## City of Dallas Greenhouse Gas

# EMISSION INVENTORY

## Our History

From atop the bluffs overlooking the three forks of the Trinity River, John Neely Bryan laid out his vision for a new city and a new beginning in the rugged frontier of Texas.

From those early days in the mid-1840s to the first decades of the 21st century, Dallas has grown from a rough outpost on the southern end of the expansive Great Plains to the ninth largest city in the United States. With her neighbors at her side, Dallas is the largest component of the Dallas - Fort Worth region, now the 4th largest and fastest growing region in the country today.

Over a century and a half after those humble beginnings, Dallas is recognized around the world as a global center and thriving metropolis. Representing the lives, stories and interests of more than a million residents, Dallas continues to build upon those early ideas laid out from the vision upon the chalky cliffs so long ago.

With our potential limited only by our imagination, we brave onward, ensuring the future we create today pays homage to the past from which we are forged.

As of July 2008, Dallas' economic base was comprised of 67,000 businesses and 1,082,000 jobs.*

Home to 25 Fortune 500 Headquarters, Dallas and the DFW region continue to enjoy prosperity and positive growth. The economic drivers in Dallas are divided among many industries including manufacturing, commodity trading, telecommunications, goods distribution, professional services, management, information technologies, financial services, energy, health and education.

Forecasts indicate that Dallas will continue to add jobs and residents in the future, with reports showing 200,000 households and 400,000 jobs by 2030.**

*(U.S. Bureau of Labor Statistics, U.S. Census Bureau, OED, C2ER, CoStar.com, Dunn & Bradstreet)

**("Economic Development Profile", City of Dallas Office of Economic Development)

Our actions have an impact on our environment. As part of an ongoing initiative to measure and mitigate those impacts and to improve environmental performance for the future, the Office of Environmental Quality (OEQ) commissioned a greenhouse gas inventory and analysis project with the assistance of consultant Camp Dresser & McKee.

The 2005 Baseline Greenhouse Gas (GHG) Emission Inventory includes emission calculations for municipal operations and community-wide emissions including all other private sector sources within Dallas (residential, commercial and industrial).

Using historic data and "back-casting" methodologies, 1990 emission levels were estimated in order to provide the necessary benchmark required for the City of Dallas to fulfill its commitment to the U.S. Mayor's Climate Protection Agreement. This commitment calls for a 7% reduction below 1990 levels for greenhouse gases by 2012, thus creating the need to recreate such data.

Further predictions were made for carbon dioxide ($CO_2$) levels for the years 2012, 2015 and 2020 to forecast the "business as usual" model of emission levels over time. These forecasts are useful in determining a feasible reduction target for both municipal and community-wide emissions.

## Methodology

The Dallas GHG emission inventory and analysis were conducted using best practices for municipal GHG accounting, available through ICLEI: Local Governments for Sustainability and the World Resources Institute and World Business Council for Sustainable Development Greenhouse Gas Protocol.

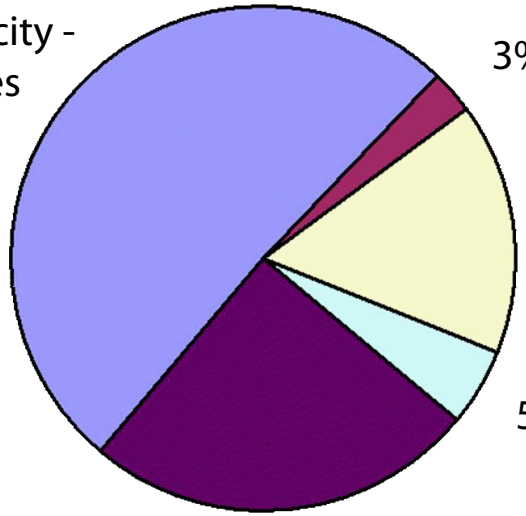
Activity data was gathered for all emission sources including electricity, natural gases, fuel oils, mobile sources and solid waste. The information was converted to GHG emissions through the use of activity and equipment-specific emissions factors.

In some instances, such as with emissions from landfill gases, special modeling programs were utilized to best identify the emissions from each particular source. For example, emissions from municipal vehicles and equipment were estimated through complex air emission models used in the "City of Dallas 2005 Emissions Inventory Final Report" document created in 2006 by Eastern Research Group, Inc.

## Results

In 2005, the City of Dallas GHG emissions totaled 656,816 metric tons, with electricity consumption by Dallas Water Utility as the largest sector within City operations. This is a common carbon profile for municipalities which own and operate their own water and wastewater facilities, accounting for 20-50% of GHG emissions.

