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GREENHOUSE GAS EMISSIONS INVENTORY REPORT

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EXECUTIVE SUMMARY

In 2006, former Mayor of Clayton Ben Uchitelle signed the U.S. Mayors Climate Protection Agreement, pledging to take action to reduce greenhouse gas pollution and prevent climate change. Cities that have signed onto this agreement pledge to make every effort to reduce their greenhouse gas emissions by 7% from the 1990 levels by the year 2012. This specific reduction target was established by the Kyoto Protocol, an agreement between almost two hundred nations to tackle climate disturbance.

Current Clayton Mayor Linda Goldstein is continuing to implement strategies to achieve the Kyoto Protocol target and preserve the environment for future generations. *Vision 2013: Building a Bright Future* is a series of objectives set for the City of Clayton by Mayor Goldstein and the Board of Aldermen for achievement by the time the city reaches its centennial in 2013. One of the city's objectives is to create and maintain a beautiful, clean and healthy community where resources are used responsibly. A key task in maintaining such a community is to take an inventory of energy usage and greenhouse gas emissions which absorb and emit radiation in the earth's atmosphere.

To measure how the City of Clayton is contributing to the Kyoto Protocol greenhouse gas reduction efforts and its own mission of creating and maintaining a beautiful, clean and healthy community, an inventory of the city's energy usage and greenhouse gas emissions has been conducted for the baseline year of 2006. The inventory addresses both city-wide activities and government internal operations for the City of Clayton.

- **Community Baseline Aggregate Emissions = 472,466 MtCO₂e**

- Sectors

- 68% Commercial
 - 19% Residential
 - 12% Transportation
 - 1% Waste

- Sources

- 76% Electricity
 - 13% Natural Gas
 - 8% Gasoline
 - 2% Diesel
 - 1% Paper Products, Food Waste, Plant Debris, Wood & Textiles

- **Municipal Baseline Aggregate Emissions = 5,627 MtCO₂e**

- Sectors

- 83% Buildings and Facilities
 - 8% Vehicle Fleet
 - 6% Streetlights and Traffic Signals
 - 3% Employee Commute

- Sources

- 83% Electricity
 - 10% Gasoline
 - 6% Natural Gas
 - 1% Diesel

INVENTORY BACKGROUND

The City of Clayton is the hub of metropolitan St. Louis and the seat of St. Louis County. Within two and a half square miles, Clayton combines a bustling downtown area and numerous neighborhood commercial districts with an exceptional housing mix including magnificent single-family homes, condominiums and multi-family apartments. Downtown Clayton contains seven million square feet of prestigious office space and one million square feet of retail space. In 2006, Clayton had a year-round residential population of 15,935 and an in/out daytime population of approximately 80,000.

Prior to conducting its Greenhouse Gas Inventory, the City of Clayton joined ICLEI, an international membership organization of local governments committed to environmental initiatives and sustainable development. ICLEI membership offers information and opportunities for local governments to share their successes, challenges, and best practices in climate protection and sustainable development.

ICLEI provides the Clean Air and Climate Protection software to its members for calculating and tracking greenhouse gas and criteria air pollutant emissions. The software is also used to forecast future emissions levels and track progress towards meeting reduction targets.

ICLEI has established the following five milestones for local governments to meet as they pursue their climate mitigation efforts:

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

Using a baseline year of 2006 and a forecast year of 2013, the City of Clayton has inventoried its energy usage and greenhouse gas emissions. The forecast year is aligned with *Vision 2013* to assist the city in realizing its goal of maintaining a wholesome community. The emissions reduction target will be in line with the U.S. Mayors Climate Protection Agreement, and therefore the Kyoto Protocol as well.

A reduction in dependency on non-renewable and high-pollution energy sources requires an understanding of how energy is used in government internal operations as well as throughout the city. Strategies for greenhouse gas emissions reduction in the City of Clayton will be focused on reaching specific reduction targets and will incorporate the information and understanding gathered from the baseline inventory.

METHODOLOGY

Greenhouse gas emissions from city-wide activities and municipal operations in the City of Clayton are calculated in the Clean Air and Climate Protection (CACP) 2009 software using coefficient sets established by ICLEI with regards to inventory baseline year and Emissions and Generation Resource Integrated Database (eGRID) sub-regional default emission factors.

