Cool Cities 2011

Progress Report

City of Ames ECOsmart

FOR A SUSTAINABLE FUTURE

Background

- Cool Cities Committee formed in 2007
  - Focus on City Operations Only
  - Collect Energy Use Data
  - Establish Carbon Footprint Baseline (2001-06)
  - Recommend Energy Reduction Goals
  - Develop Implementation Plan
- Goal to reduce carbon footprint (excluding utilities) 15% by 2014

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Improvements Since 2009

- All but two intersections have LED traffic signals
- New LED lights on 13th Street, in City Hall west parking lot
- New lighting at City Hall, Fleet, Fire Station 2, Golf Course
- Improved mechanical systems at City Hall
- New dock apron seals at Electric Distribution
- New motion activated switches at Fire Station 1, Fire Station 2, Fire Station 3

Energy Sectors

- Building Sector
- Fleet Sector
- Street Light Sector

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Building Sector

- **Data Inputs**
  - Annual kWh Consumption of Electricity
  - Annual Therms of Natural Gas
  - Total Square Feet
- **Controls**
  - Building Square Footage Changes
  - Degree Days (average daily temperature minus 65 degrees)

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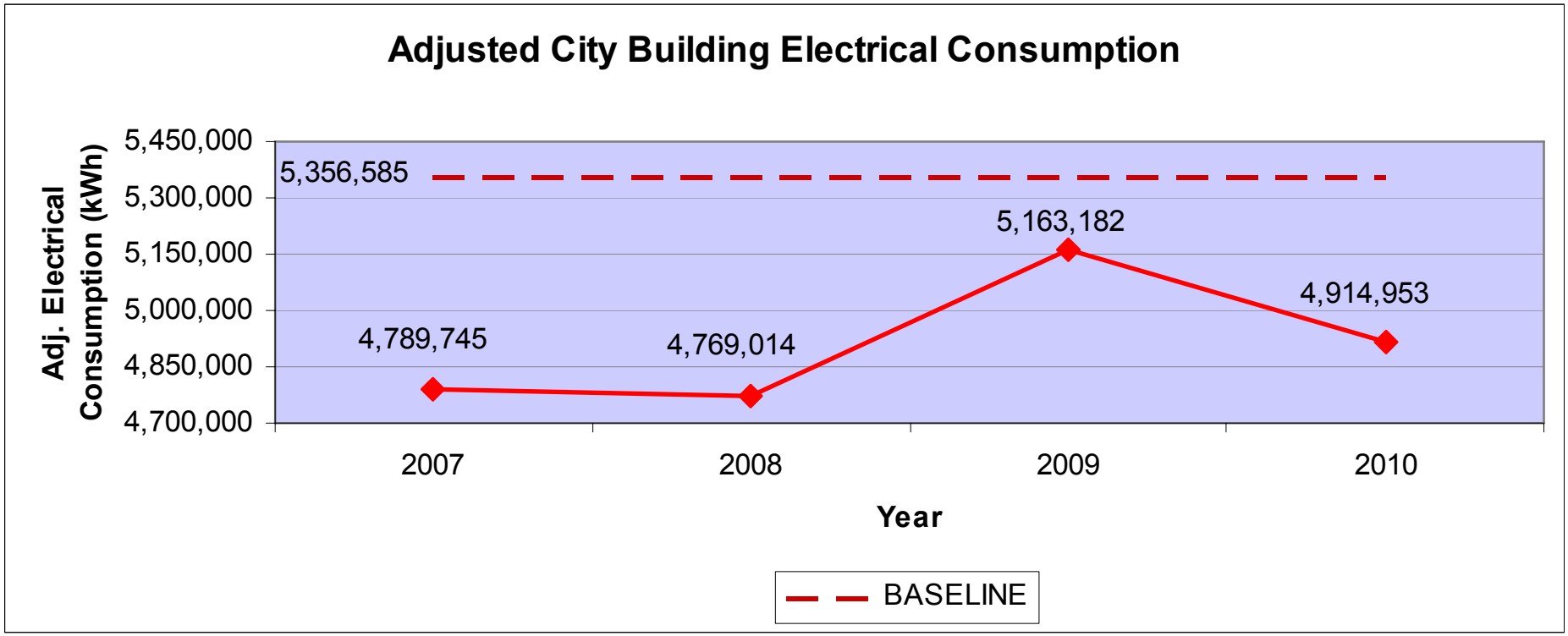
Building Sector Electrical Consumption



Building Sector Electrical Consumption

Electricity Used - kWh, Adjusted for Degree Days and Bldg. Size

Building or Department	BASELINE	2007	2008	2009	2010
Airport	24,675	21,545	18,631	15,794	12,055
Animal Shelter	33,917	30,640	25,501	25,973	26,424
Cemetery	11,116	12,189	12,068	11,776	12,706
City Hall	2,110,237	1,894,773	1,910,480	2,049,903	1,914,982
Cy-Ride	367,352	331,857	364,360	430,803	459,434
Electric Administration	66,226	69,481	70,453	72,038	69,529
Electric Distribution	342,743	333,844	321,072	330,585	330,245
Fire Station 1	182,448	120,072	104,048	116,919	109,302
Fire Station 2	57,932	50,198	48,331	51,788	52,388
Fire Station 3	86,149	82,130	89,620	84,080	83,152
Golf Course	21,516	22,167	20,068	21,010	20,888
Ice Arena	1,116,920	1,002,840	962,464	1,062,293	949,514
Information Services	29,670	24,202	22,445	23,946	19,143
Library	653,878	611,355	548,925	612,066	623,833
Maintenance Facility	177,556	120,800	190,959	190,787	175,299
Parks Maintenance	14,972	12,241	14,770	20,019	17,785
Parks Office	59,279	49,413	44,817	43,402	38,274
TOTAL BLDG. SECTOR	**5,356,585**	**4,789,745**	**4,769,014**	**5,163,182**	**4,914,953**

