

CITY OF NEW ORLEANS
BASELINE GREENHOUSE GAS EMISSIONS PROFILE
MAYOR'S OFFICE OF ENVIRONMENTAL AFFAIRS
OCTOBER 2001

INTRODUCTION

In January 2001, the Intergovernmental Panel on Climate Change (IPCC) released the most comprehensive study on global warming to date. Findings show that rising temperatures could melt ice caps and raise sea levels by as much as 34 inches in the next 100 years. Sea level rise is anticipated to result in flooding that may displace tens of millions of people from low-lying coastal areas such as New Orleans. The IPCC report declares unequivocally for the first time that mankind is responsible for global warming rather than changes brought by the sun or other natural factors.¹

The City of New Orleans is committed to the reduction of greenhouse gas (GHG) emissions. In 1999, under Mayor Marc H. Morial's leadership, New Orleans joined the international Cities for Climate Protection (CCP) Campaign, and agreed to take the following steps:

- Pass a City Resolution stating New Orleans' commitment;
- Establish a Baseline Emissions Profile;
- Identify a Reduction Target;
- Prepare a Local Action Plan; and
- Initiate activities designed to reduce multiple emissions.

CCP is a global campaign of the International Council of Local Environmental Initiatives (ICLEI). ICLEI is a clearinghouse for sustainable development that provides policy guidance, training, technical assistance, and consulting to local governments to increase their capacity to address global challenges. More can be learned about ICLEI by visiting their website at <http://www.iclei.org>.

THREATS FROM GLOBAL WARMING

Global warming increased dramatically in the last century with the onset of industrialization and the burning of fossil fuels. Human activities began to amplify the concentration of heat-trapping gases, such as carbon dioxide, in the atmosphere. Carbon dioxide (CO₂), methane, and nitrous oxide are called greenhouse gases (GHGs) because they trap heat somewhat like the glass

¹ *Science panel warns of global warming*, Times-Picayune 01/23/2001 p. A-6

panels in a greenhouse. This phenomenon creates what is known as the *greenhouse effect*.

The burning of fossil fuels worldwide releases 5.5 billion tons of carbon to the atmosphere every year. Another 1.5 billion tons are released annually through land use changes such as deforestation.² Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the raising of livestock and the decomposition of organic wastes in municipal solid-waste landfills.

Sea level rose worldwide about six to eight inches during the last century.³ This rise is attributed to melting glaciers and the expansion of water that results from warmer ocean temperatures. Higher sea levels erode beaches, increase storm surges, lead to loss of wetlands, and can compromise freshwater supplies through saltwater intrusion.

There are multiple economic effects that may result from this rise in sea level. Between 1988 and 1997, heat waves, storms, floods, and other extreme weather events in the United States caused an estimated \$140 billion in property damage.⁴ This does not include the clean up cost from devastating storms. In addition, an expected decline in rainwater runoff due to increased evaporation under global warming could affect drinking water availability and irrigation.

Coral reefs, the richest ecosystem in the ocean, are deteriorating due to the increase in ocean temperatures. These rich breeding grounds for sea-life are extremely vulnerable to heat and high sea surface temperatures (SST). When SST's reach a certain temperature the corals begin to "bleach". Bleaching results when the coral turns white after expelling algae that live within its tissue. If bleaching is continuous the corals eventually die because they depend upon the algae to feed it through photosynthesis. Because reef fish make up approximately 10 percent of the global fish catch, the death of coral reefs can result in a great loss in the fisheries. The demise of coral reefs would also imperil reef structures that serve to protect certain heavily populated areas in the world. Increased erosion is predicted to leave such populations susceptible to the disastrous effects of flooding and increased poverty.⁵

The public health aspects of global warming must also be considered. Warmer temperatures encourage the proliferation of disease-carrying mosquitoes in new areas. This phenomenon can increase the incidence of infectious diseases such as encephalitis, malaria, or dengue fever. Rising temperatures can also increase

² EPA Document: *Climate Change* EPA-430-C-00-001 March 2000

³ <http://www.epa.gov/globalwarming/> What is Global Warming?

