



Preliminary Greenhouse Gas Emissions Inventory Results

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Project Background

- LMG signed US Mayors' Climate Protection Agreement (2005)
 - ◆ Meet or beat 7% reduction from 1990 levels by 2012 (Kyoto targets)
 - ◆ Urge governmental implementation of programs to assist in reaching Kyoto targets
 - ◆ Urge US Congress to pass bipartisan climate change legislation
- Mayor's commitment under the agreement is consistent with initiatives under Partnership for a Green City (PGC)
- Key initial step for Mayor's commitment involves developing a baseline greenhouse gas (GHG) inventory



Benefits of Mayors' Climate Protection Agreement Implementation

- Enable communities to meet emissions reduction goals
- Adopt and enforce effective land-use policies
- Promote alternate transportation options (e.g., public transit, bicycle use, and car pooling)
- Increase use of alternative renewable energy resources
- Practice and promote sustainable building practices
- Increase recycling rates in City operations and in the community



GHG Inventories Project Scope

- Community inventories
 - historical
 - ◆ 1990
 - ◆ 2006
 - Community inventory projections
 - ◆ 2012
 - ◆ 2020
- Entity GHG inventories (2006)
 - ◆ JCPS
 - ◆ LMG
 - ◆ UofL
- Other PGC (quasi-governmental) inventories (2006)
 - ◆ LRAA (2004)
 - ◆ LWC
 - ◆ MSD
 - ◆ TARC



GHG Inventories Project Scope

- Geographic scope
 - ◆ Emission sources within Jefferson County
 - ◆ Excluded process emissions and some fuel use (other than natural gas) from industrial facilities and community fugitives (i.e., refrigeration)
 - Excluded emissions are likely to be a small proportion of the total inventory and may be included in industrial sources' emissions inventories to be prepared by those sources
 - Only energy usage data provided by LG&E is used
- Organizational boundaries
 - ◆ Operational control approach
 - ◆ Includes sources where entities have full authority to introduce and implement operating policies



GHG Emission Sources

- Fuel usage in combustion units at partnership entities
 - ◆ Boilers, generators, engines
- Fuel usage in combustion units within the residential, commercial, and industrial sectors (as reported by LG&E)
 - ◆ Boilers, generators, engines
- Mobile combustion by partnership entities
 - ◆ Vehicle fleets owned/operated by the entities
- Mobile combustion by community
 - ◆ On-road sources operating within the community
- Other sources in community
 - ◆ Nonroad sources operating within the community (e.g., forklifts, backhoes, lawn mowers)



GHG Emission Sources

- Fugitive emissions
 - ◆ Coal handling & storage
- Waste-related emissions
 - ◆ Solid waste disposal & wastewater treatment
- Airports (LRAA)
 - ◆ Airport vehicle fleet & airplanes



GHG Emission Calculation Approach

- Standard approach recommended by EPA
- Conforms to guidelines from Intergovernmental Panel on Climate Change
- Used software from International Council for Local Environmental Initiatives (ICLEI)
- Carbon dioxide equivalent (CO₂e) emissions are quantified
- Does not include any criteria pollutant emissions from industrial facilities

Community Emissions Sectors

Residential

- Electricity/natural gas used in homes

Commercial

- Electricity/natural gas used in business properties (Small commercial and industrial sales and large commercial sales on FERC form)

Industrial

- Electricity/natural gas used in mfg facilities (Large industrial sales on FERC form)

Transportation

- Fuels used by on-road and non-road sources

Waste

- Emissions at landfills and wastewater treatment plants

Other

- Nonroad emissions (e.g., forklifts, backhoes, lawn mowers)