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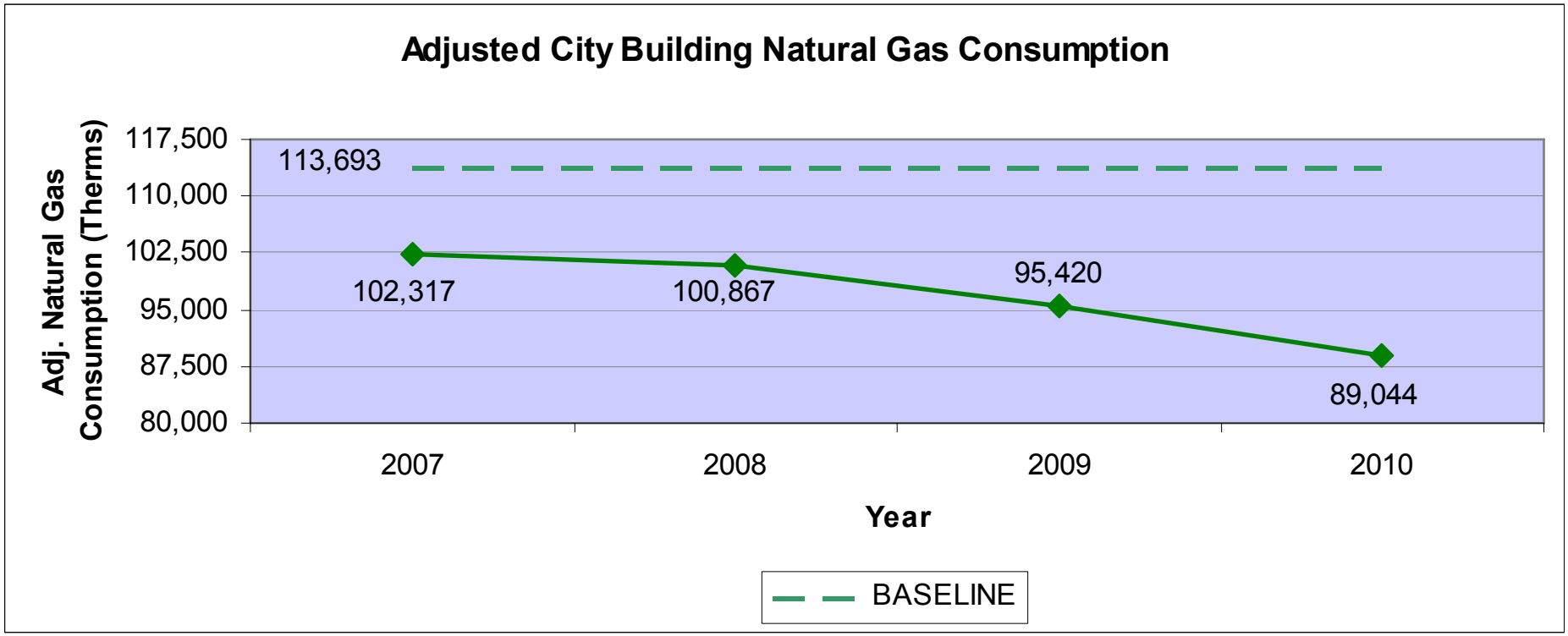
Building Sector
Natural Gas Consumption



Building Sector
Natural Gas Consumption

Natural Gas Used - Therms, Adjusted for Degree Days and Bldg. Size

Building or Department	BASELINE	2007	2008	2009	2010
Airport					
Animal Shelter	3,737	3,462	3,168	2,812	2,715
Cemetery	1,810	1,448	1,703	1,615	1,417
City Hall	2,708	2,572	2,257	1,843	1,694
Cy-Ride	28,617	21,271	20,236	19,548	17,268
Electric Administration					
Electric Distribution					
Fire Station 1	7,783	7,906	6,715	6,239	5,746
Fire Station 2	2,688	2,549	2,680	2,552	2,318
Fire Station 3	6,496	5,994	7,499	6,367	6,518
Golf Course	1,375	1,465	1,731	1,741	1,352
Ice Arena	25,749	25,322	25,610	25,912	23,021
Information Services	674	0	0	198	674
Library	8,594	8,802	8,739	7,826	7,942
Maintenance Facility	19,017	16,955	15,532	14,064	13,748
Parks Maintenance	1,577	1,795	1,892	1,762	1,726
Parks Office	2,868	2,777	3,105	2,940	2,905
TOTAL BLDG. SECTOR	**113,693**	**102,317**	**100,867**	**95,420**	**89,044**

