



# 2012 City of Madison Carbon Inventory



# Carbon Inventory, Analysis, and Forecast

*City of Madison Government Operations – Inventory Year 2012*

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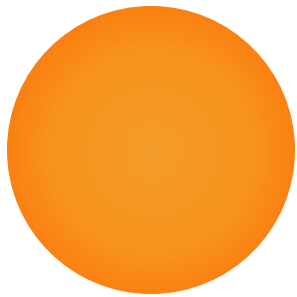
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# PRESENTATION OUTLINE

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**Background Information**

**Methodology**

**Carbon Inventory Results**

**Recommendations and Conclusion**





# Background Information

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- Community Inventory: 2010
- Government Inventories: 2007, 2010, 2012
  - **2012 Inventory**
    - Continued monitoring of GHG emissions
    - GHG forecast
    - Goals and Recommendations



# What is a Greenhouse Gas Inventory?

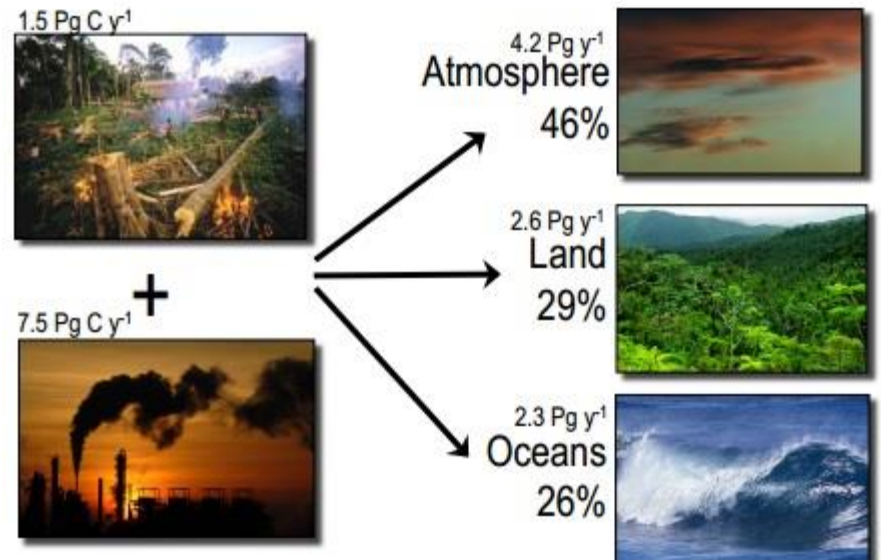
- **Assessment of GHG emissions from various sources.**
- **All the emissions data will be expressed in CO<sub>2</sub> equivalent**



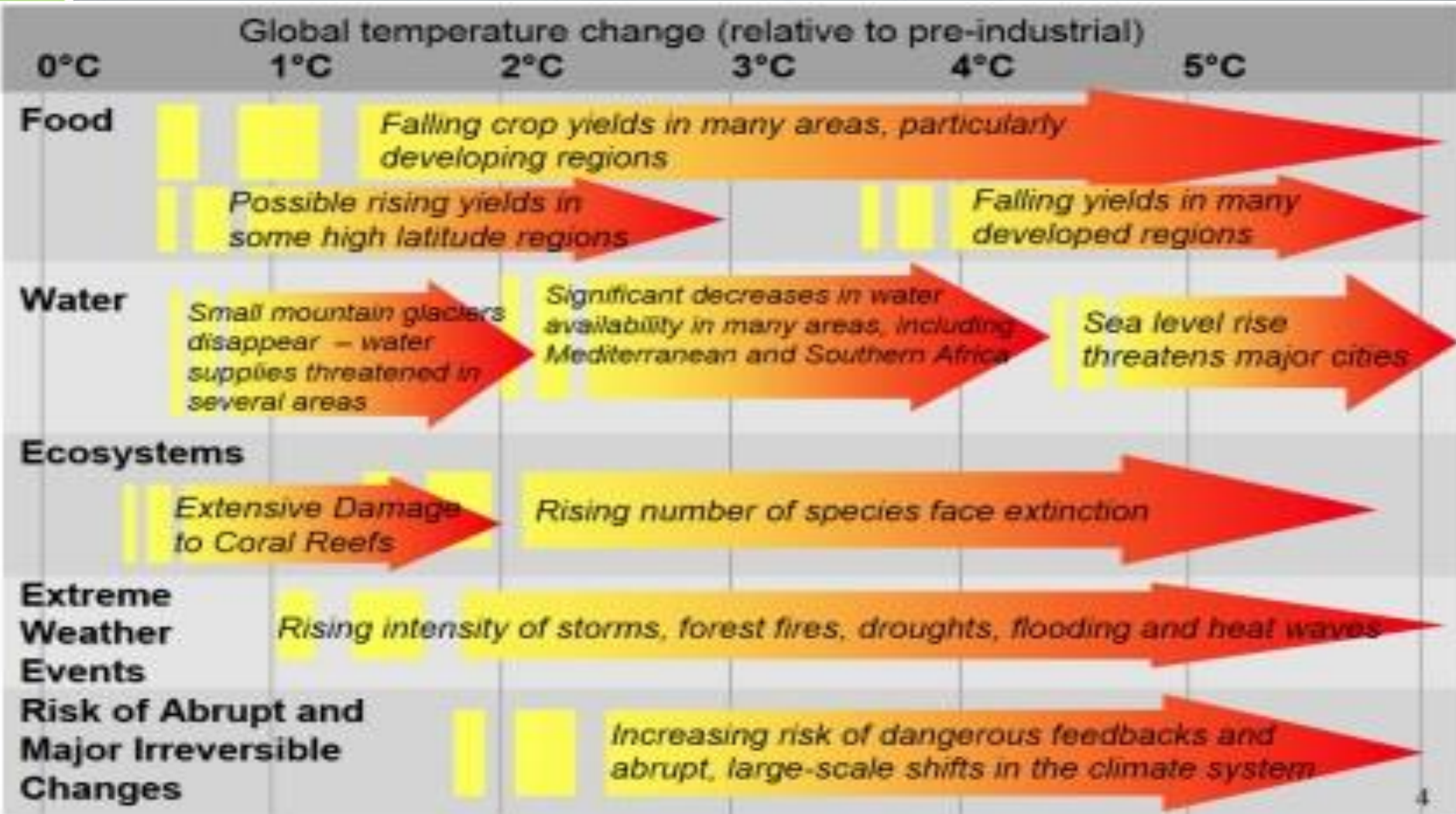
# Why is it recommended to develop a carbon inventory?