Entities Emissions Sectors

Buildings

- Electricity/natural gas/coal used in entity operations

Vehicle Fleet

- Fuels used by on-road sources

Waste

- Waste generated by entity operations

Other

- Coal handling/storage and LRAA emissions data

Data Inputs for GHG Inventories

Type	Input Data
Stationary Combustion/ Electricity	<ul style="list-style-type: none"> ■ LG&E information ■ FERC forms ■ Entity-specific fuel usage
Mobile Combustion	<ul style="list-style-type: none"> ■ LMG information ■ Fuel type, fuel usage, VMT ■ KIPDA TDM, EPA MOBILE 6.2 and FHWA data
Waste-Related	<ul style="list-style-type: none"> ■ Waste generation data from solid waste management annual reports ■ Entity-specific waste generated data
Fugitive	<ul style="list-style-type: none"> ■ Relevant data not readily available for refrigerants and fire suppression ■ Most likely will have low emissions profile as compared to total emissions
Other	<ul style="list-style-type: none"> ■ Information from nonroad sources (NONROAD 2005 models) which includes emissions from forklifts, backhoes, lawn mowers, etc.; Louisville International Airport and Bowman Field (LRAA); and coal handling/storage at UofL



GHG Inventories Results

--Key Points--

- GHG emissions from the community are in the range of emissions of similar cities
- Transportation & residential sectors constitute the two largest emitting sectors of total inventory
- 4.8% of the total community emissions are contributed by PGC entities
- Based on climate action plans implemented by other communities, GHG emissions profile highly dependent upon...
 - ◆ Fuel type used for heating & cooling
 - ◆ Public transportation infrastructure & deployment
 - ◆ Residential density