Coefficients built into the CACP software are used to factor emissions levels of various greenhouse gases and criteria air pollutants. These coefficients are determined by the average emissions from various sources in the region where the inventory is being taken for the specific baseline year.

In accordance with the Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories, greenhouse gas emissions identified in Clayton's inventory are separated into various scopes. Scope 1 includes all direct greenhouse gas emissions except those that come from biogenic sources. Scope 2 includes indirect greenhouse gas emissions associated with the consumption of purchased or acquired electricity, steam, heating or cooling. Scope 3 includes all other indirect greenhouse gas emissions not included in Scope 2.

In addition to scope, emissions are also categorized by sector. In the community wide portion of the baseline greenhouse gas inventory, the sectors inventoried are residential, commercial, transportation and waste. Without any industrial properties in the City of Clayton, emissions from this sector are not inventoried.

Several sectors contributed to the greenhouse gas emissions calculations in the government portion of the inventory. These sectors included buildings and facilities, streetlights and traffic signals, vehicle fleet, employee commute, process fugitive emissions and mobile source refrigerants. The municipal sectors included in this inventory were those which the City of Clayton has operational control over.

Equivalent carbon dioxide is a measure used to compare emissions from various greenhouse gases using the global warming potential of carbon dioxide as the standard. Metric tons of equivalent carbon dioxide (MtCO₂e) are the standard unit of measurement used in Clayton's baseline greenhouse gas inventory.

COMMUNITY DATA COLLECTION

The emissions sources for the baseline inventory of community-wide activity include residential electricity, residential natural gas usage, commercial electricity, commercial natural gas usage, vehicular traffic, light rail electricity usage and city-wide solid waste.

Of the community-wide emissions sources, residential and commercial natural gas usage and vehicular traffic are categorized as Scope 1 emissions. Residential, commercial and light rail electricity are Scope 2 emissions. Greenhouse gas emissions resulting from solid waste disposed of in the City of Clayton are categorized as Scope 3.

Natural gas usage data in Clayton's residential and commercial sectors was provided by Laclede Gas, a natural gas distributing utility in eastern Missouri. Residential and commercial electricity data for the community-wide baseline data was collected from the Ameren-Missouri Customer Service System Area Report. AmerenUE is the electricity service provider for the City of Clayton. This utility company has sixteen power generating facilities in Missouri and Illinois. Four of the facilities are coal-fired, one is a nuclear plant, seven are combustion turbines using either natural gas or oil, and three are hydroelectric plants.

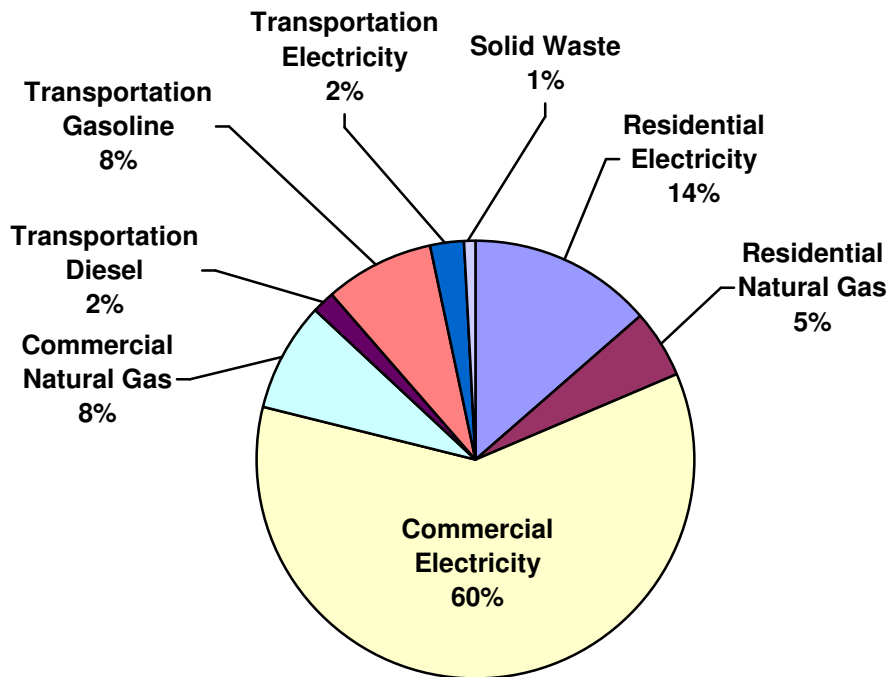
Baseline year transportation emissions levels were calculated using average annual daily traffic figures and road lengths of collectors/local roads, major arterial streets, and limited access highways within city limits. The Transport Assistant included in the CACP 2009 software calculates community-wide fuel usage and greenhouse gas emissions from estimated Annual Vehicle Miles Traveled in Clayton.