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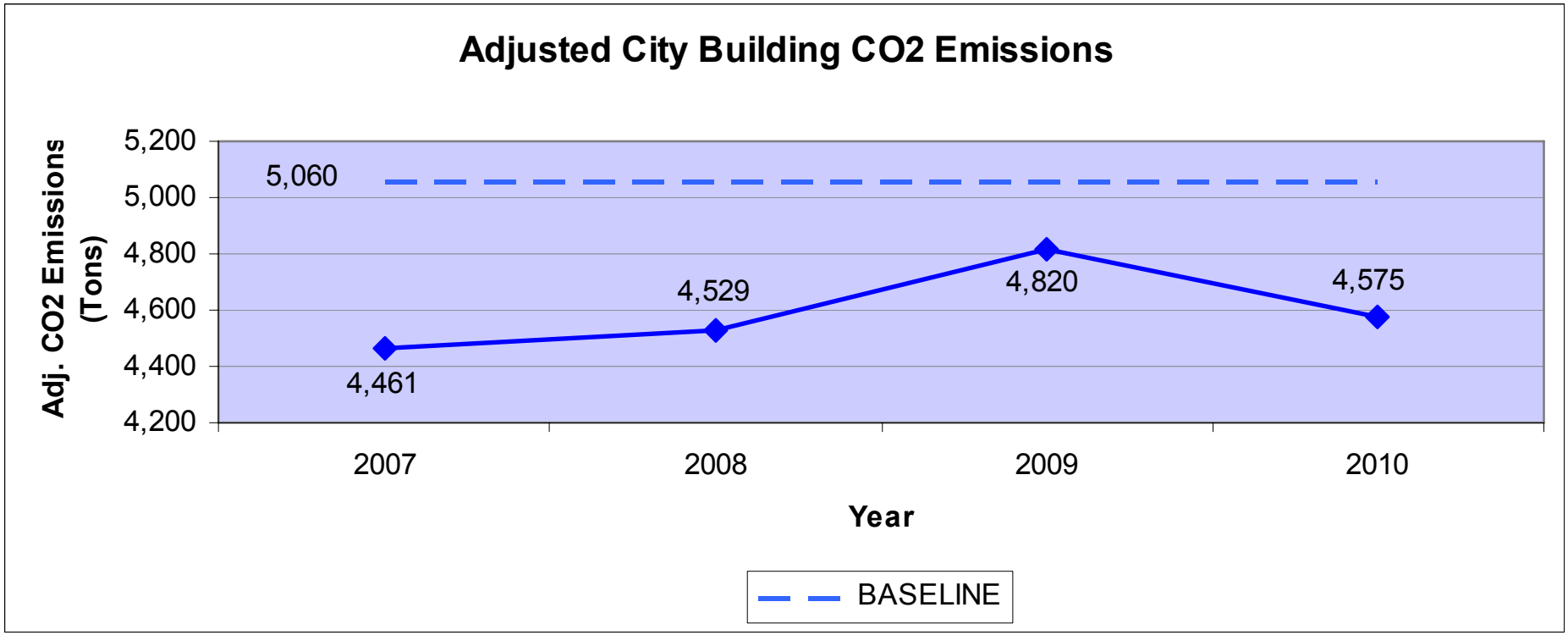
Building Sector CO2 Emissions



Building Sector CO2 Emissions

CO2 Emissions - Tons, Adjusted for Degree Days and Bldg. Size

Building or Department	BASELINE	2007	2008	2009	2010
Airport	20	18	15	13	10
Animal Shelter	51	46	40	39	38
Cemetery	20	19	20	20	19
City Hall	1,745	1,568	1,579	1,691	1,579
Cy-Ride	466	403	423	474	483
Electric Administration	54	57	58	59	57
Electric Distribution	281	273	263	271	271
Fire Station 1	198	147	127	134	125
Fire Station 2	64	57	56	58	57
Fire Station 3	111	104	120	108	108
Golf Course	26	27	27	28	25
Ice Arena	1,072	978	947	1,030	920
Information Services	24	20	18	21	20
Library	589	555	504	550	560
Maintenance Facility	251	110	252	243	229
Parks Maintenance	22	21	24	27	25
Parks Office	66	58	56	54	49
TOTAL BLDG. SECTOR	**5,060**	**4,461**	**4,529**	**4,820**	**4,575**

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Building Sector Carbon Footprint Reduction Summary

Building Sector Change Summary

	2007	2008	2009	2010	Total
Electric Consumption Change (kWh)	-566,840	-587,571	-193,403	-441,632	**-1,789,446**
% Electric Consumption Change	-10.6%	-11.0%	-3.6%	-8.2%	
Natural Gas Consumption Change (Therms)	-11,376	-12,826	-18,273	-24,649	**-67,124**
% Natural Gas Consumption Change	-10.0%	-11.3%	-16.1%	-21.7%	
CO2 Change (Tons)	-599	-531	-240	-485	**-1,855**
% CO2 Change	-10.0%	-10.3%	-4.5%	-9.6%	

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Fleet Sector

Data Inputs

- Annual Gallons of Fuel Burned
  - by *Type of Fuel*
  - by *Type of Vehicle/Equipment*
- Annual Miles Driven