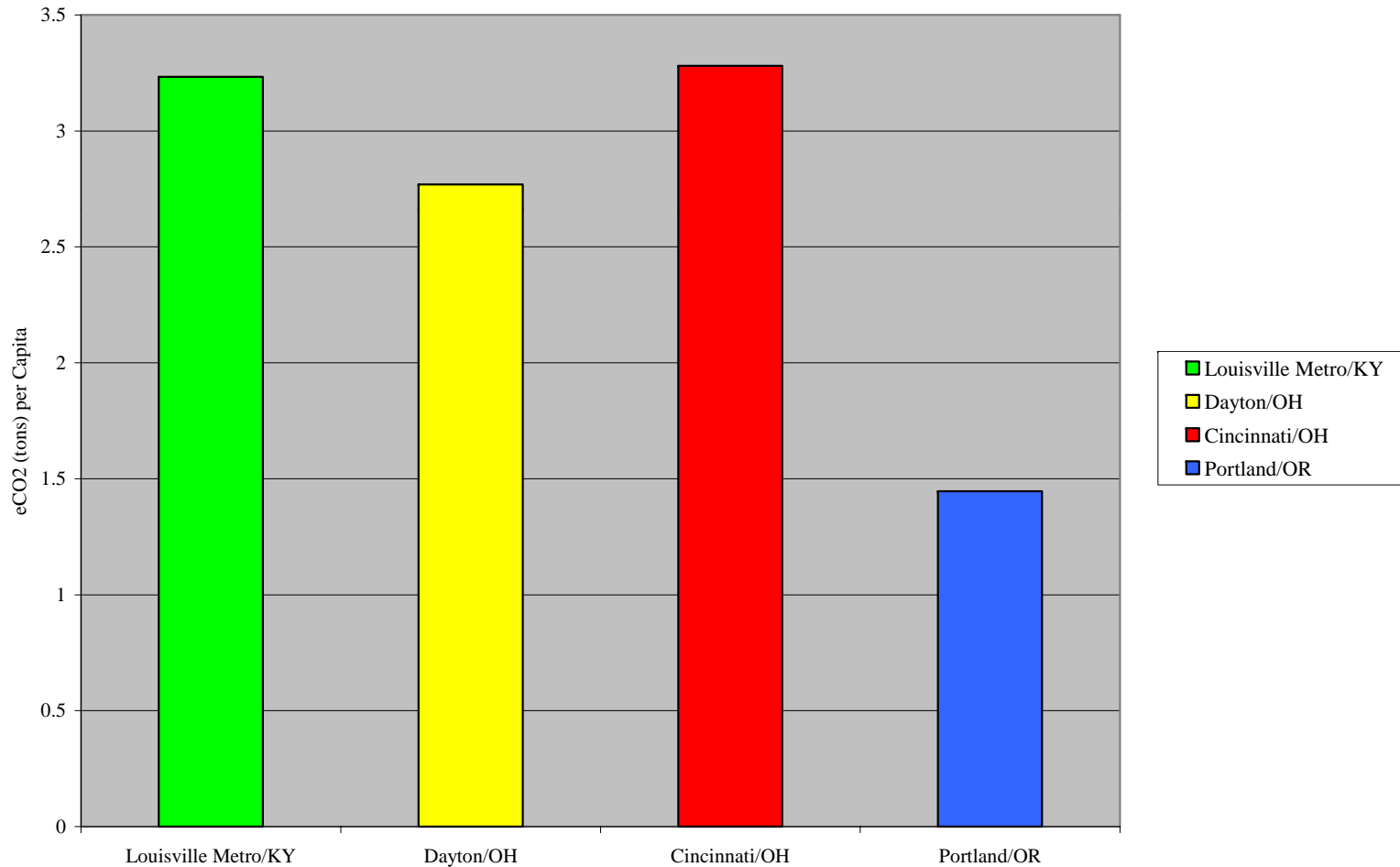
GHG Inventory Results

--Key Points--

- GHG emissions have increased by 8.5% between 1990 and 2006
- Reaching GHG reduction goal in Mayors' Climate Protection Agreement will be a challenge
 - ◆ Even for communities already implementing programs

GHG Emissions Comparisons

Comparison of Per Capita Emissions from Brookings Report (Tons CO₂e per capita)