City wide solid waste data was collected from Allied Waste Services Volume Report for the City of Clayton. ICLEI's default waste shares as well as plant debris percentage provided by Allied Waste Services were used to estimate various waste shares. Recycled material was not included in the waste amount. Waste hauling service is contracted out by the City of Clayton. In 2006, this service was provided by Allied Waste Services. Solid waste collected in the City of Clayton in 2006 was disposed of at a managed landfill without methane sequestration.

- **There were 472,466 MtCO₂e emissions from community-wide activities in 2006.**
- **In 2006, Clayton residential electricity usage emitted 64,153 MtCO₂e.**
- **Residential natural gas usage emitted 23,347 MtCO₂e.**

- Commercial electricity usage resulted in the emission of 284,990 MtCO₂e.
- Natural gas usage in the commercial sector emitted 38,539 MtCO₂e.
- Road traffic in Clayton emitted 7,377 MtCO₂e from diesel usage and 38,687 MtCO₂e from gasoline usage.
- Electricity usage from light rail transportation emitted 11,249 MtCO₂e.
- Solid waste contributed 4,124 MtCO₂e in 2006.

2006 Community Greenhouse Gas Emissions Sources



MUNICIPAL DATA COLLECTION

Municipal operations emissions sources accounted for in the baseline inventory include buildings and facilities electricity, buildings and facilities natural gas usage, streetlight and traffic signal electricity, vehicle fleet, employee commute, process fugitive emissions and mobile source refrigerants. The municipal sectors included in this inventory were those which the City of Clayton has operational control over.

Operational control is defined by the Local Government Operations Protocol as having “the full authority to introduce and implement its operating policies at the operation.” Because the City of Clayton does not have operational control over water delivery, wastewater treatment or solid waste facilities, these sectors were not included in the municipal emissions calculations.

Buildings and facilities natural gas usage and vehicle fleet gasoline and diesel portions of a biodiesel blend usage are categorized as Scope 1 emissions. Fire suppressants as process fugitive emissions and fleet vehicle refrigerants as mobile source refrigerants are also included in Scope 1. Electricity usage from buildings, facilities, streetlights and traffic signals are Scope 2 emissions. Employee commute emissions are Scope 3 emissions.

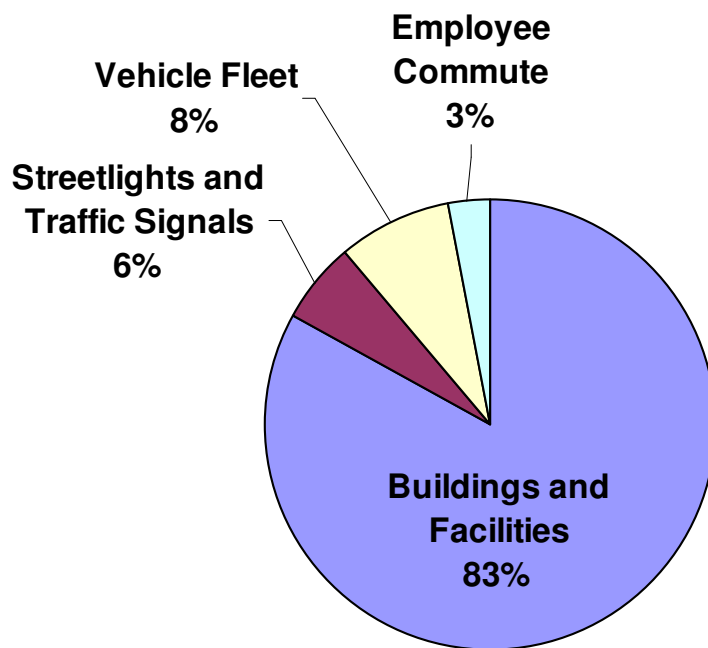
Although process fugitive emissions from fire suppressants and mobile source refrigerants from fleet vehicles were inventoried, they did not release any greenhouse gas emissions. Fire suppressants used by the City of Clayton Fire Department in 2006 included Aqueous Film Forming Foam, Dry Chemical Fire Extinguisher Compound and water. These agents do not produce direct greenhouse gases. No fleet vehicle refrigerant was leaked during the baseline year. All Freon used in the City fleet is recycled on-site and returned to fleet vehicles that have air conditioning systems.