Analysis

- Efficiency, not overall decrease
- Demand changes for vehicles

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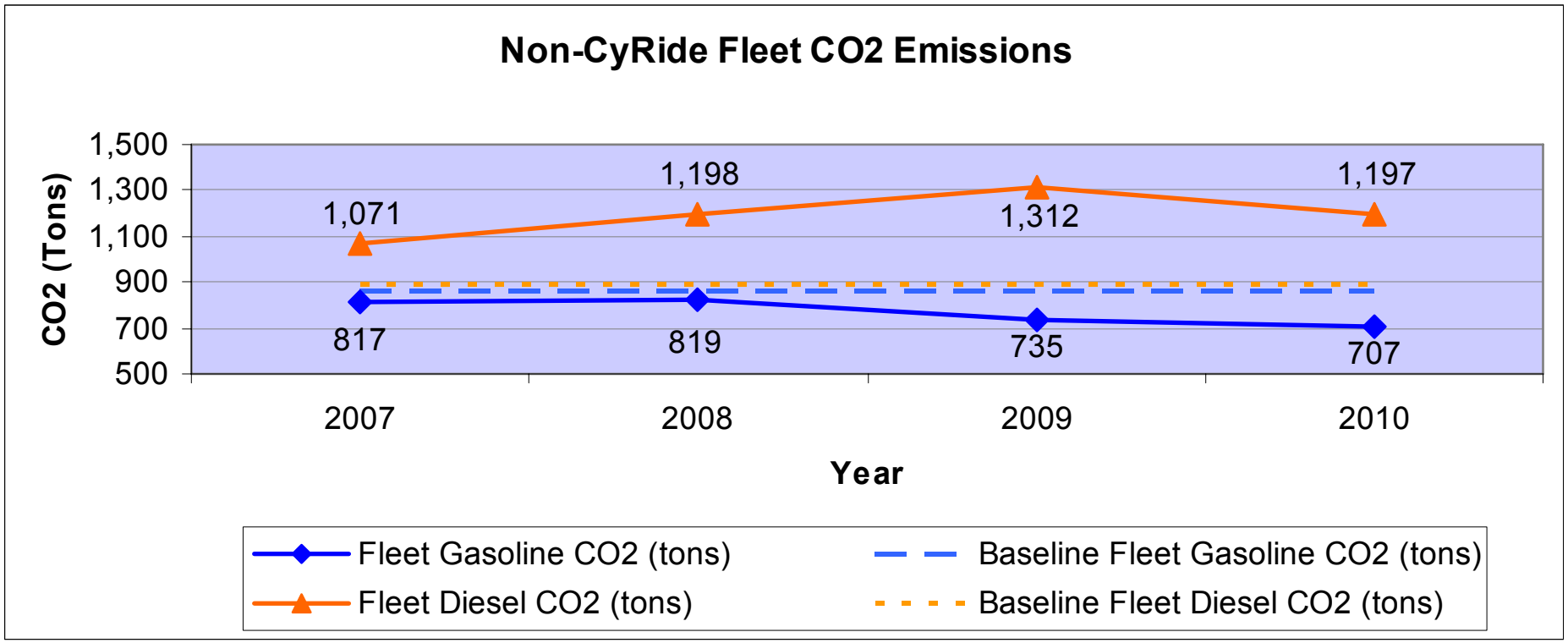
Non-CyRide Fleet Sector Carbon Emissions



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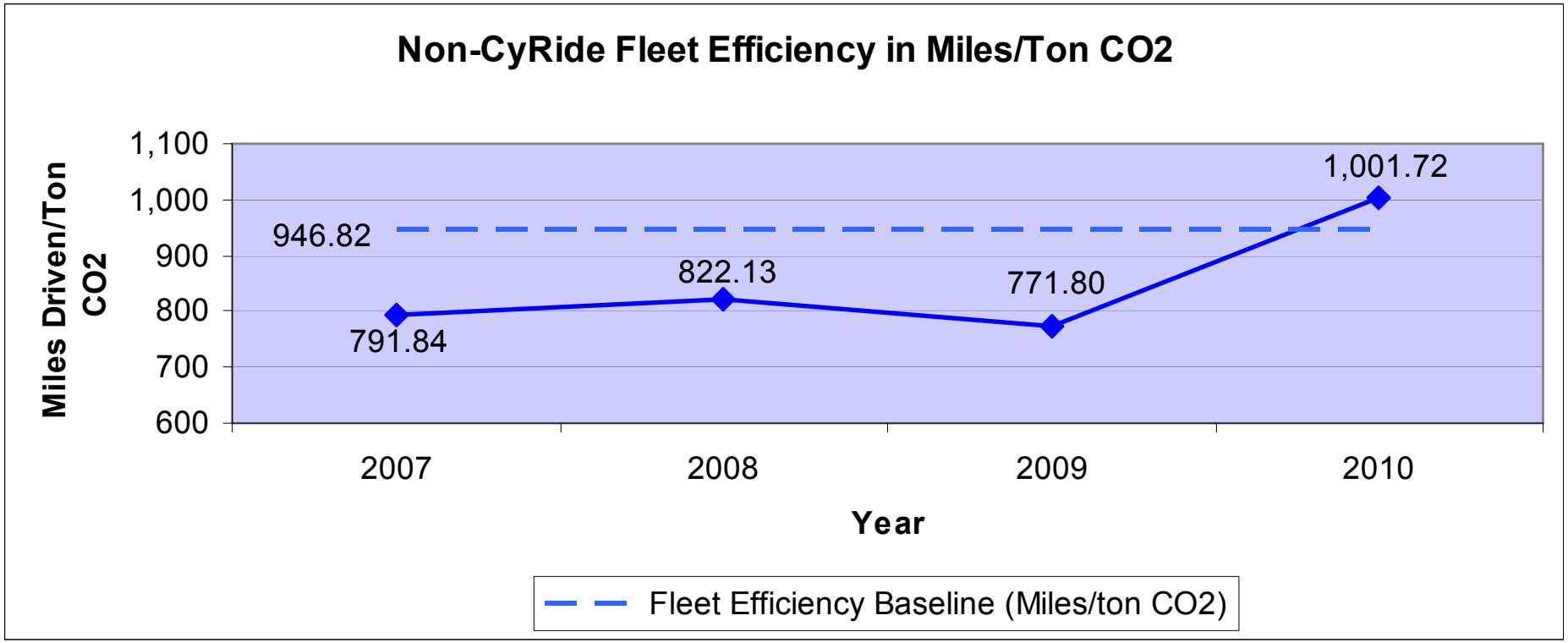
Non-CyRide Fleet Sector Carbon Efficiency



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Non-CyRide Fleet Sector Fuel Consumption

