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# City of Knoxville

## Energy & Sustainability Initiative

Task Force Meeting – December 12, 2007

2:00 – 4:00

Small Assembly Room, City-County Building

# Agenda

- Energy consumption and emissions inventories
- Working group reports
  - Energy Services Performance Contract
  - Buildings
  - Transportation / Land Use
  - Waste / Recycling
- Emission reduction targets
- Next Steps

# City Government Inventory

## City Government Data:

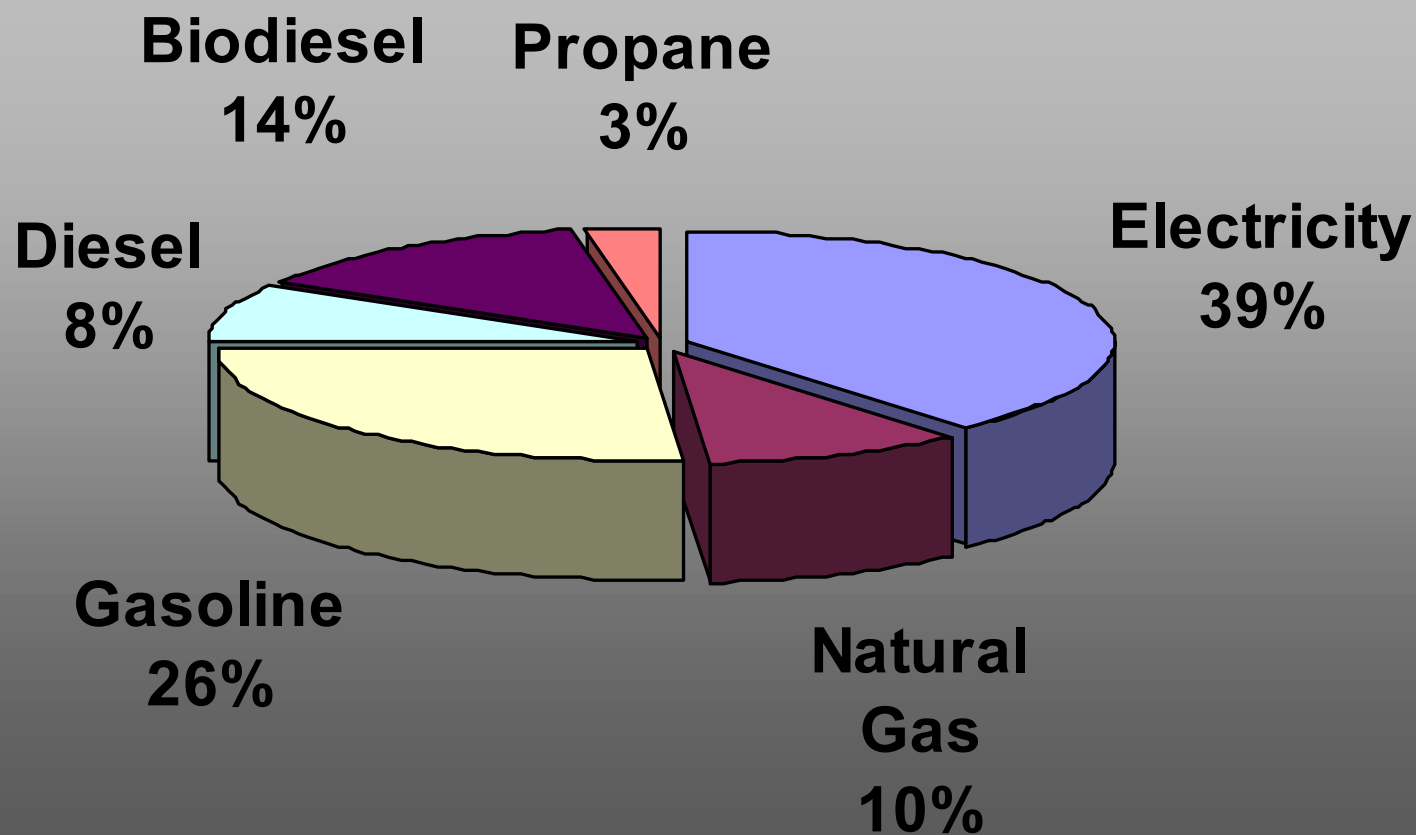
- 62.3 mill kWh electricity
- 640.5 thou therms natural gas
- 1.4 mill gal gasoline
- 398.1 thou gal diesel
- 661.7 thou gal biodiesel
- 165.6 thou gal propane
- 2.1 mill lbs waste