## You can't effectively reduce what you don't measure!

- Global climate change
- Sea level rise
- Participate in carbon markets.
- Set goals to mitigate further rise in GHG emissions.
- To identify ways to stabilize emission at current level or reduce them.



# Projected impacts of climate change



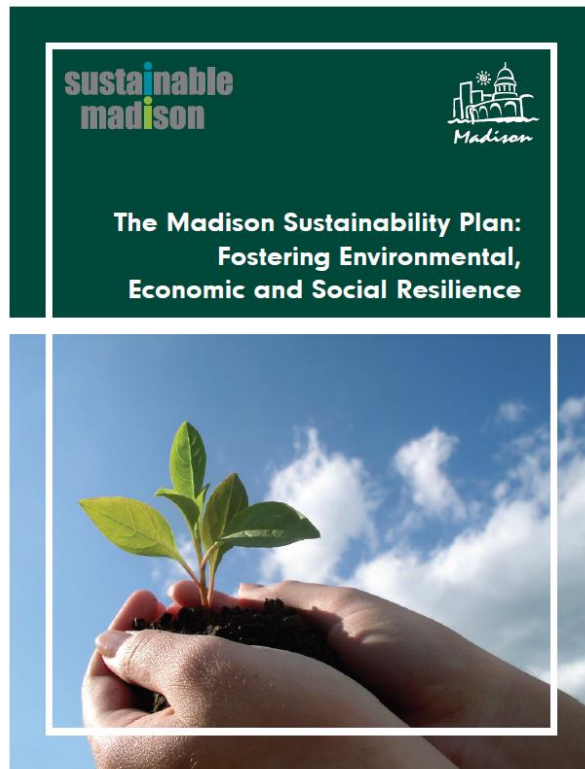
Source: Stern review.



# Why is Madison doing a carbon inventory?

## The Madison **Sustainability** Plan:

Fostering Environmental, Economic and Social Resilience



*Reduce* Carbon Emissions by **80%** by 2050  
(2010 baseline)

# Goal 6: Report Carbon Footprint

## Actions:

1. Develop a carbon footprint baseline (2010)
2. Develop carbon footprint estimate.
3. Develop baseline carbon analysis, budget and outline a climate action plan with benchmarks....

*“Develop a comprehensive Carbon Footprint Report for the City of Madison that highlights green house gases and air pollutatns emitted and provide report to the public every two years.”*

## Local Government Operations Protocol (LGOP)

Clean Air Climate  
Protection (CACP)  
Software

## ICLEI—Local Governments for Sustainability

“Local action for global sustainability and supports cities to become sustainable, resilient, resource-efficient, biodiverse, low-carbon; to build a smart infrastructure; and to develop an inclusive, green urban economy with the ultimate aim to achieve healthy and happy communities.”

# Methodology



# ICLEI's Five Milestones



# Milestone 1: ICLEI Carbon Inventory Boundaries

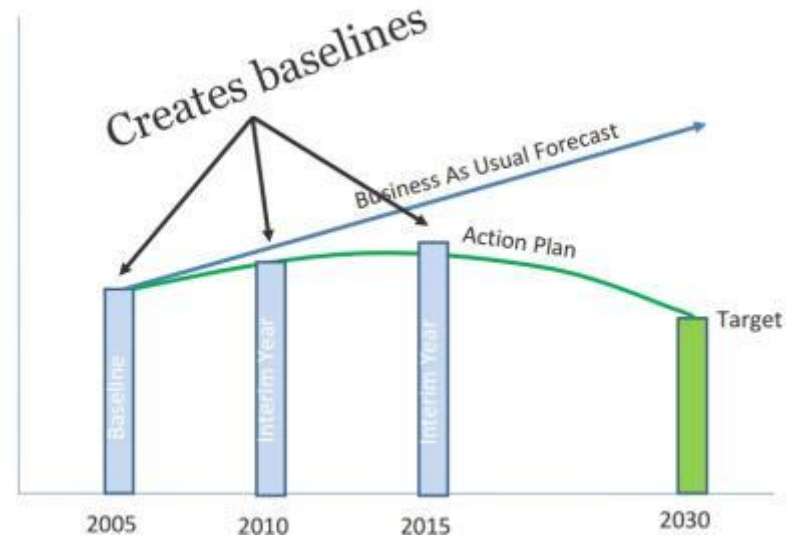


# LGOP and selecting a baseline year

Designed to provide a standardized set of guidelines to assist local government in quantifying and reporting GHG emissions associated with their government operations



The Climate Registry







# Categorizing Emission by Scopes

## Scope 1: Direct emissions

- Vehicle and equipment fuel consumption
- On-site natural gas combustion
- Refrigerants leaked from on-site equipment



## Scope 2: Indirect emissions

- Off-site electricity production
- Off-site heat or steam production



## Scope 3: Other indirect emissions

- Employee commute vehicle emissions
- Employee waste production
- Contracted services