⁴ EPA Document *Climate Change and Public Health* EPA 236-F-97-005 October 1997

⁵ <http://www.enn.com/features/1999/> Coral Death—Disaster in the Making. April 1999

pollution indexes and reduce air quality in heavily populated urban areas. This can lead to increased respiratory and cardiovascular disease.

NEW ORLEANS' COMMITMENT

Municipal operations account for a small percentage of overall greenhouse gas emissions from New Orleans. However, by taking energy efficient measures, City government can lead by example, decrease its emissions, and save money.

The Mayor's Office of Environmental Affairs (OEA) coordinates New Orleans' participation in the CCP Campaign. OEA established this baseline profile from a 1998 audit of GHG emissions from municipally operated sources. This profile is the base upon which municipal New Orleans will develop its Local Action Plan. OEA also collected data on emissions throughout the community. This information is located in Appendices B and C.

MATERIALS AND METHODS

OEA utilized CCP Greenhouse Gas Emissions Software © Version 3.54a (August 1999), developed by Torrie Smith & Associates, for its baseline emissions profile. This software is made available to local governments in the CCP Campaign through support of the U.S. Environmental Protection Agency (EPA). Information input to the software was obtained from:

<u>Organization</u>	<u>Contact</u>	<u>Phone Number</u>
Sewerage and Water Board	Jack Huerkamp	504-865-0412
Sewerage and Water Board Fleet	Hagar Simpson	504-942-3916
Utilities Department	Drayfus Guient	504-565-6260
Sanitation Department	Lisa Maack	504-299-3692
Equipment Maintenance Division	Bill Krubbe	504-941-4500
Regional Planning Commission	Jeff Roesel	504-568-7665
Entergy New Orleans	John Michelet	504-576-5242
Airport Fleet	Thomas Moore	504-464-3535
N.O Aviation Board	Allyson Ogles	504-464-3536

There are six core greenhouse gases: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Each gas has different chemical properties and therefore different propensities for contributing to global warming. For ease of analysis, the relative contribution of each of the six greenhouse gases has been converted by the software and consolidated to a single unit of measure: "equivalent tons of CO₂."