CITY OF KNOXVILLE  
BILL HASLAM, MAYOR

# Energy Consumption by Source

**Total MMBTU = 574,479**

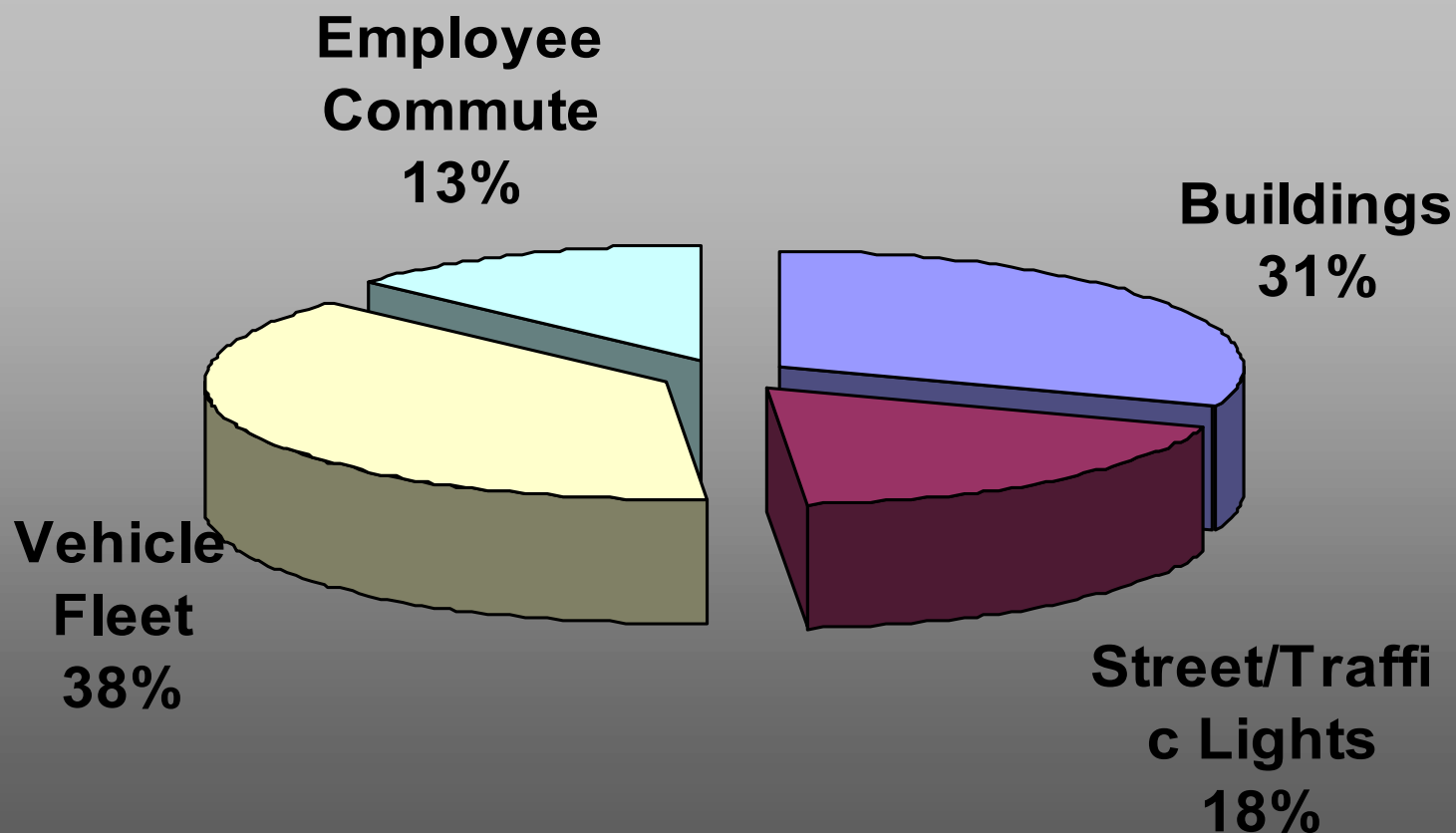