- **Increase in CO2**
  - More diesel usage
  - Severe weather:
    - Baseline years averaged 25 inches of snow, 2007-2010 averaged 42 inches
    - July 2010 windstorm
    - August 2010 floods
    - More severe winters = more trucks to fill potholes
- **Increase in Efficiency**
  - 2010: 15% increase in miles, only 9% increase in CO2

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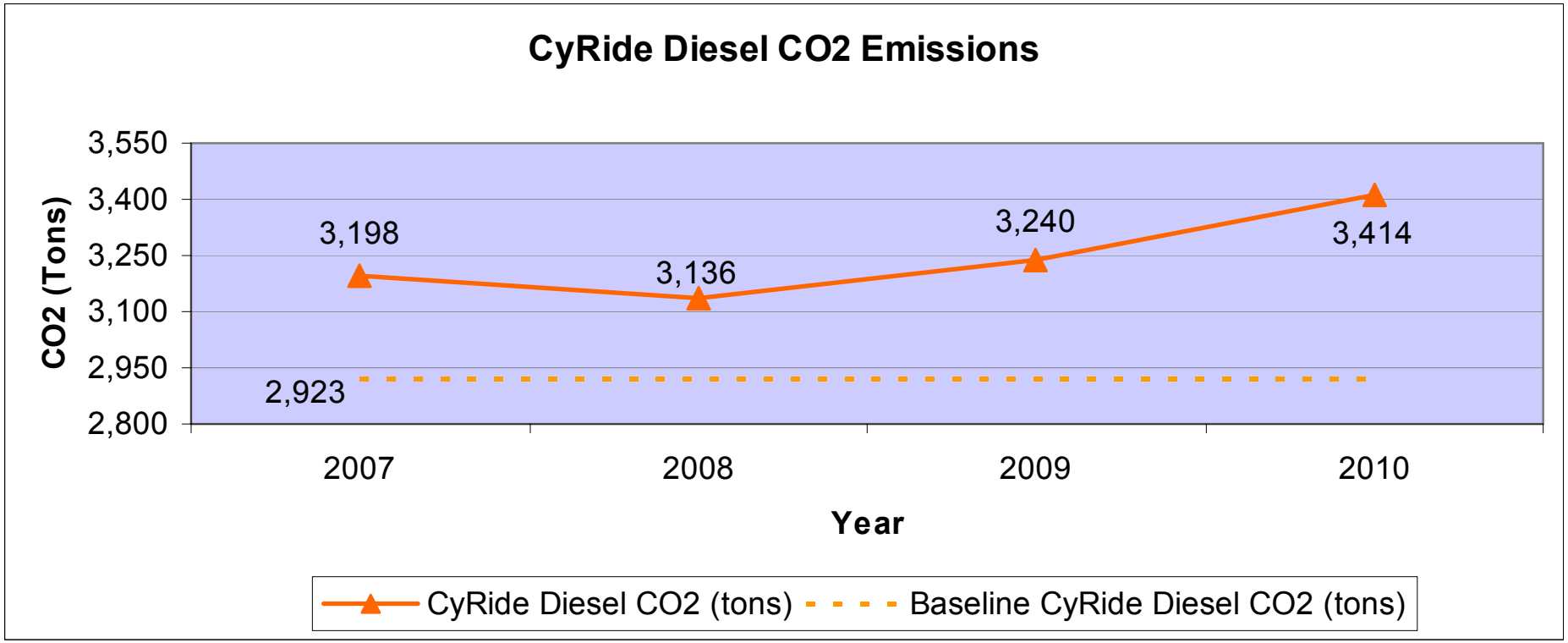
CyRide Fleet Sector Carbon Emissions



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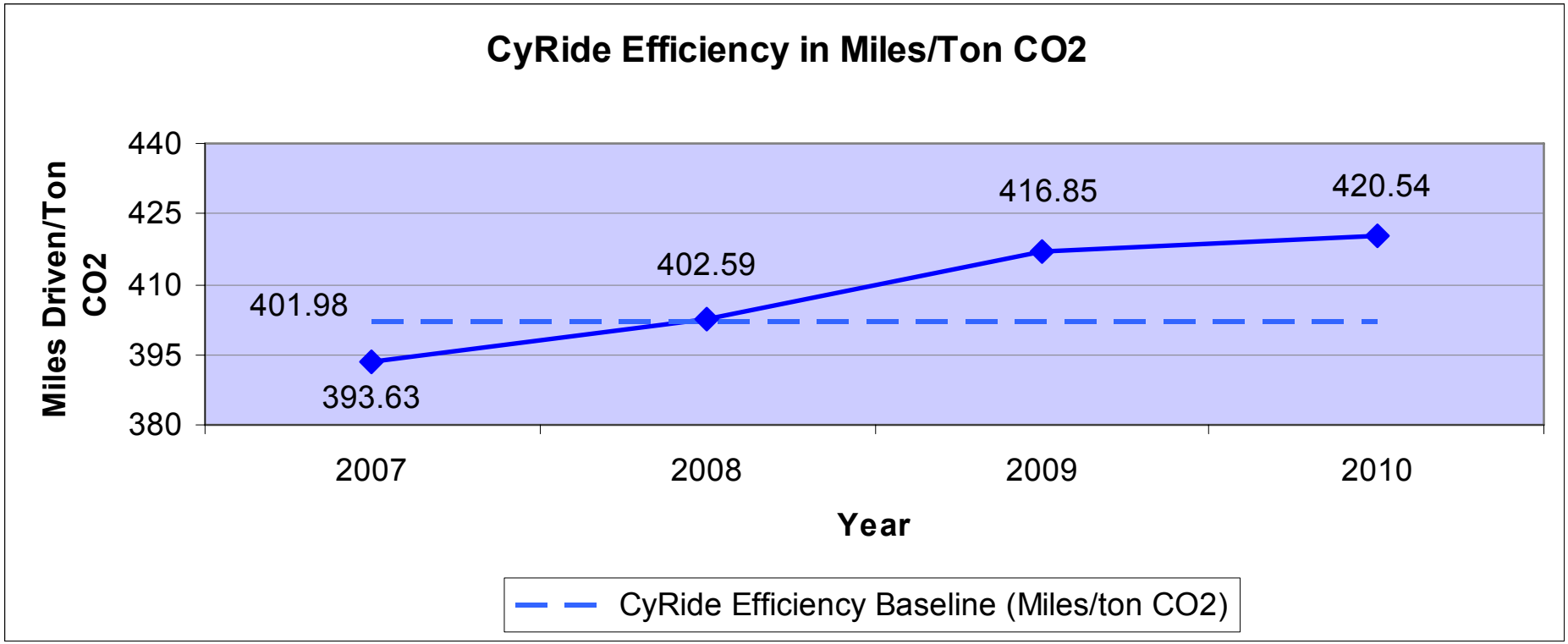
CyRide Fleet Sector Carbon Efficiency