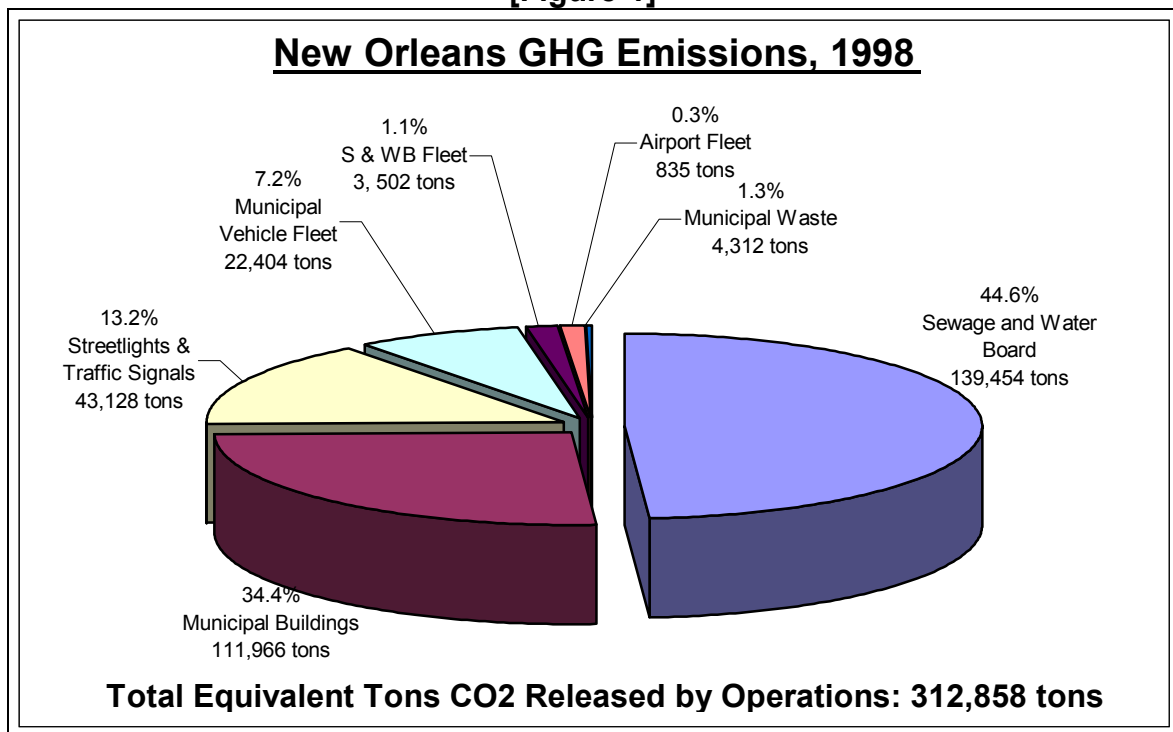
RESULTS

Greenhouse gas emissions for both municipal operations and community-wide energy use were inventoried and totaled for 1998. The year 1998 was selected for a baseline because it was the furthest year back for which the data were available. The greenhouse gas emissions software was used to generate a forecast pertaining to the target reduction year of 2015. According to the data, the city as a whole (municipal and community together) released 7,906,347 equivalent tons of CO₂ to the atmosphere in 1998. Copies of the reports generated by the CCP software are attached as Appendix A.

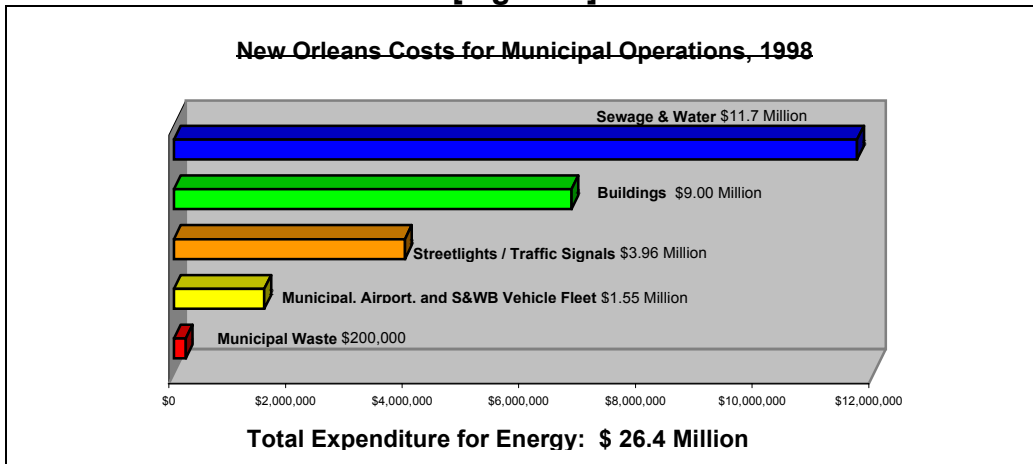
Emissions from Municipal Operations: City of New Orleans

Municipal operations were responsible for the release of 312,858 equivalent tons of CO₂ in 1998. This translates to approximately 2.8 million BTUs of energy, and a cost of \$26.4 million. (See *Figures 1 & 2*)

[Figure-1]