Seventy-nine of the inventoried City vehicles and equipment were using gasoline in 2006. Of these seventy-nine running on gasoline, eighteen had a gross vehicle weight over 8,500 pounds. Forty-four city vehicles and equipment inventoried from 2006 were using B5 biodiesel. Nineteen had a gross vehicle weight of 8,500 pounds or less. Thirteen weighed over 8,500 and up to 19,500 pounds. Twelve weighed over 19,500 pounds. The fuel cost for the City’s vehicles and equipment totaled almost \$150,000 in 2006.

Information items are not included in any of the three scopes but are accounted for to provide information on energy use patterns and climate impact. Biodiesel usage from a biogenic source in the vehicle fleet is an information item included in the City of Clayton municipal operations baseline inventory.

- There were 5,627 MtCO₂e emitted from municipal government operations in 2006.
- Government operations contributed approximately 1.19% of the City of Clayton's total greenhouse gas emissions in 2006.

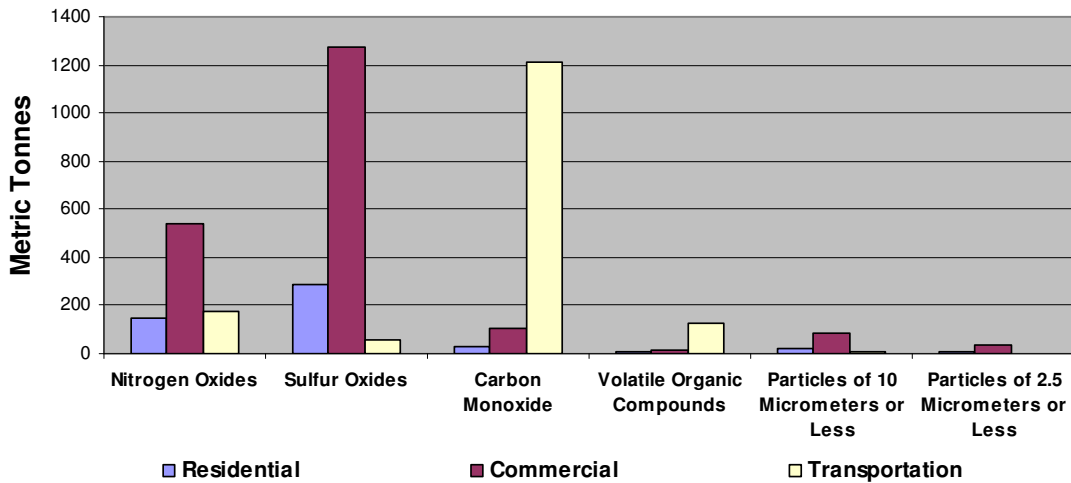
2006 Municipal Government Greenhouse Gas Emissions Sources



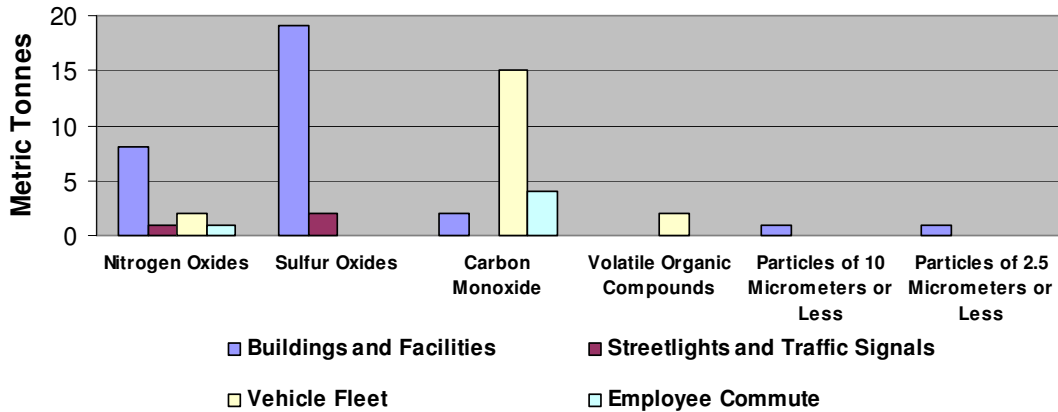
CRITERIA AIR POLLUTANTS

Criteria air pollutants are common pollutants which can damage human health as well as the natural and built environments. Permissible levels of these pollutants are regulated by the Environmental Protection Agency based on human health and environmental criteria.