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CyRide Fleet Sector Fuel Consumption

- **Increase in CO2**
  - More diesel usage: 323,000 gals. in 2010 vs. 267,000 gals. in 2002
  - More gasoline usage: New minibuses in 2010 increased gas usage by 400%, but are more efficient
- **Increase in Efficiency**
  - 2010: 26% increase in miles, only 21% increase in CO2
- **Increase in Ridership**
  - 1.2 million more riders in 2010 than in baseline years (29% increase)

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Fleet Sector Carbon Footprint Reduction Summary

Fleet Sector Efficiency Change Summary

	2007	2008	2009	2010	Total
Non-CyRide Fleet CO2 Change From Baseline (Tons)	136	265	295	152	675
% Non-CyRide Fleet Efficiency (Miles/Ton CO2) Change From Baseline	-16.4%	-13.2%	-18.5%	5.8%	
CyRide CO2 Change From Baseline (Tons)	275	213	317	609	808
% CyRide Efficiency (Miles/Ton CO2) Change From Baseline	-2.1%	-0.2%	3.7%	4.6%	

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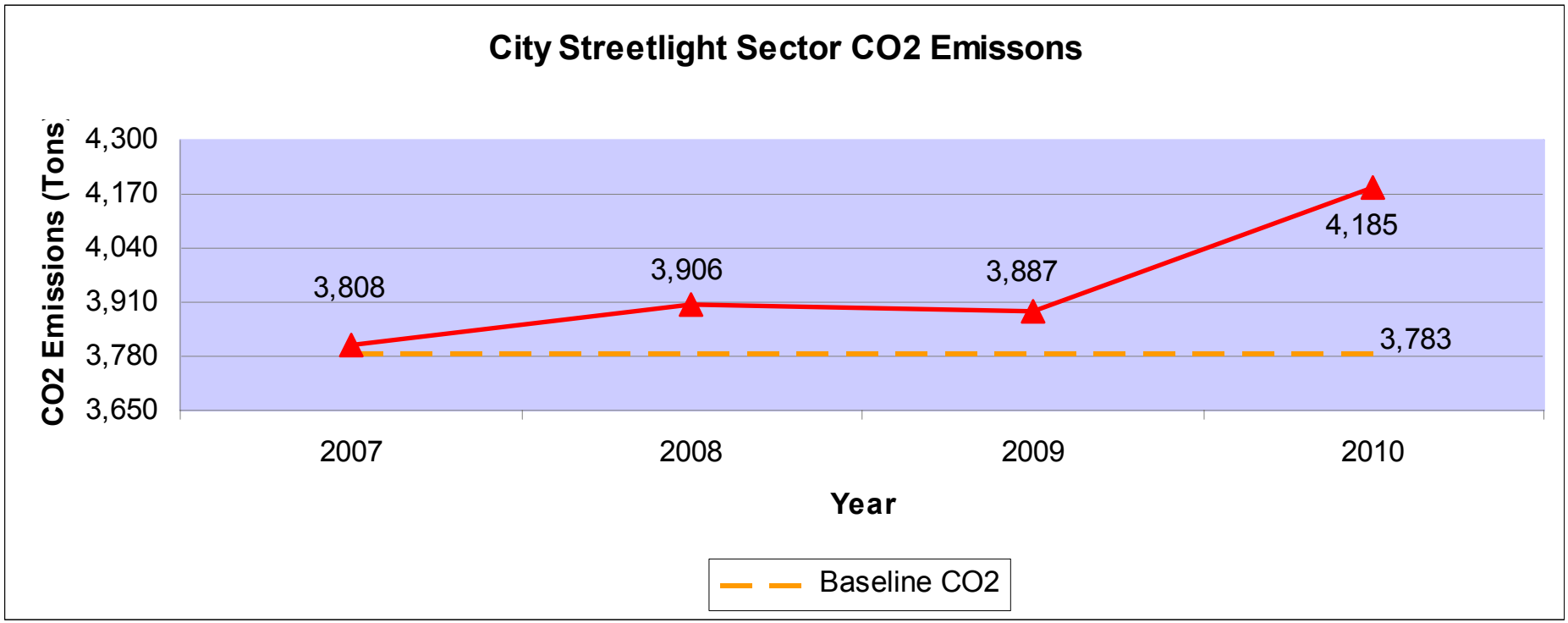
Street Light Sector

Data Inputs

(Includes Traffic Signals, Streetlights, Sirens, Parks, & Pool)