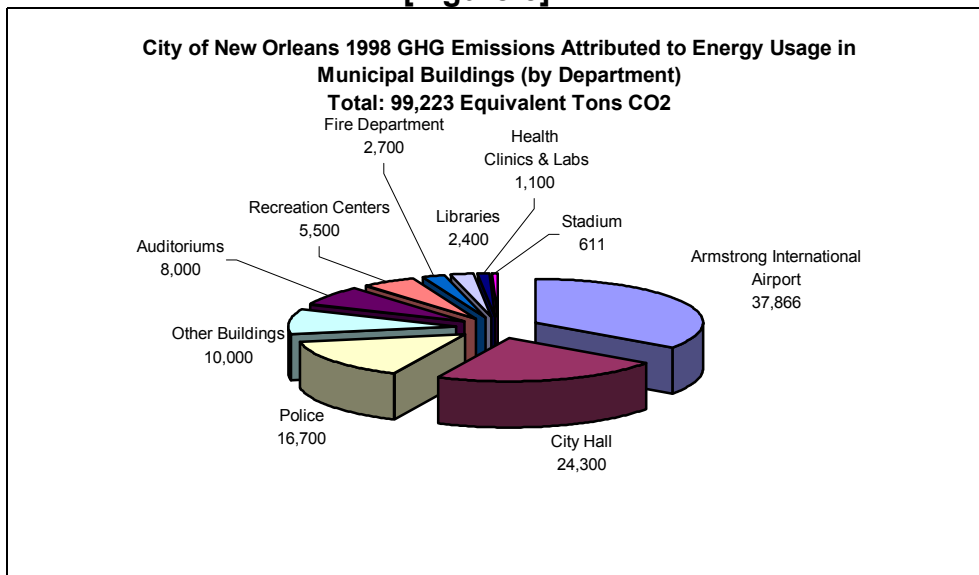
[Figure 2]



The bulk of these greenhouse gases released in 1998 were produced as a result of energy expended on operation of the N.O. Sewerage and Water Board (139,454 equivalent tons). Sewerage and water operations for New Orleans constituted 45% of all greenhouse gas emissions from municipal sources at a cost of \$11.7 million.

The second-largest contributor of greenhouse gases was the municipally operated buildings. Approximately 99,223 equivalent tons of CO₂ were released as a result of the energy from building operations, and this accounts for 34% of the total. Municipal buildings consumed 491,624 BTUs of energy at a cost of \$9 million. *Figure-3* represents the breakdown of energy usage within municipal building divisions.

[Figure-3]



In third place, streetlights and traffic signals in Orleans Parish were responsible for the release of 43,128 equivalent tons CO₂. This represents 13.2% of the total, 202,262 BTUs of energy, at a cost of almost \$4 million.

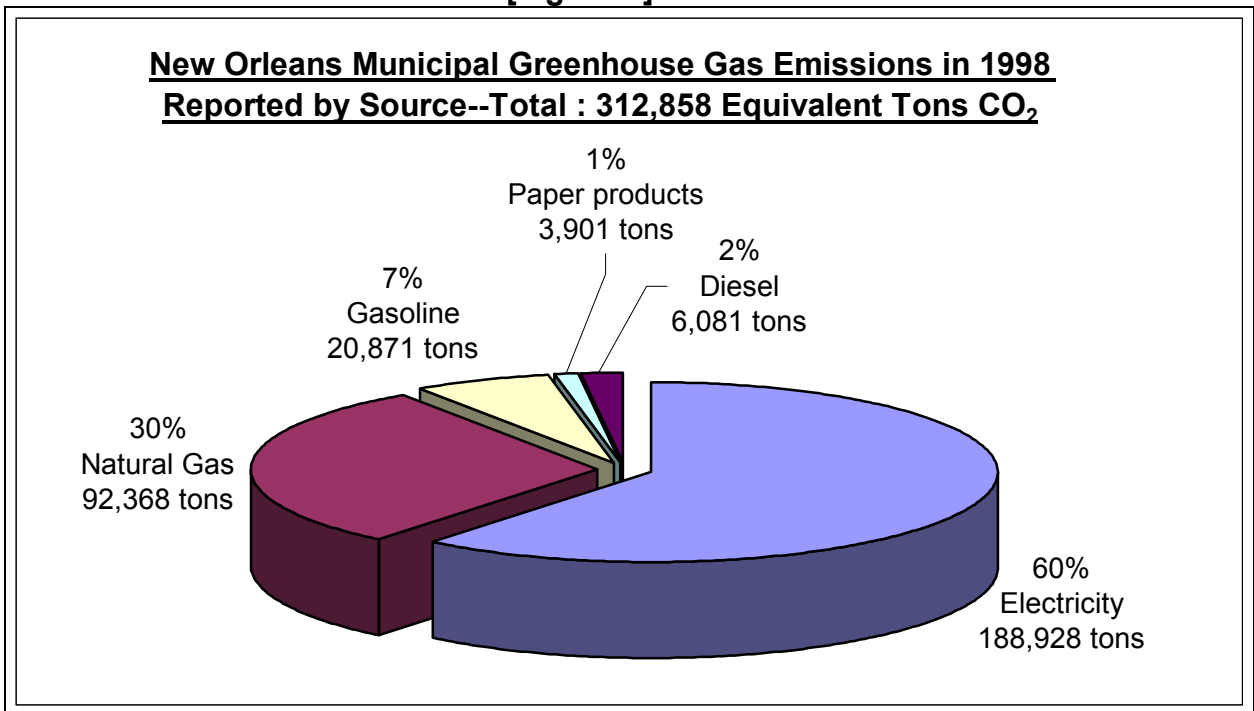
The City's vehicle fleet was the fourth-largest contributor of GHG emissions. The combined fleet (Municipal, S&WB, and N.O. International Airport) released approximately 26,741 equivalent tons of CO₂, which accounts for approximately 8.6% of the total for 1998, and represents 322,055 BTUs at a cost of \$1.6 million.