## 2005 Baseline: Percentage of GHG Emissions by Emissions Source for City Operations




| 2005 City Operations GHG Emissions | | | |
|---|---|---|---|
| Source | Metric Tons / Year | Metric Tons / Employee | Metric Tons / Sq. Foot |
| Electricity - Public Facilities | 166,751 | 12.83 | 1.22E-02 |
| Electricity - Water Utilities | 329,233 | 25.33 | 2.42E-02 |
| Electricity - Street Lights | 31,933 | 2.46 | 2.34E-03 |
| Stationary Sources | 22,881 | 1.76 | 1.68E-03 |
| Mobile Sources | 106,017 | 8.16 | 7.78E-03 |
| **City Operations Total** | **656,816** | **48.07** | **4.58E-02** |

| 2005 Community Wide Greenhouse Gas Emissions | | | |
|---|---|---|---|
| Source | Metric Tons / Year | Metric Tons / Capita | Metric Tons / Sq. Mile |
| Electricity | 12,043,444 | 9.46 | 35,112 |
| Natural Gas | 1,733,583 | 1.36 | 5,054 |
| Fuel Oils | 226,984 | 0.18 | 662 |
| Transportation | 4,042,346 | 3.18 | 11,785 |
| DART - Public Transit | 66,419 | 0.05 | 194 |
| Solid Waste | 152,937 | 0.12 | 446 |
| **Community Wide Total** | **18,265,713** | **14.35** | **53,253** |

Community-wide GHG emissions for 2005 totaled 18,265,713 metric tons (tonnes) or 14.35 tonnes per capita based on 2005 population estimates. For both the municipal and community emissions inventories, electricity is by far the largest source of GHG emission, accounting for 81% of City emissions and 66% of community emissions.

When considered a sector within the larger community inventory, municipal GHG emissions account for only 3.5% of the entire carbon footprint. This is typical of community GHG emission inventories; despite representing a small percentage of GHG emissions, local governments have the opportunity to directly control these emissions and set an example for the private sector.

Community wide, the commercial and industrial sector represents the largest GHG emission source, contributing 51.3% of the emissions within Dallas.

## Back-casting

CDM estimated 1990-level emissions using sector specific growth factors.

This back-casting was performed to demonstrate the emission reductions which would be required from the baseline 2005 levels to meet targets set from baseline 1990 levels, such as the U.S. Mayors Climate Protection Agreement.

To meet the City-wide emission reduction target of 15% below 2005 levels, it will be necessary to eliminate 98,401 metric tons of GHG. To meet the community-wide emission reduction target of 30% below 2005 levels, a reduction of 5,748,843 metric tons will be necessary.


**2005 Community GHG Emissions: 18,265,713 metric tons**

# Forecasting Future Emissions

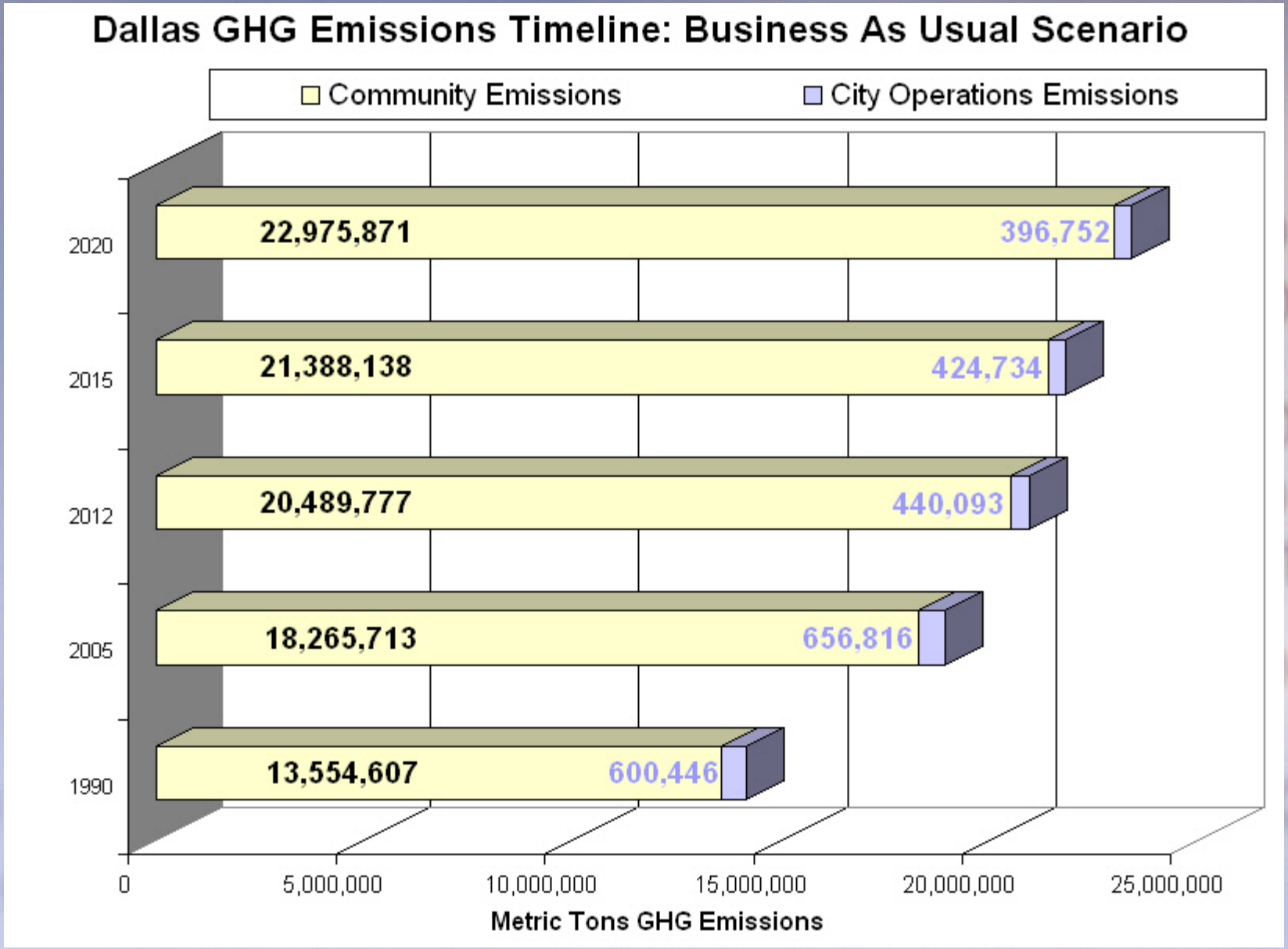
Forecasting emissions to identify the “business as usual” scenario can help when identifying potential reduction opportunities in both the short and long term situations.