2006 Community Criteria Air Pollutant Emissions

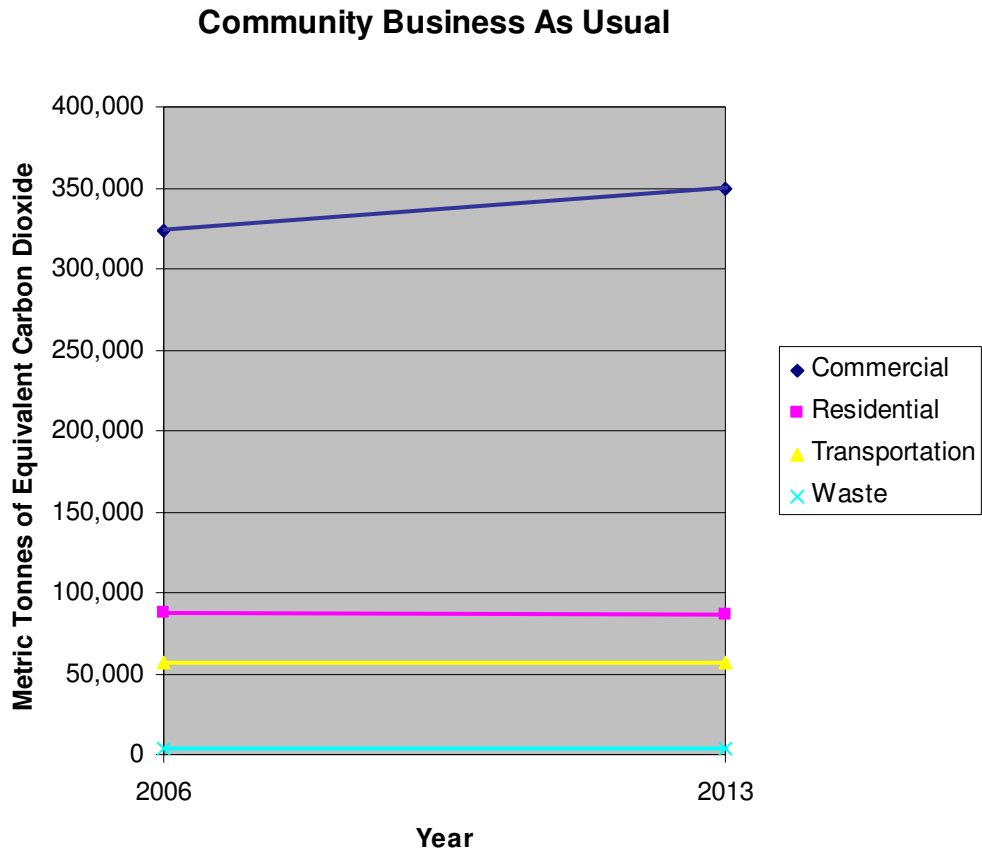


2006 Municipal Government Criteria Air Pollutant Emissions



FORECAST EMISSIONS

The City of Clayton is using 2013, the centennial anniversary of the incorporation of the City, as the forecast year for both community and government in the Greenhouse Gas Emissions Inventory. In the community forecast, the number of households is expected to decline at a rate of 1.28% from 2006 to 2013. A commercial growth rate of 8% is expected between the baseline and forecast year.



Greenhouse gas emissions from municipal operations are predicted to remain constant between the baseline and forecast years.

APPENDIX A

2006 Baseline Indicators

City Size: 2.5 square miles

Year-Round Population: 15,935

Daytime Population: 80,000

City Employees: 180 full-time, 250 part-time

Department of Energy Climate Zone: 4

Heating and Cooling Degree Days:

Approximately 4,200 Heating

Approximately 1,400 Cooling

Housing Units: 5,850

Public Transportation: 2 light rail stations, 8 bus routes