Municipally generated trash was responsible for 4,312 equivalent tons CO₂ released to the atmosphere in 1998. This represents approximately 1.3% of the total and a cost of approximately \$200,000.

GHG Emissions by Energy Type

Figure-4 shows that 60% (188,928 tons) of municipal GHG emissions were attributable to electricity usage. Natural gas represents the second-largest contributor of greenhouse gas emissions at 30% of the total share (92,368 tons). The city's fleet and gasoline-powered equipment are third at 7% of total emissions (20,871 tons). Finally, municipal diesel contributed 2% (6,081 tons), and paper product waste, 1% (3,901 tons).

[Figure-4]



REDUCTION TARGET

New Orleans has no immediate plans for significant expansion of municipal facilities and operations between now and the year 2015. Therefore, the forecast for energy expenditure and the resultant GHG emissions is not expected to increase much from 325,602 equivalent tons CO₂ inventoried in 1998.

This *Baseline Greenhouse Gas Emissions Profile* served as the basis for establishing a municipal emissions reduction target to be attained by 2015. The IPCC has found that GHG emissions worldwide need be reduced by over 60% by the end of the 21st Century to achieve stabilization of GHG concentrations. On March 15, 2001 the New Orleans City Council adopted a resolution to decrease greenhouse gas emissions by 10% by 2015, a reduction of 32,560 tons. A reduction of 10% for municipal operations was chosen because it is a realistic target that New Orleans can achieve, and it marks a substantial beginning. The S&WB uses exceedingly high amounts of energy due to the pumping stations that keep the City from being under water. The necessity of the New Orleans S&WB to use high amounts energy makes it difficult to adopt a more stringent target, but as more energy efficient technologies and green power become affordable and available, New Orleans can increase its emissions reductions. There are numerous strategies that the City of New Orleans can use to reduce its GHG emissions to achieve or even exceed its goal.

GREENHOUSE GAS REDUCTION MEASURES UNDERWAY

Some measures that will reduce greenhouse gas emissions for the City of New Orleans are currently underway. These include the usage of higher efficiency light bulbs in streetlight fixtures, municipal building retrofits, and citywide tree planting.

Higher Efficiency Street Lighting

The streets of New Orleans are illuminated by approximately 52,400 streetlamps that formerly used wattages of 400 or 175. The Utilities Department began changing the bulbs on these lamps to higher efficiency 250 and 150-watt lamps, respectively. Projected energy savings from these new bulbs translates to a reduction of approximately 12,105 equivalent tons of CO₂. This will save the City about \$618,000 in annual energy bills⁶.

⁶ Figure does not include significant savings due to lowered maintenance costs.