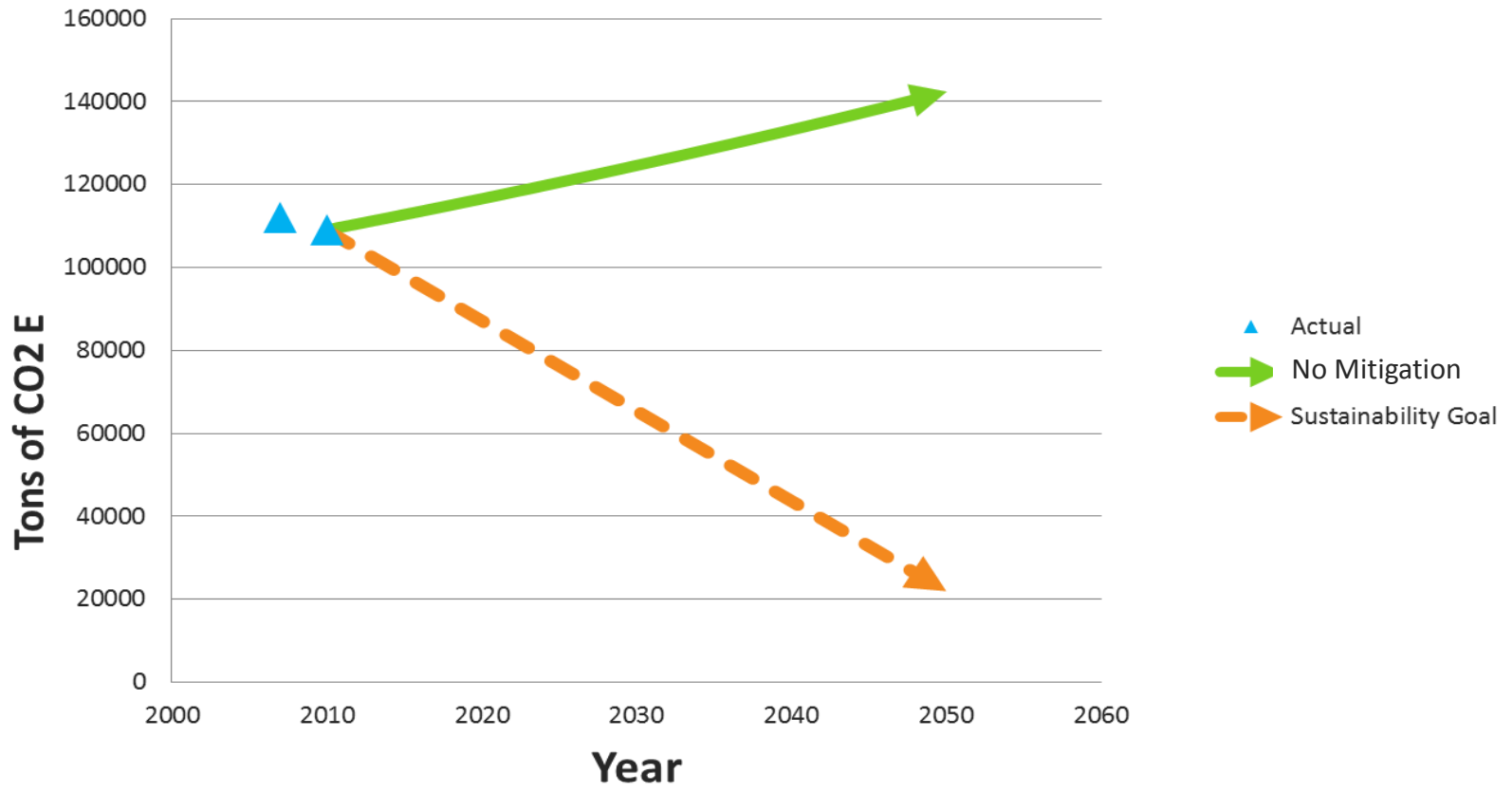


# Inventory Results



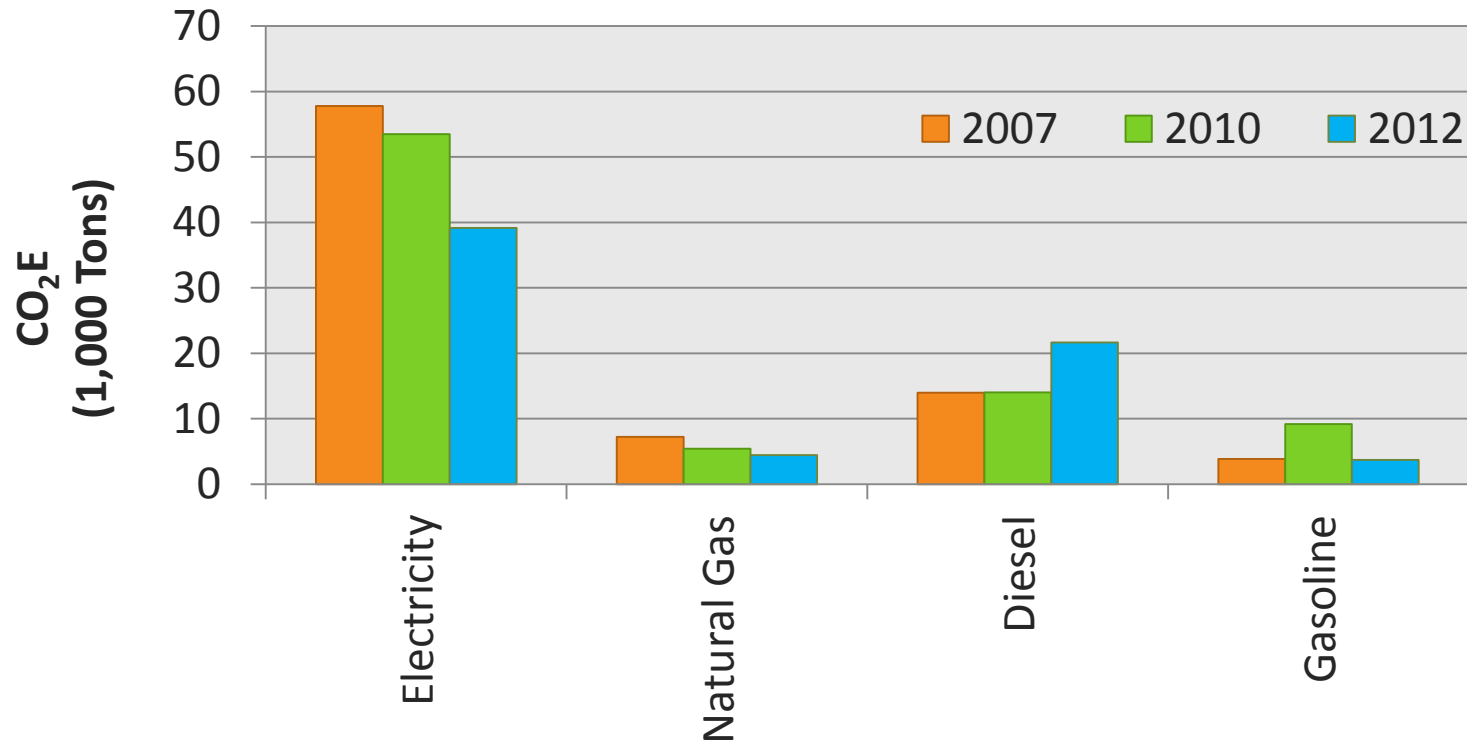
# Carbon Emissions Forecast & Sustainability Goals

In LGOP, Equivalent Carbon Dioxide (CO<sub>2</sub>E) includes:  
Carbon Dioxide (CO<sub>2</sub>), Nitrous Oxide (N<sub>2</sub>O), Methane (CH<sub>4</sub>) and other Chlorofluorocarbons and Hydrofluorocarbons