Given that "business as usual" models assume the habits practiced today will persist into the future, community and municipal GHG emissions were forecasted out to the years 2012, 2015 and 2020.

Community emissions were calculated using a combination of data from the North Central Texas Council of Governments, and the Electric Reliability Council of Texas.

When forecasting community based emissions, the following variables were considered and incorporated: population growth, transportation and vehicle miles traveled projections, electricity demand projections and access to renewable energy generating capacity.

Municipal emissions were forecast using projections of added facility square footage and additional fleet for each forecasted year. Additionally, City calculations also included a commitment to purchase 40% of municipal electricity from renewable energy sources. Despite the controls the City of Dallas has in place governing its own municipal operations, emissions all together continue to increase through 2020 in the “business as usual” model.




This graph is the compilation of both community based emissions (in yellow) and municipal based emissions (in blue) over the full forecasted emission time line of analysis, from 1990 to 2020. Given the modeling data previously mentioned, it is evident that community related emissions, those outside the control of the City of Dallas itself, continue to increase the emission levels in the area over the course of the coming decades.


NEXT

The City of Dallas is a demonstrated environmental leader among cities in its own right. From the purchase of alternatively fueled vehicles to energy efficiency measures, the City continues to implement emission reduction strategies successfully while saving tax-dollars in return.

The City, as a municipality, recognizes its carbon footprint and understands that for Dallas, the community, additional reductions of greenhouse gases will be necessary to meet the challenge of the U.S. Mayor's Climate Protection Agreement.

As a major land owner, water utility owner, employer, building manager, fleet operator, and service provider, the City of Dallas has the opportunity to make advancements in the area of sustainability and resource conservation.

The City has the opportunity and the obligation to work collaboratively with the community to create a sustainability framework by which to meet our obligations as a signatory to the Climate Protection Agreement and to lead the region.

This report provides a GHG emission inventory for the City of Dallas for the baseline year of 2005. This measure is an absolute requirement to understanding our contributions to the environmental challenges we face today, particularly air quality.

The emissions data presented here is intended to provide the reader with an understanding of the footprint each of us makes.

Additionally, projections presented here on future emissions will enable the City and the community to work together and collaboratively toward reducing emissions while increasing the inherent carrying capacity of the region. This undertaking, when done correctly, will provide a healthier future for all of north Texas.

This inventory is the critical first step in quantifying the task challenge ahead. By identifying the largest sources of GHG emission, showing trends and habits which need addressing, and showing the impacts of actions taken, we can design strategies for achieving our reduction goals.

Working together with our partners in the public, private and non-profit sectors, the City of Dallas will do what it does best: *lead by example*.

The next logical step is for the City to use this inventory and other collected data to develop a Sustainability Action Plan which includes a Sustainability Index to ensure smart growth for decades to come to protect the future we leave our children.

The Plan will include the principles, purpose, goals and strategies needed to guide, implement and support the vision of Dallas becoming an entirely sustainable community.

The Index, in turn, will be a dynamic tool, able to accept and integrate new information as it becomes available and needs change. This will ensure long-term environmental stewardship while promoting economic development and social justice throughout Dallas.


# OEQ

## Office of Environmental Quality

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