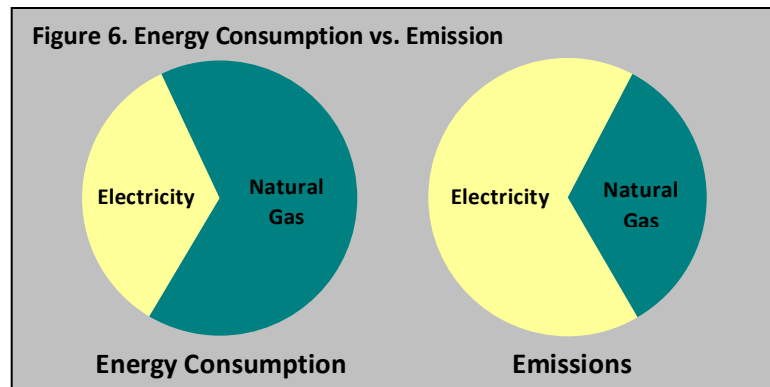
Section 5: Emissions Profile for Warrenville

The Connection between Energy and Emissions

In addition to understanding energy consumption, it is important to recognize the relationship between energy and greenhouse gas emissions. Emissions attributed to electricity consumption are different from those attributed to natural gas consumption because of differences in the production of energy from different sources.

Most of the world's energy originates from the burning of fossil fuels including coal, petroleum, and natural gas. Fossil fuels consist of hydrogen and carbon, and when burned, the carbon combines with oxygen to create carbon dioxide.

However, all energy is not created equal. The amount of carbon dioxide produced for a given unit of energy depends on the carbon content of the fuel source. For example, coal (used to produce electricity) emits nearly two times the carbon dioxide per unit of energy compared to natural gas. Understanding this off balanced relationship is important when calculating emissions and identifying strategies to reduce emissions. Figure 6 illustrates this off balanced relationship between energy consumption and emissions, using data from the Chicago metropolitan region. Understanding this off balanced relationship is important when calculating emissions and identifying strategies to reduce emissions.



Emissions Calculations

Your municipal greenhouse gas emissions profile was calculated for 2007 using United Nations Intergovernmental Panel on Climate Change (IPCC) methods and local data sources in combination with modeling of national data to local demographics. All data presented are measured in metric tons (MT) or million metric tons (MMT) CO₂e (carbon dioxide equivalent), to enable comparison internationally.

Emissions were calculated for the six major categories of greenhouse gases regulated under the Kyoto Protocol: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Emissions were converted into CO₂e using global warming potentials from the IPCC Fourth Annual Assessment Report. Activity data were translated into emissions using standard emissions factors and global warming potentials.

Emissions Profile for Warrenville

An energy profile in the community serves as the basis for conducting a community greenhouse gas emissions profile. In addition to energy and transportation, which are by far the biggest contributors to greenhouse gas emissions, this emissions profile includes estimates for solid waste, waste water, and product use based on regional totals previously analyzed for a regional profile developed for the Chicago Metropolitan Agency for Planning (CMAP).

Below is the breakdown of Warrenville’s emissions by sector (Table 6 and Figure 7).

Table 6. Warrenville’s Emissions by Sector, 2007

Sector	MMT CO ₂ e
Electricity	0.111
Natural Gas	0.046
Transportation	0.063
Solid Waste	0.002
Waste Water	0.002
Product Use	0.007
TOTAL	0.229

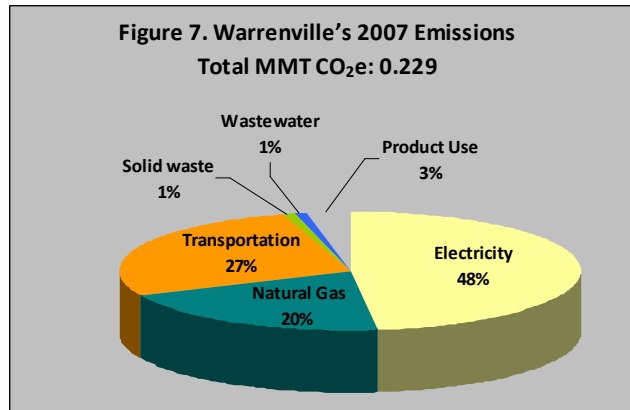


Figure 8 provides another context through comparison of Warrenville’s and DuPage County’s 2007 emissions per capita.

Figure 8. Per Capita Emissions, 2007