# Results (Scope 1&2)

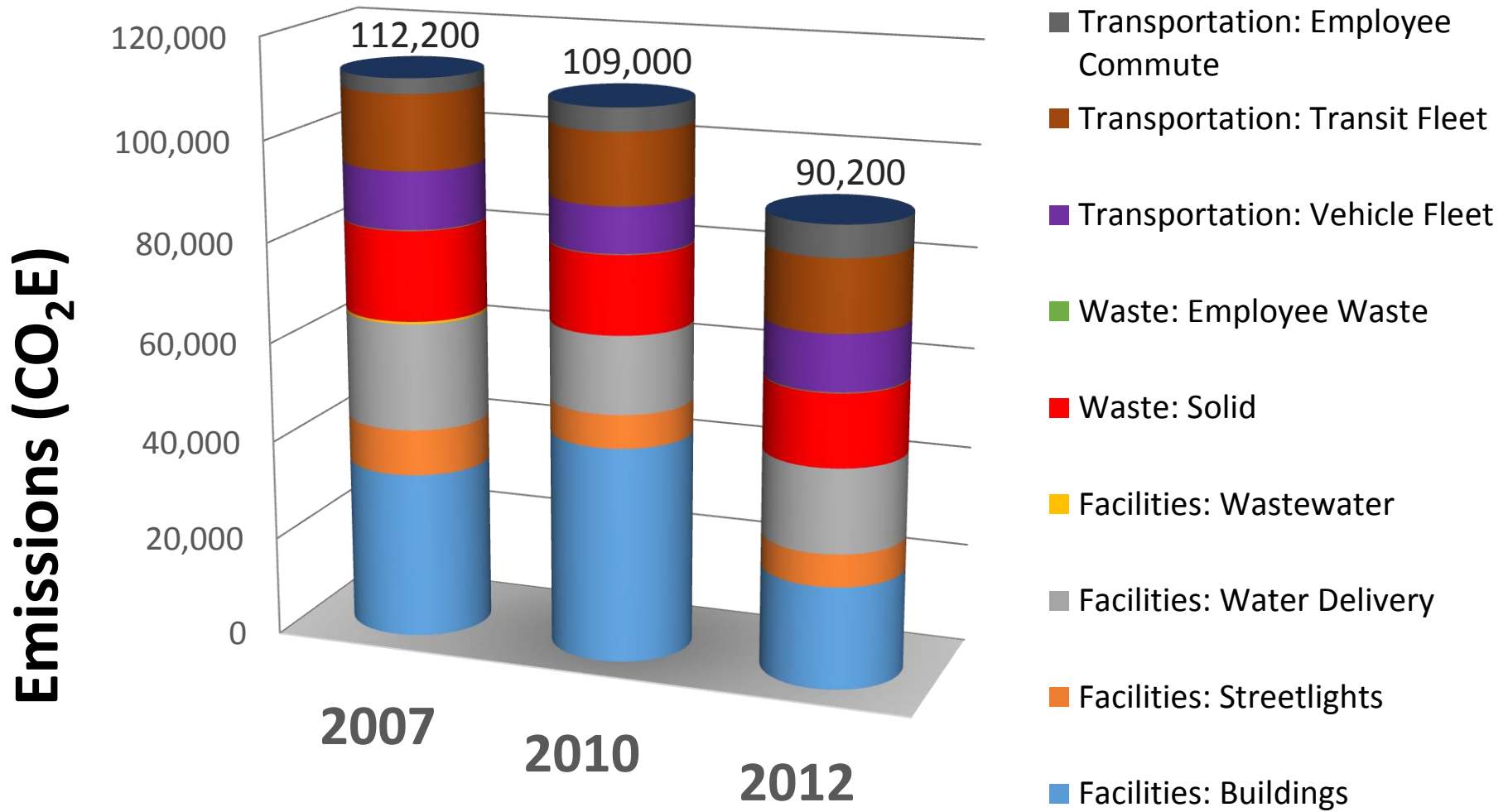
## by Source, 2007-2012



\*Refrigerant data not included in graph above due to low emissions  
(Less than 100 Tons Equivalent CO<sub>2</sub> annually)

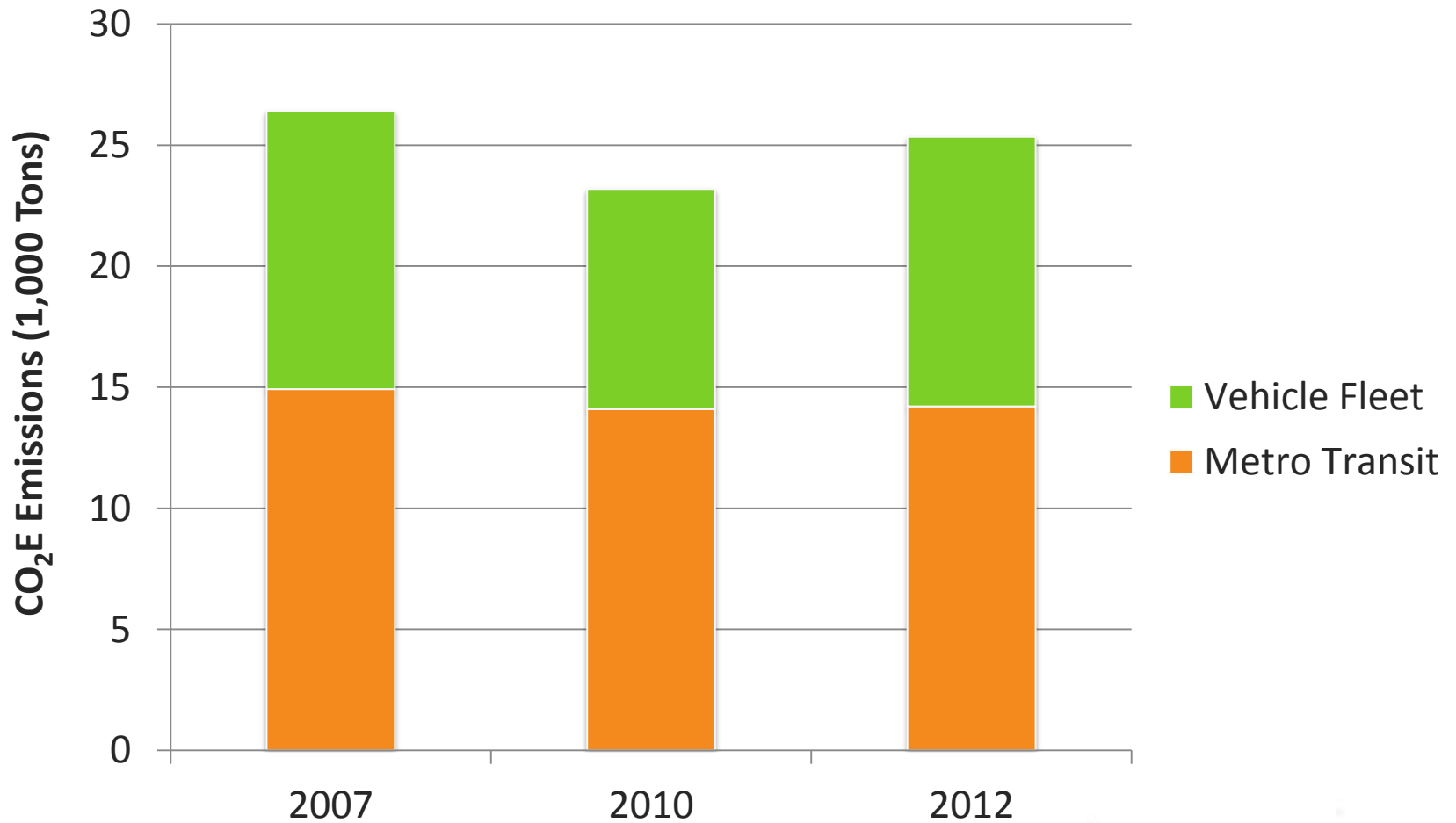
# Summary of Inventories by Sector

At a glance: -20% Emissions 2007 to 2012?