Municipal Building Retrofits

Seven municipal buildings are currently undergoing retrofit renovations by Johnson Controls, Inc. These are: City Hall, Civil Courts, Criminal Courts, District Attorney's Office, Municipal and Traffic Courts, Police Headquarters, and the Central Library. Eventually all city buildings will be included. The scope of the retrofit includes upgrading of boilers and chillers, installation of energy efficient lighting and insulation, etc. These seven buildings have been assessed with a net usage of 150,502 million BTU's of energy. Johnson Controls estimates that 50,244 million BTUs may be cut from this expenditure via retrofit. This preliminary estimate would provide a 33% rise in efficiency with an annual savings of at least \$608,000. GHG emissions will be reduced by approximately 9,000 equivalent tons of CO₂.

As of October 2001, Johnson Controls has completed Phase I of its renovations (the initial 7 buildings) and is now poised to move forward with Phase II. Phase II of the retrofit plan includes energy efficient renovations to be performed upon 80 additional municipal buildings. This will reduce New Orleans greenhouse gas emissions to a substantially greater degree. The Armstrong International Airport has also recently entered into a contract with Johnson Controls to perform retrofits upon the airport facilities.

Tree Planting

Unfortunately, in order to maintain optimum utility, sewerage, and water services to the citizens of New Orleans, it is sometimes necessary to destroy trees whose limbs and root systems may interfere with the delivery of these services. Despite the City's tendency to plant approximately 700 additional trees to offset these losses each year, an annual overall net loss of trees generally results. However, in 2000, the Department of Parks and Parkways in conjunction with Parkway Partners, its non-profit partner, planted 4,000 trees in Orleans Parish. These plantings should sequester about 354 tons of CO₂ annually. Similar quantities of trees planted in the following years would yield similar results. If, for example, the City were to plant an additional 1000 trees each year for the next 15 years, this could translate to the sequestration of at least 1325 additional equivalent tons of CO₂ annually.

Executive Order and Policy Memorandum

An Executive Order from Mayor Morial directed the creation of a Conservation Council. The mission of this Council is to assist City offices with the adoption of

more environmentally sound practices such as recycling, energy conservation, purchasing environmentally friendly supplies, etc. A policy memorandum has also been developed that provides guidelines for recycling, energy conservation and environmentally responsible procurement. Whereas the reductions associated with these measures are difficult to quantify, small changes in our day-to-day behaviors add up to significant reductions in GHG emissions.

OTHER POTENTIAL GREENHOUSE GAS REDUCTION MEASURES

LED Technology

The replacement of a red incandescent traffic signal head with a Light Emitting Diode (LED) unit can cut energy usage by an estimated 82 to 93%. The payback for the initial investment in LED traffic lights is approximately 2.5 to 3 years through energy savings.⁷ In 1998, traffic signals in New Orleans consumed 15,000 million BTUs of energy, or 3,223 equivalent tons of CO₂ released to the atmosphere. Assuming a conservative energy savings of 70%, the use of LED technology in New Orleans traffic signals would mean a reduction of approximately 2,260 equivalent tons of CO₂.

Utility providers across the country have entered into agreements with municipalities to facilitate the introduction of LED technology. Increased use of LED technology in municipal traffic signals reduces the burden placed upon energy providers. The energy savings are then used to underwrite the costs of purchasing and installing the new fixtures. For example, in 1997, the City of Philadelphia's Municipal Energy Office began a two-year, \$2.33 million program to replace all 28,000 signals in the city. This project is expected to save \$576,000 annually with an electric power reduction of approximately 32,000 million BTUs. The Street Lighting Department estimates an additional annual savings of \$165,000 will be saved annually from reduced signal maintenance requirements and lower annual relamping costs.⁸

LEDs also work well for exit signs within buildings. In fact, Johnson Controls has replaced incandescent and fluorescent exit sign fixtures with LEDs in municipal buildings being retrofitted. Since exit signs are lit up 24 hours a day, 7 days a week, substantial savings and reduction in energy usage can be achieved by equipping them with LEDs. A standard 40-watt incandescent exit sign can be replaced with a 5-watt LED sign to yield energy savings of over 80%.