- Annual kWh Consumed
- Annual Therms Consumed
- Number of Units in Service

Streetlight Sector Carbon Footprint



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Streetlight Sector Carbon Footprint Reduction Summary

Street Light Sector

Qty. of Units in Service	BASELINE	2007	2008	2009	2010
Sirens	17	15	15	15	15
Bookmobile Sites	5	5	5	5	5
Parks	30	31	31	32	32
Traffic Signals	60	59	63	64	65
Streetlights	5,899	6,148	6,150	6,176	6,211
Pools	1	1	1	1	1

Street Light Sector

CO2 (Tons)	BASELINE	2007	2008	2009	2010
Sirens	0	0	0	0	0
Bookmobile Sites	1	1	1	1	1
Parks	128	165	169	159	164
Traffic Signals	379	225	202	184	173
Streetlights	3,225	3,365	3,482	3,492	3,501
Pools	50	52	52	51	346
Totals	3,783	3,808	3,906	3,887	4,185

298 Tons CO2 Increase (2010)

10.6% CO2 Increase (2010)

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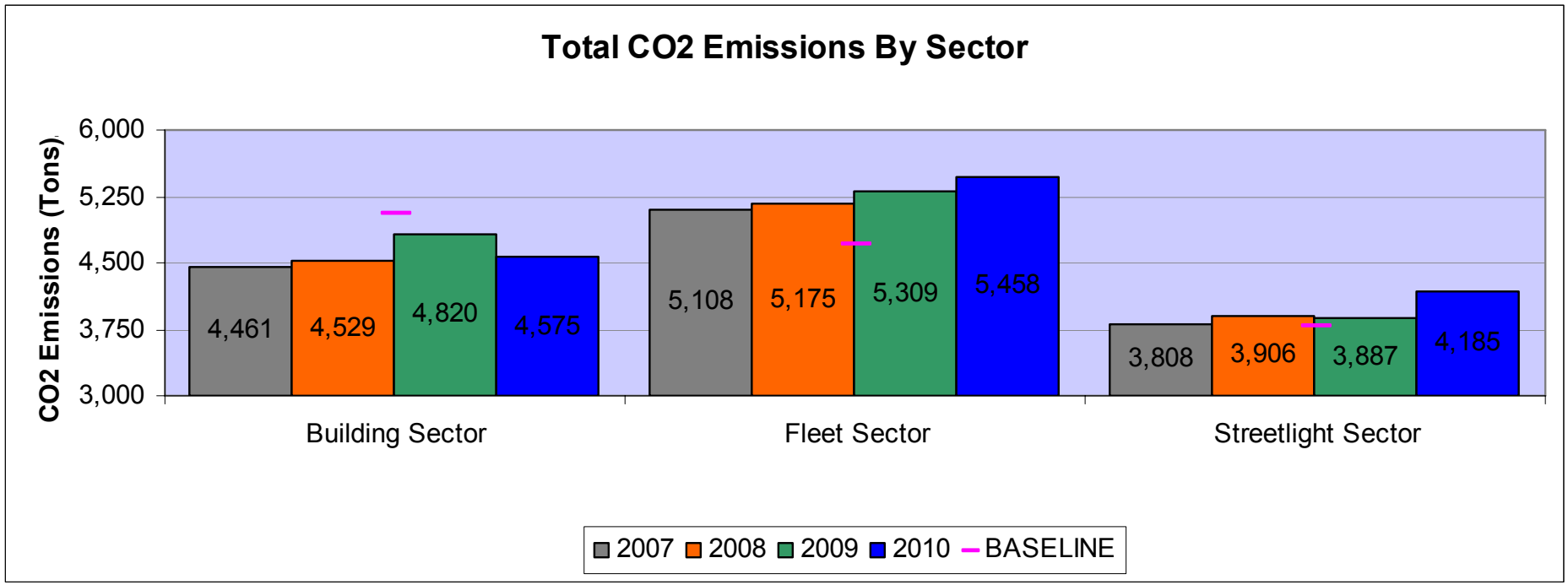
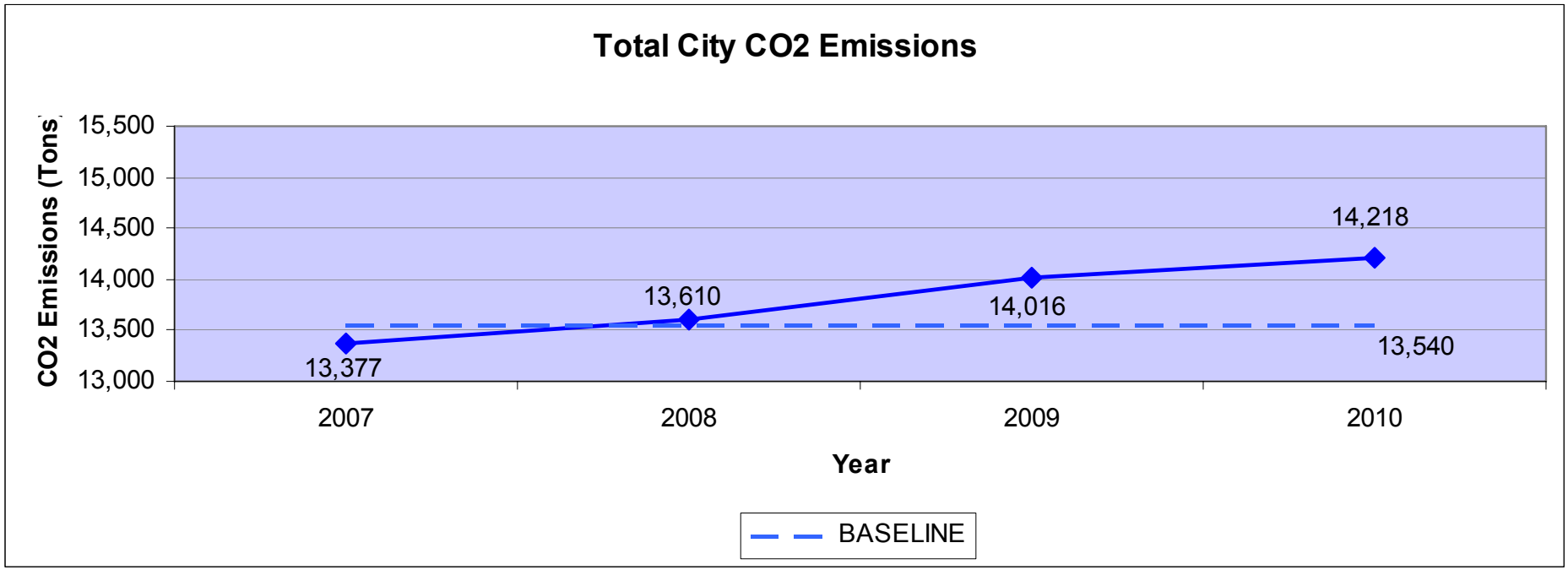
Carbon Footprint by Sector