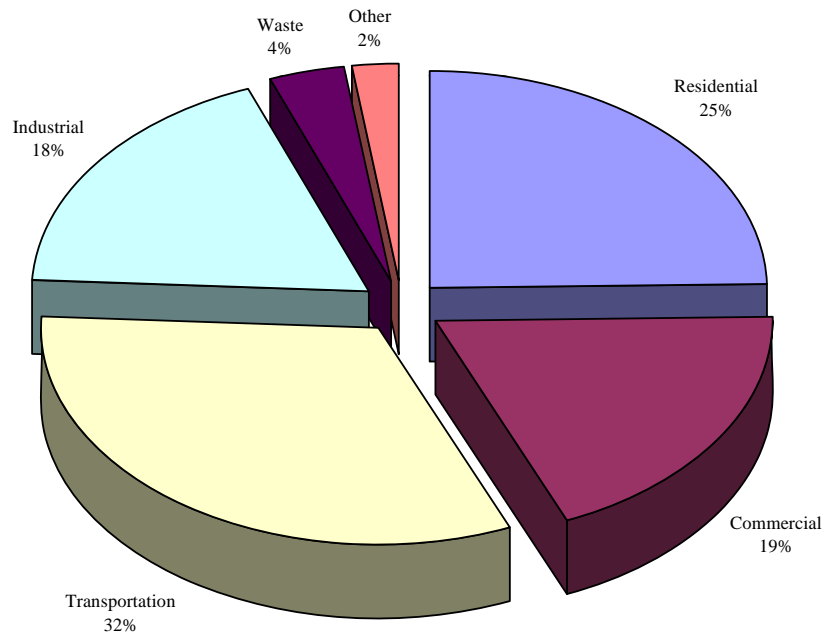


Community GHG Inventory Summary

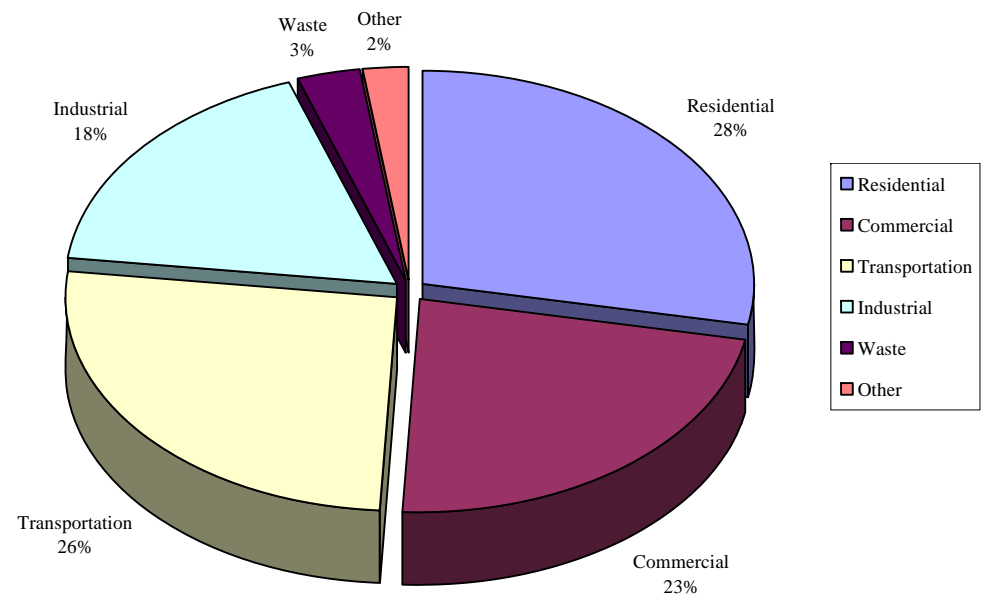
Sector	CO ₂ e (tons)		Percentage Increase from 1990 (%)
	1990	2006	
Residential	4,522,223	5,554,793	23
Commercial	3,399,389	4,501,454	32
Transportation	5,887,782	5,174,358	-12
Industrial	3,318,719	3,483,336	5
Waste	676,503	608,900	-10
Other	398,551	437,284	10
Total	18,203,167	19,760,125	8.55
Population	665,123	703,998	
CO₂e (tons) per Capita	27.37	28.07	