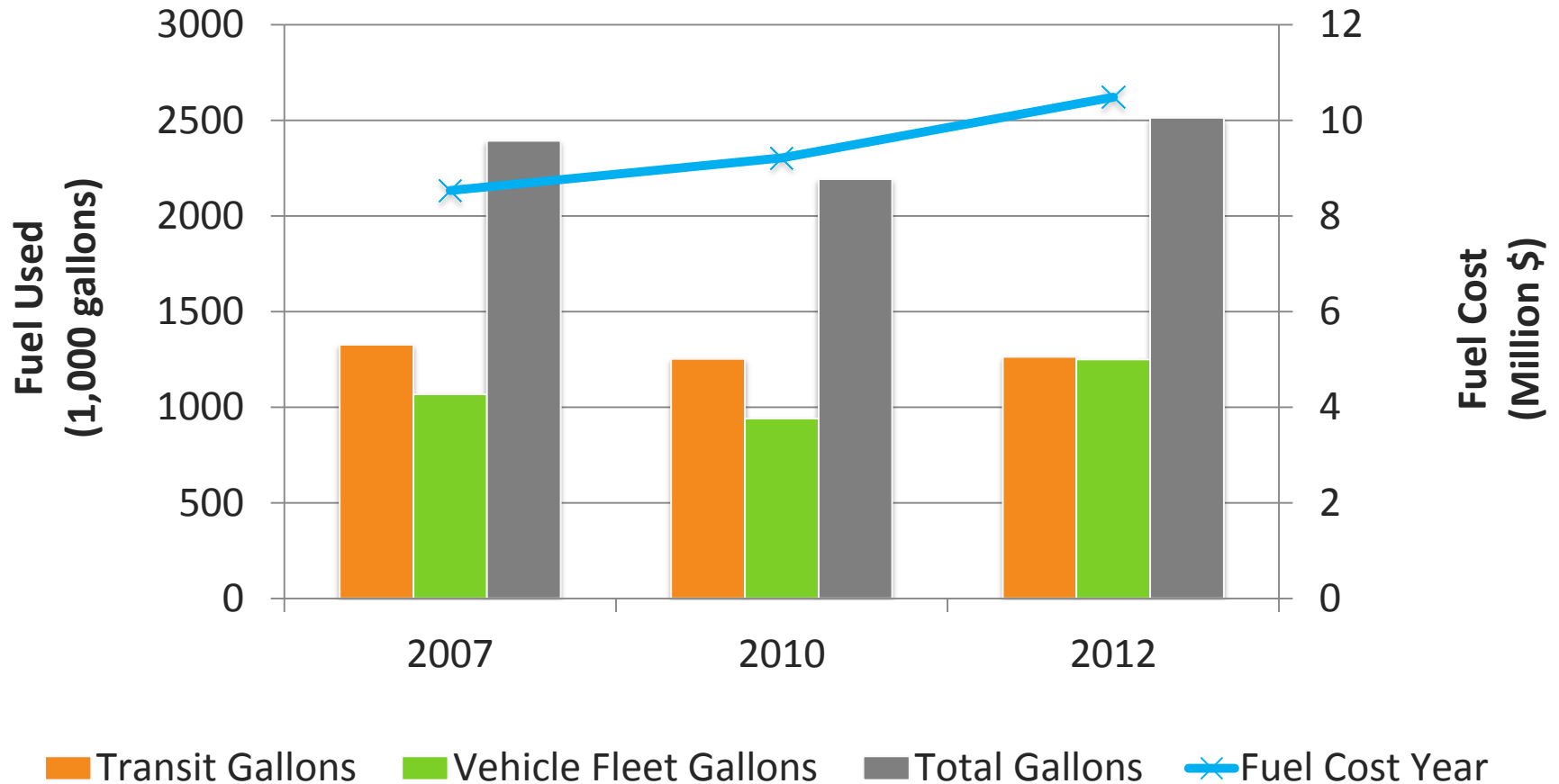


**DATA VARIABILITY OF INDIVIDUAL SECTORS DOES NOT ALWAYS EQUATE TO EMISSIONS REDUCTION.**

# Transportation: Revenue Transit & Support Vehicle/Equipment



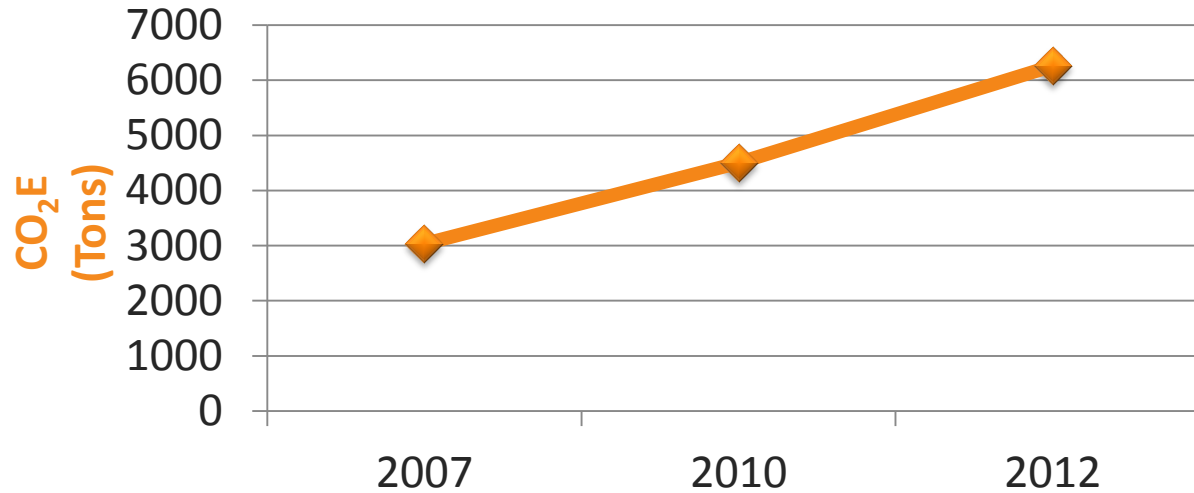
# Transportation (cont'd): Fuel Energy and Cost