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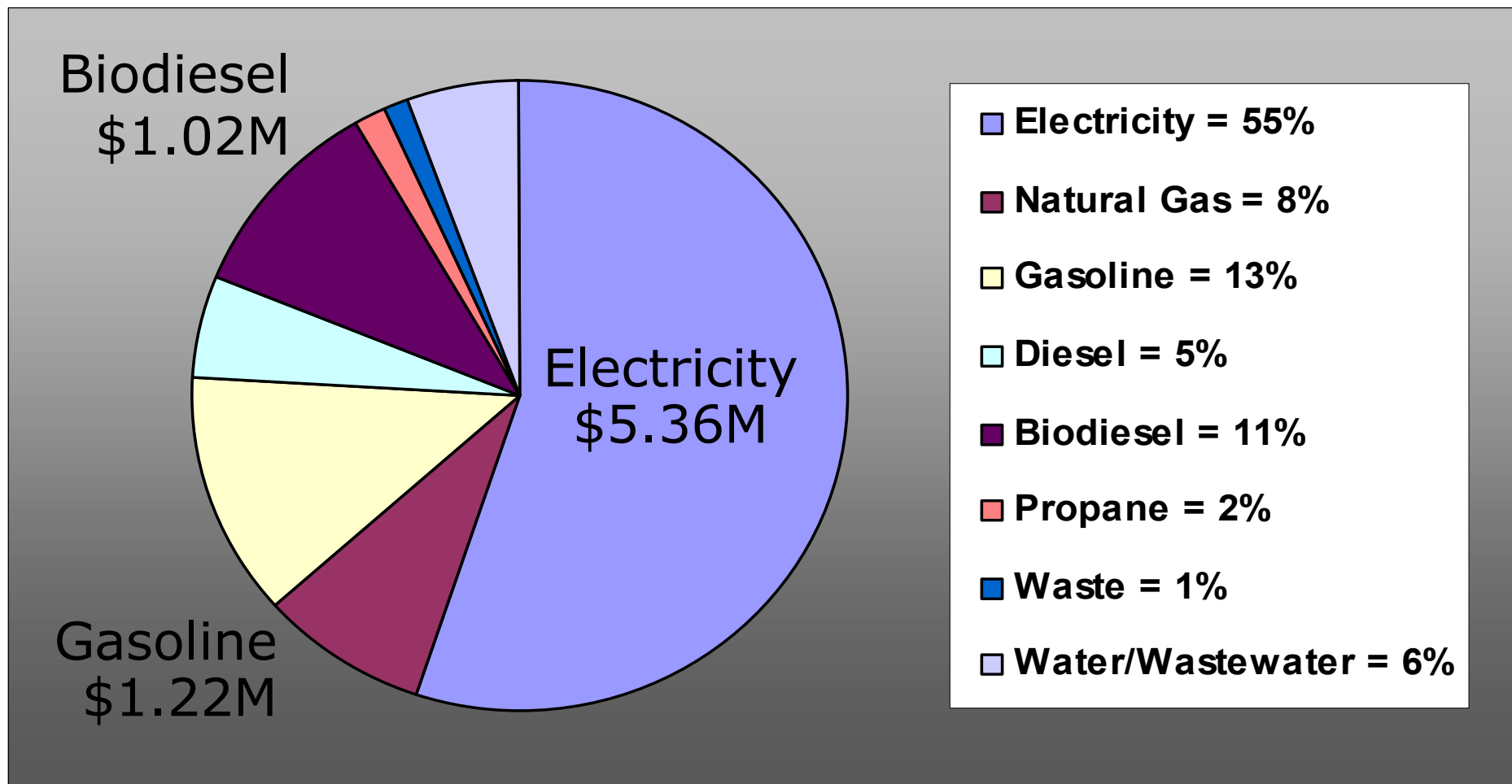
# Energy Consumption by Sector