Community GHG Inventory Summary

1990 Emissions Inventory by Sector



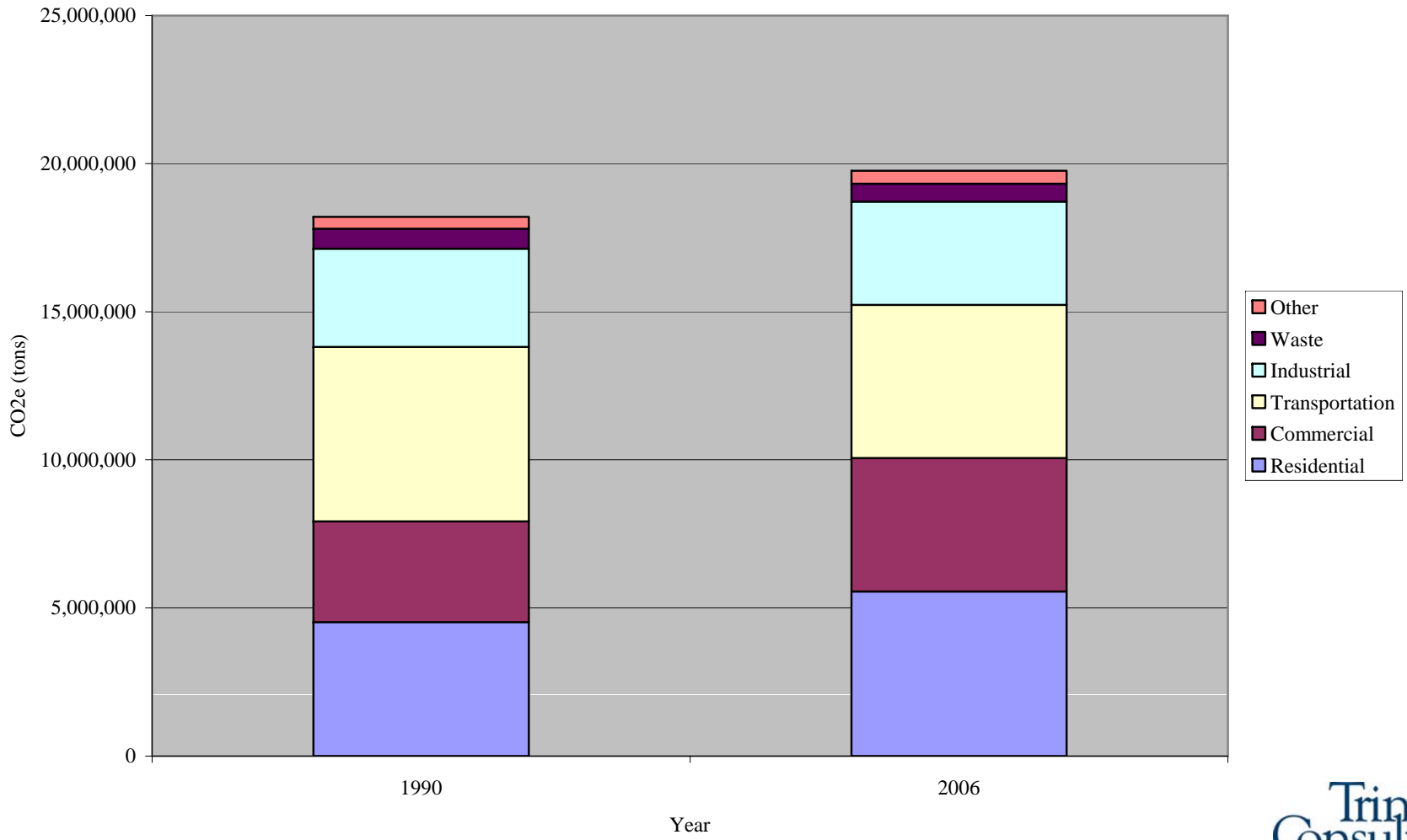
2006 Emissions Inventory by Sector



The percentages are relative to total absolute emissions for 1990 and 2006.

Community GHG Inventory Summary

Community CO2e Total Profile



Community GHG Inventory Summary

Sector	CO ₂ e (tons)			
	1990	2006	2012	2020
Residential	4,522,223	5,554,793	5,633,291	5,901,637
Commercial	3,399,389	4,501,454	4,554,342	4,772,183
Transportation	5,887,782	5,174,358	5,494,362	5,754,852
Industrial	3,318,719	3,483,336	3,516,122	3,684,962
Waste	676,503	608,900	630,637	659,560
Other	398,551	437,284	452,804	473,496
Total	18,203,167	19,760,125	20,281,558	21,246,690
Population	665,123	703,998	723,541	738,732
CO₂e (tons) per Capita	27.37	28.07	28.03	28.76