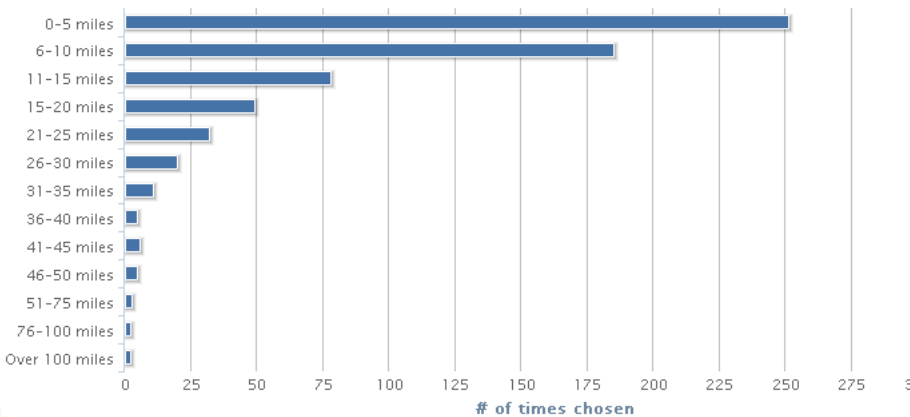
**In 5 years: Annual Fuel Expenditure = +23% VS Fuel Cost Per Gallon = +27%**

# Transportation : Employee Commute (Scope 3)

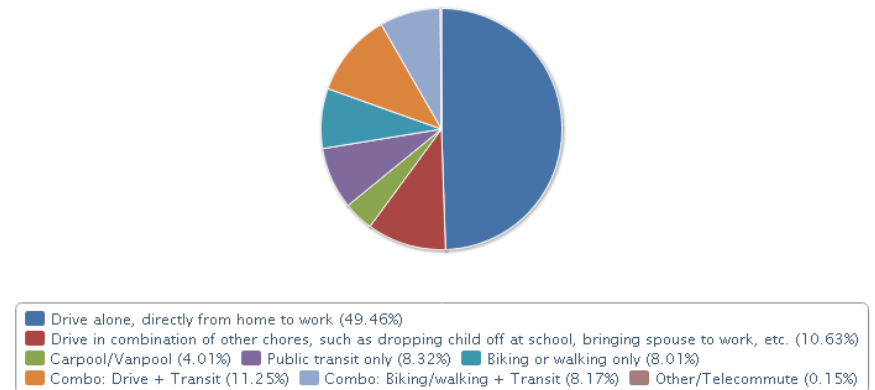
## Employee Commute Survey Results



In 2012, what is the distance of your commute, ONE-WAY, to...

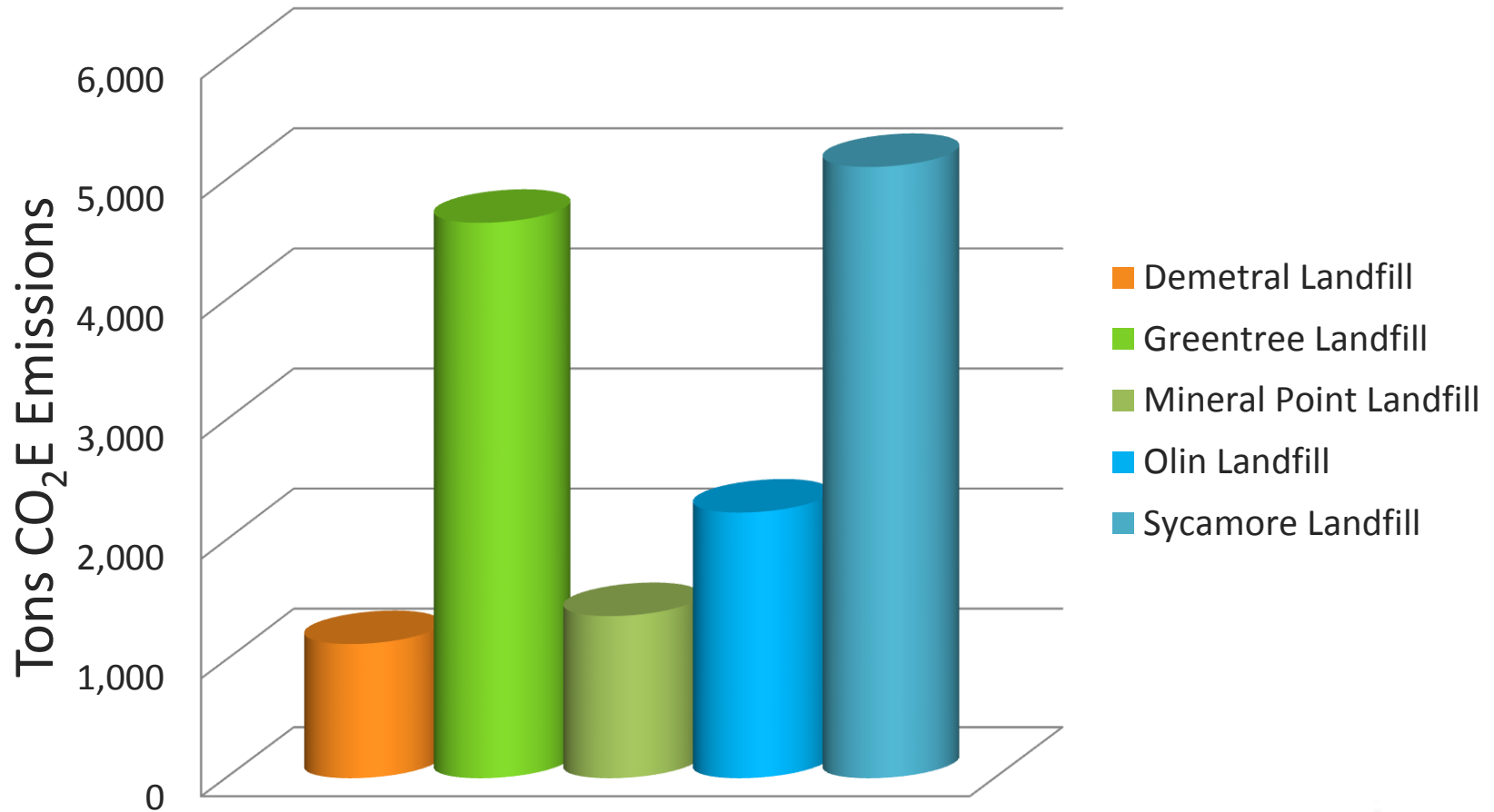


In 2012, what was your primary mode of transportation for...