City of Ames - Operations
Total Carbon Footprint



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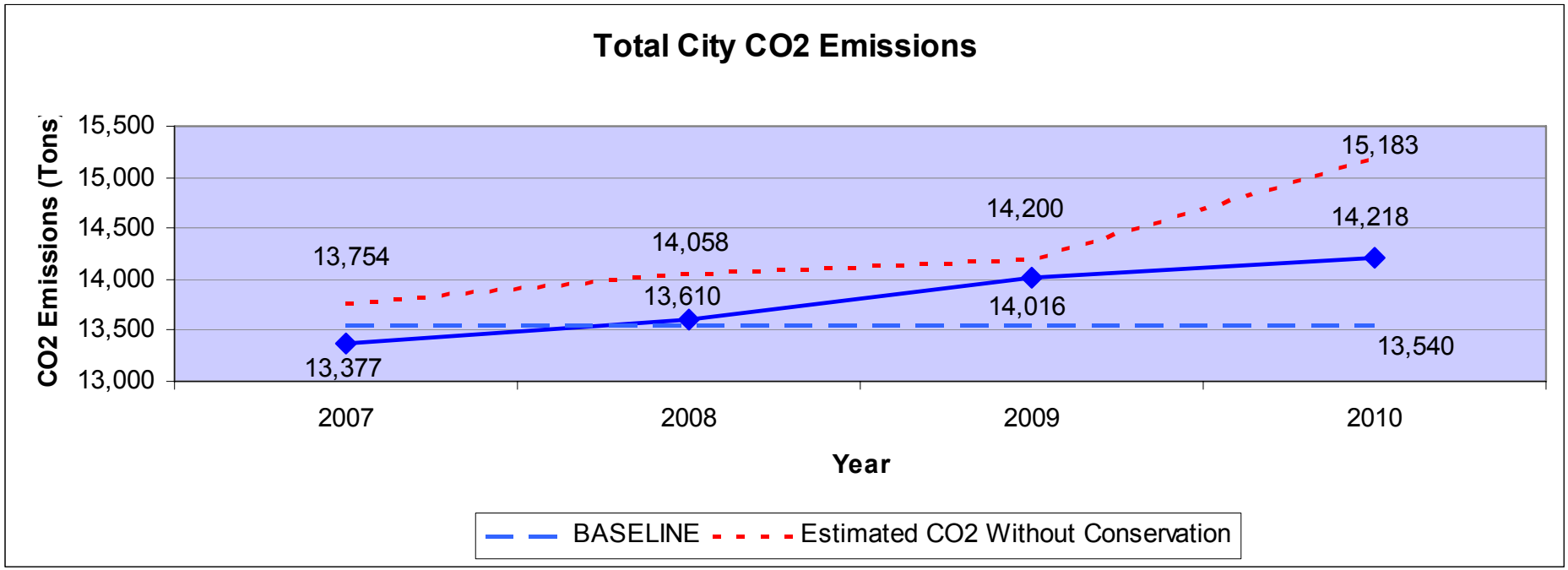
City of Ames - Operations
Total Carbon Footprint



City of Ames - Operations Total Carbon Footprint

- **Decrease in Building Sector CO2**
  - 9.7% reduction in 2010
- **Increase in Fleet Sector Efficiency**
  - 5.8% increase in non-CyRide vehicle efficiency
  - 4.6% increase in CyRide vehicle efficiency
- **Increase in Streetlight Sector CO2**
  - 7.8% increase due to more lights, Aquatic Center
  - This sector will be a challenge to make more efficient in the future.

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Improvements Planned for 2011 and Beyond

- Replacing lighting in Ice Arena, City Hall Gym
- Lighting conversions for Parks Office, Parks Maintenance, Cemetery
- Improved heating and cooling for Fleet building
- Improvements to ice systems in the Ice Arena

Questions for Council to Consider

- Should our current goal be structured to measure carbon efficiency, not just total fuel use?
- How should we address new facilities that are added to the City?
- Is the Aquatic Center in the appropriate sector?

Questions ?

THANK YOU

Prepared by

Brian Phillips
Project Coordinator
City of Ames
515-239-5227
bphillips@city.ames.ia.us

Paul Hinderaker, Director
Fleet & Facilities
City of Ames
515-239-5521
phinderaker@city.ames.ia.us

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