Key Sector Analysis

2006 Emissions Profile

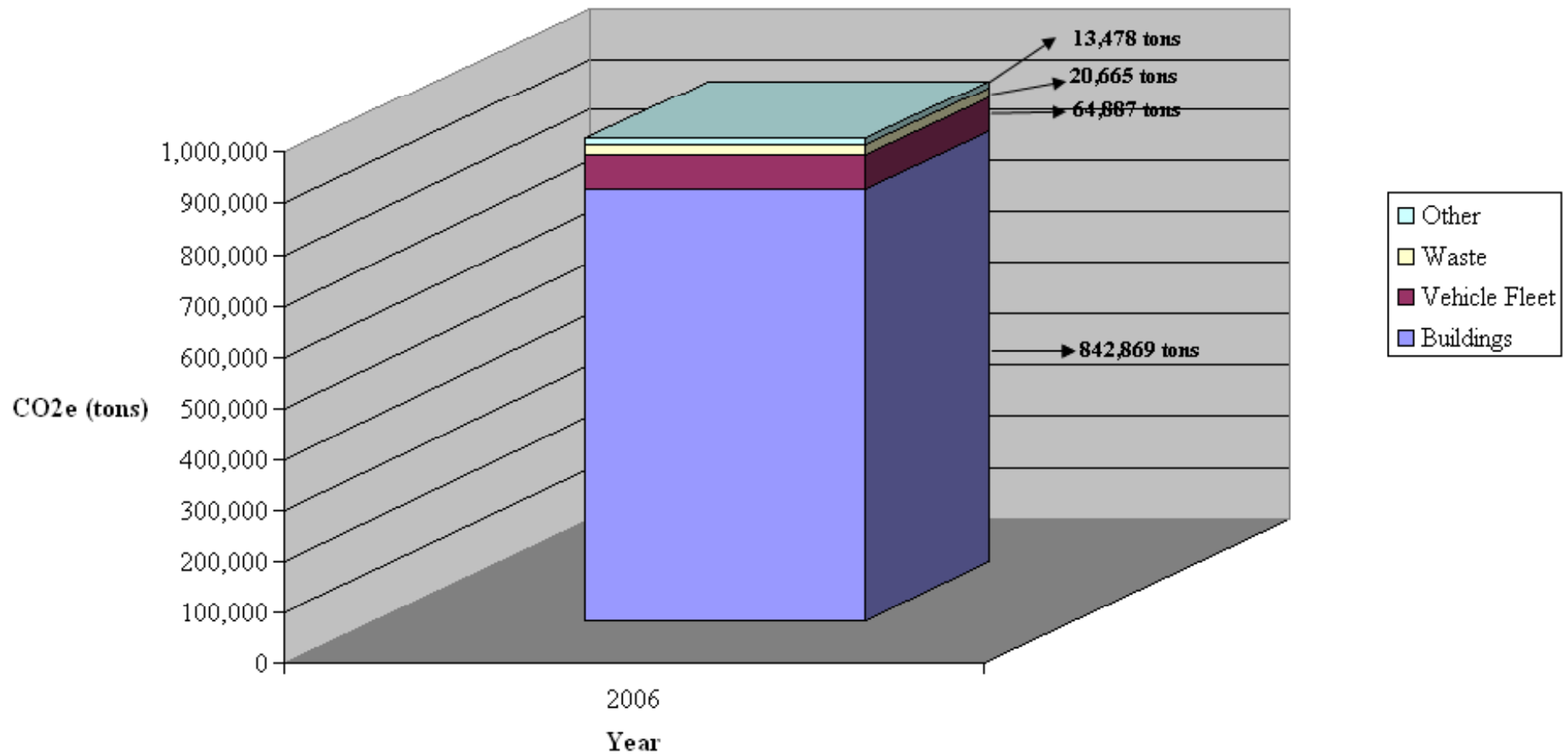
- Residential sector
 - ◆ 80% of total emissions attributable to electricity usage
- Commercial sector
 - ◆ 89% of total emissions attributable to electricity usage
- Industrial sector
 - ◆ 97% of total emissions attributable to electricity usage
- Transportation sector
 - ◆ 74% of total emissions attributable to E-10 gasoline use
 - ◆ Factors including, but not limited to, transition to 10% ethanol in gasoline blend and use of more fuel efficient vehicles has led to reduction of emissions within this sector between 1990 and 2006
- Waste sector
 - ◆ 2006 emissions are lower than those in 1990 due to increased waste diversion through recycling
- Other sector
 - ◆ Nonroad emissions are estimated outside the CACP tool

Entities GHG Inventory Summary

Sector	CO ₂ e (tons)						
	JCPS	UofL	LMG	LRAA	LWC	TARC	MSD
Buildings	218,297	201,539	107,107	0	131,639	5,958	178,329
Vehicle Fleet	32,499	65	25,652	0	747	5,150	774
Waste	5,229	0	15,436	0	0	0	0
Other	0	263	0	13,215	0	0	0
Total	256,025	201,867	148,195	13,215	132,386	11,108	179,103
Grand Total							941,899