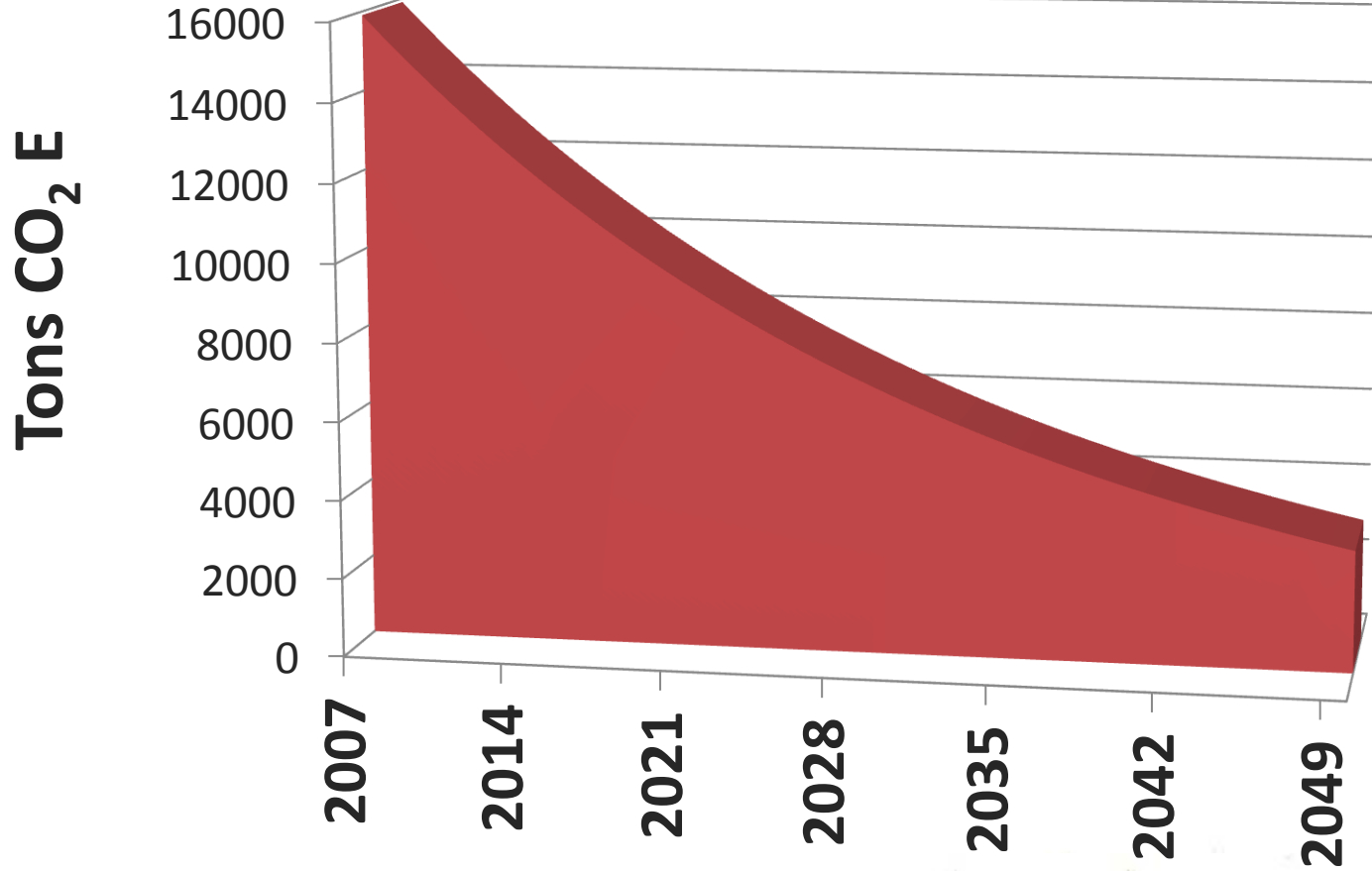




# Results: 2012 Solid Waste Emissions



# Total CO<sub>2</sub> Equivalent Emissions from Landfills

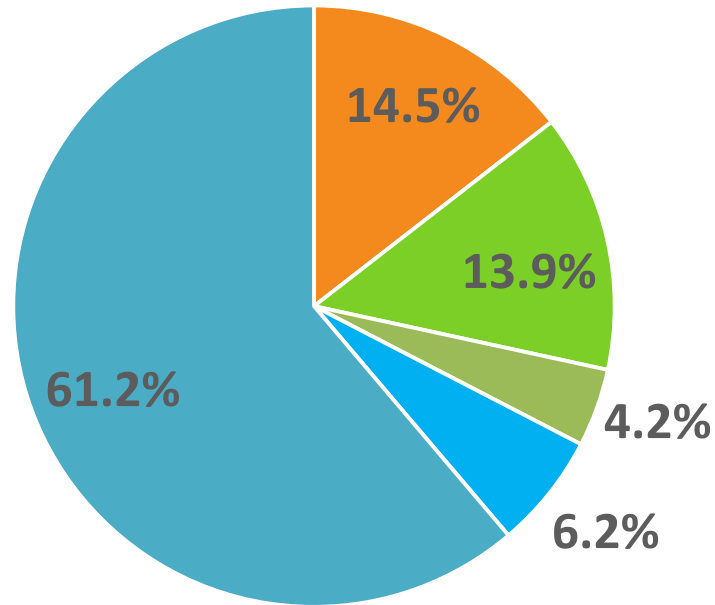


# Employee & Facilities Waste

- No City Owned Open Landfill
- City not directly responsible for GHG
- Exact data unavailable
- Estimated 1000 tons/year