**Total MMBTU = 574,479**



# Energy Cost by Source

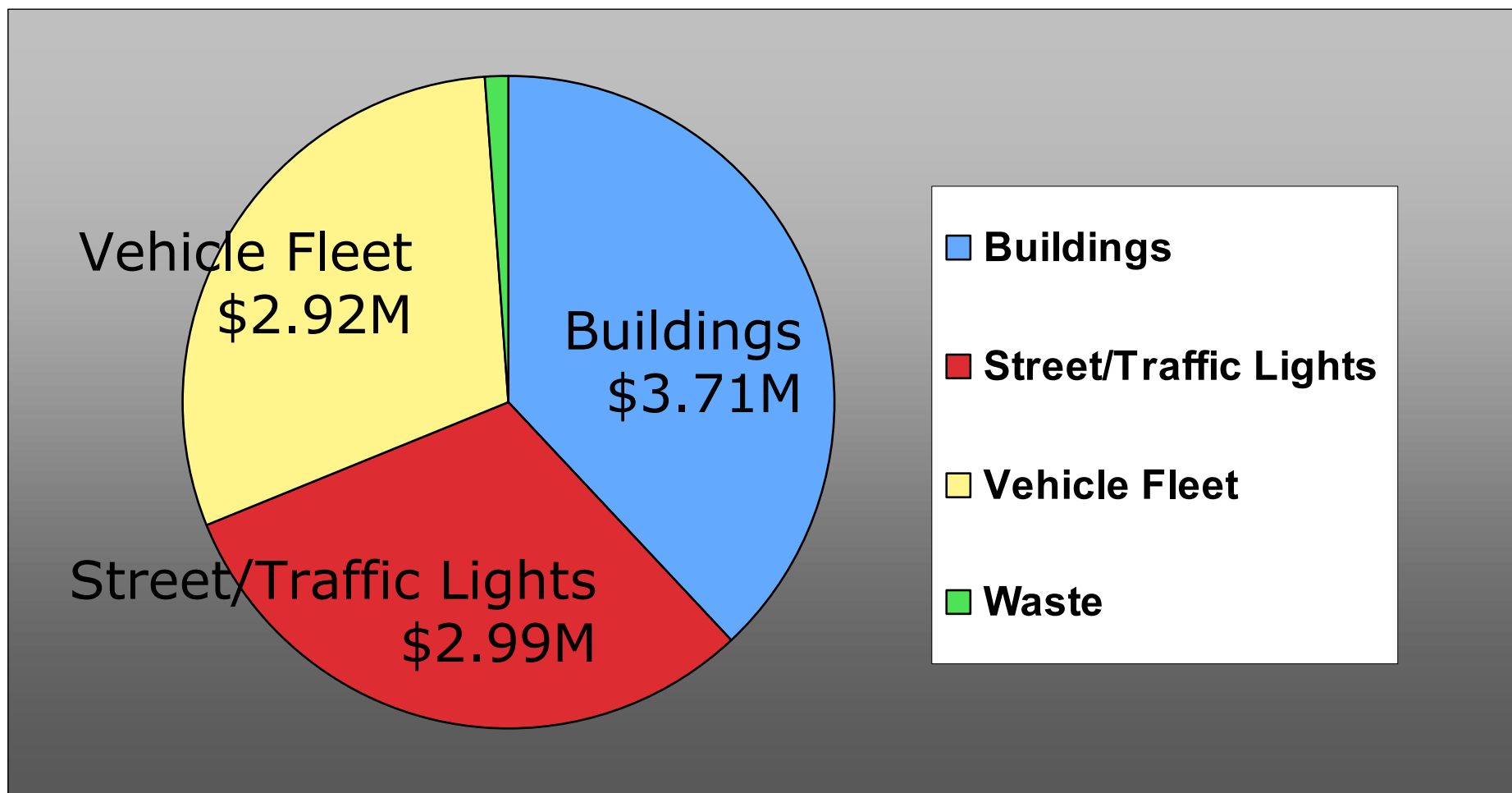
**Total Cost = \$9,722,844**



Note: Waste disposal cost for PBA buildings not included.