⁷ *Light Emitting Diodes*, Climate Change Technologies. January 2000. EPA-430-C-00-001

⁸ LED Traffic Signals Update <http://www.cceformt.org/resrc/updates/00-04led/00-04led.html>

Participation in the U.S. Department of Energy’s Clean Cities Program

Clean Cities is a voluntary, government-industry partnership coordinated by the U.S. Department of Energy (DOE) to expand the use of alternatives to gasoline and diesel fuel. The New Orleans Regional Planning Commission (RPC) is currently developing a local program in which the City of New Orleans is a participant. Benefits of being designated a *Clean City* include technical and monetary assistance from federal agencies for alternative fuel vehicles and fueling stations.

Alternative fuels include E85 (an 85% ethanol, 15% gasoline mixture), liquefied natural gas, compressed natural gas, propane, and M85 (85% methanol, 15 % gasoline). To varying degrees, these alternative fuels can provide benefits in terms of cost, availability, air quality, and greenhouse gas emissions. Table-I summarizes these benefits as they pertain to reduction of GHGs when compared to the use of conventional gasoline.

<u>Alternative Fuel</u>	<u>Projected Reduction</u>
E85	25.8%
Liquefied Natural Gas	11.0%
Propane	9.6%
Compressed Natural Gas	6.7%
M85	1.7%

In 1998, the City’s vehicle fleet was responsible for the consumption of 268,393 million BTUs of energy and the release of 21,283 equivalent tons of CO₂. If 30% of the fleet were to utilize alternative fuels, the city could reduce its GHG emissions by at least 810 equivalent tons annually.

Setting Codes for Energy Efficiency

An Energy Efficiency Code would provide New Orleans with a direct mechanism for impacting energy usage and cutting the resultant pollution. Development of a municipal energy efficient standard would require builders to comply with a code for energy efficiency resulting in reduced emissions, the stimulation of business in energy services, and significant financial savings. Other benefits of such a code include a greater market value for energy-efficient buildings, reduced need

⁹ Adapted from: *The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) Model*, Transportation Energy Data Book: Edition 20—2000. <http://www.transportation.anl.gov/ttrdc/greet>

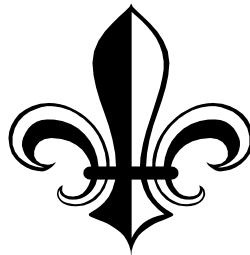
for electricity generation, more cost-effective operations and lower maintenance costs for building managers, and greater tenant appeal for energy-efficient buildings.

Buying Renewable Electricity

Renewable or “green” sources of electricity such as wind, solar, and geothermal energy generate power without burning fossil fuels. The purchase of renewable energy encourages local utilities to consider more sustainable alternatives. Setting an example by buying energy from renewable sources would help New Orleans convince residents and businesses to make the change as well. This would stimulate the market for renewable energies and dramatically reduce GHG emissions within the region.

Reduce the Urban Heat Island Effect

Large amounts of paved and dark colored surfaces in urban communities absorb rather than reflect the sun’s heat, causing temperatures to be higher than in rural areas. City temperatures in late summer afternoons are on average 5° F warmer than in the countryside. This phenomenon is called the Urban Heat Island Effect and it intensifies heat waves, causes smog, exacerbates ozone levels, raises energy costs, and adds to global warming pollution. Local governments around the country are beginning to adopt Urban Heat Island Effect mitigation strategies to counter this effect. Measures include the usage of reflective roofing, light-colored parking lots, and strategic tree planting.



The benefits of implementing an emissions reduction strategy in New Orleans are many. Policies for GHG reduction can help solve multiple environmental issues. Implementation of GHG reduction policies can improve air and water quality, health, waste disposal, congestion, and economic development. When examining the multiple benefits that the City of New Orleans may realize as a result of reducing GHG emissions, one can understand the importance of taking action now.