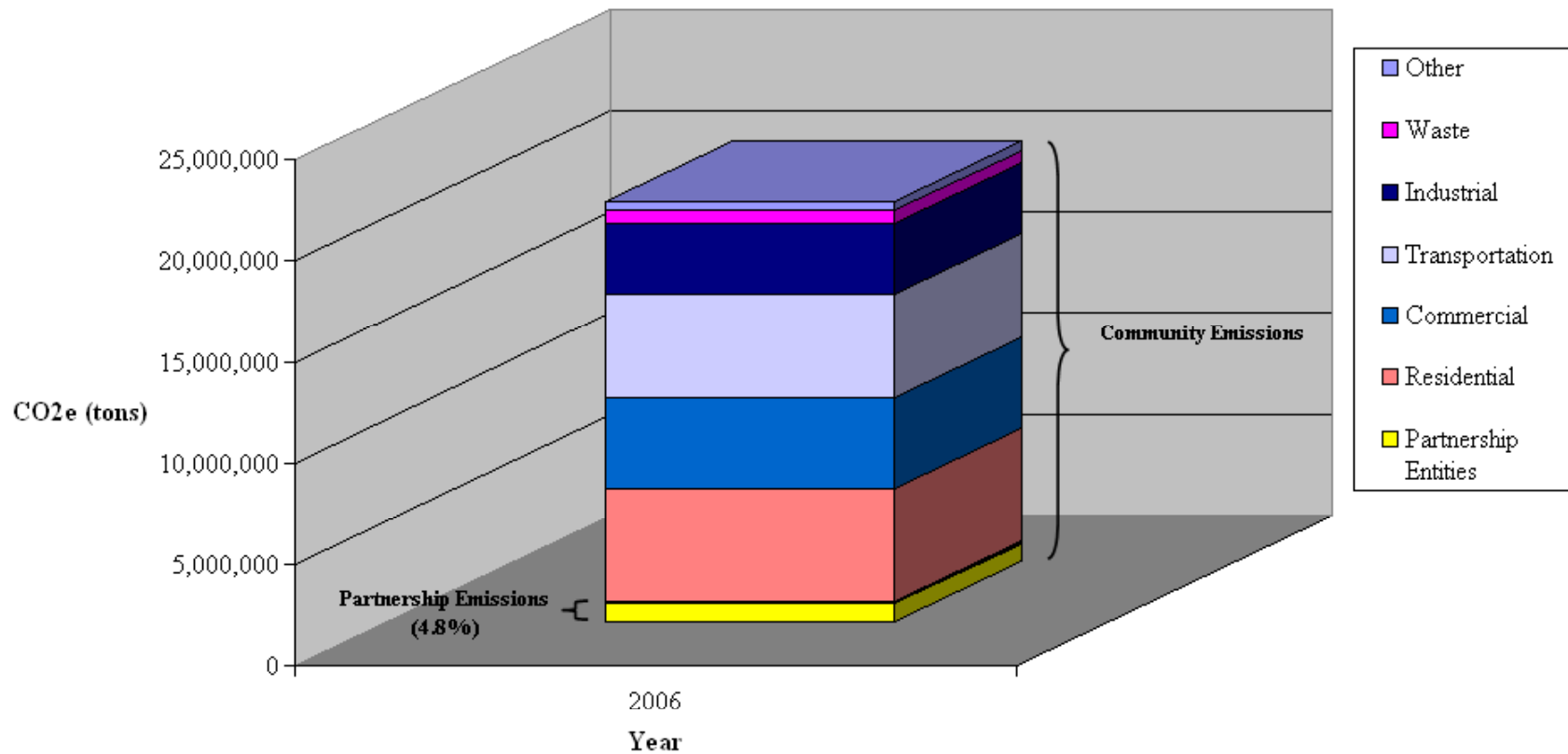
Partnership Emissions

Partnership Analysis GHG Emissions (CO₂e tons)



Community and Partnership Emissions

Community and Partnership Analysis GHG Emissions (CO₂e tons)





Next Steps

- Trinity/APCD
 - ◆ Finalize data collection to refine the community inventory
 - ◆ Develop final inventory report to document basis for GHG emissions inventory and highlight assumptions/recommendations
- PGC Climate Change Committee
 - ◆ Subcommittees continue to evaluate GHG mitigation options and corresponding costs
 - ◆ Select recommended strategies and prepare report for Partnership leaders