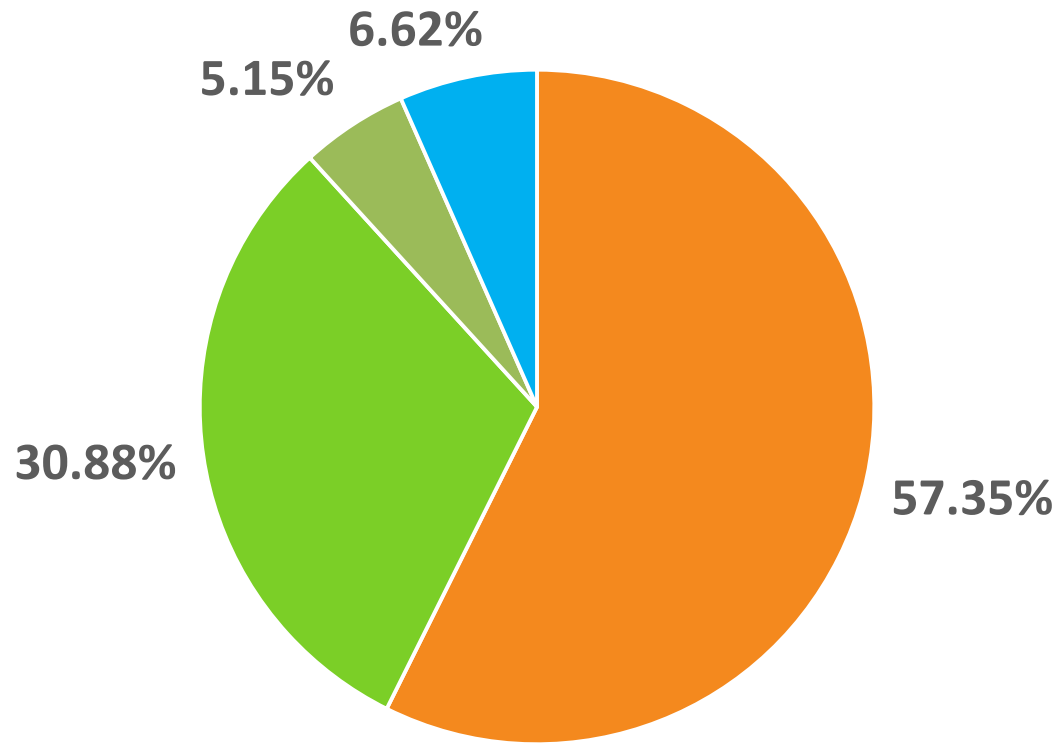


# Waste Composition



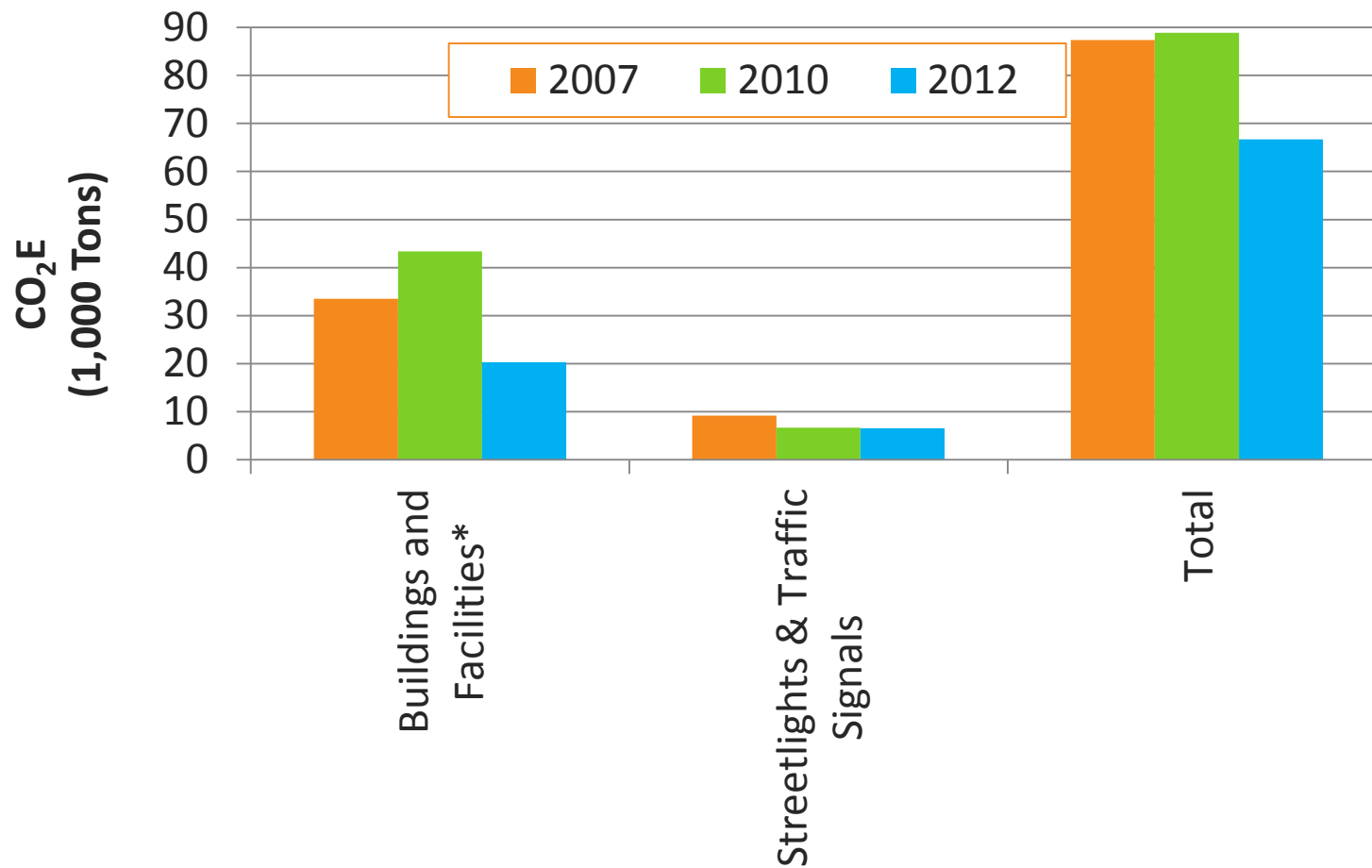
- Paper Products
- Food
- Plant Debris
- Wood or Textiles
- Other Waste

# Greenhouse Gas Contributions of Waste



- Paper Products
- Food Waste
- Plant Debris
- Wood or Textiles

# Results: Facilities & Lighting by Sector, 2007-2012



# 2012 Data Considerations

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2012 Emissions Data significantly different from 2007/2010

1. Madison transitioning to new data software
  - Possible double-counting in 2007/2010
  - Missed or underreported emissions in 2012
    - Central Library
    - City and County Building
2. Consistent data important for cross-year analysis
  - Vehicle Fleet data (equipment 2012)

Green Electricity surcharge only generally included in electrical emissions data

1. Electricity comes from wide area, data does not disclose how much green electricity received.
2. City-owned and operated green energy projects different



# Recommendations



## Recommendations:

Utilize ICLEI's  
**Standardization** and  
**Replication** Tools

## Standardize... and Replicate!

1. Improve software fluency
2. Improve data accessibility
3. Consistent information across years key to data efficacy
4. Solve data variations



Data. Now Accessible.

Source: prstech.com

**Danke schon!!!!**  
**QUESTIONS?**