# Energy Cost by Sector

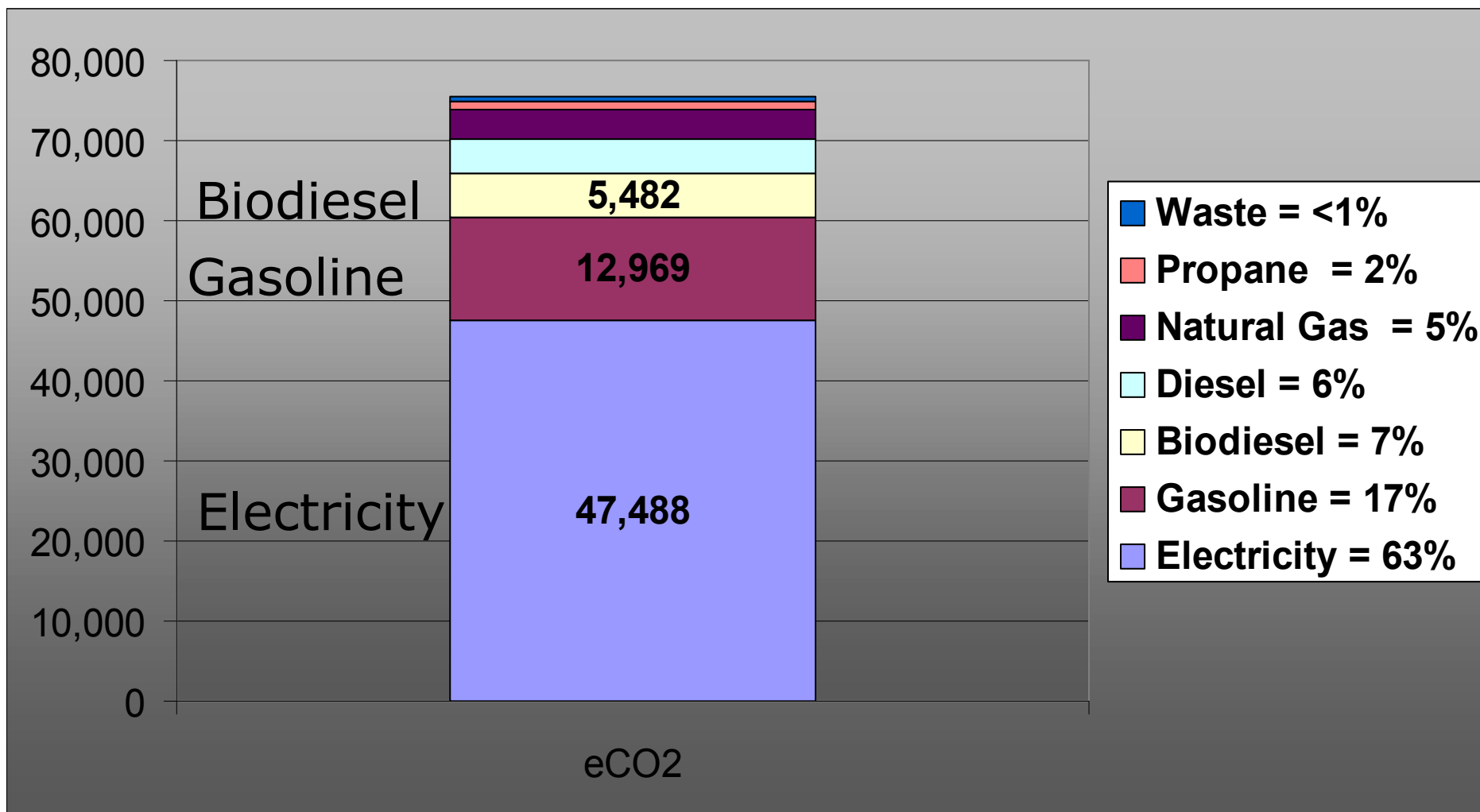
**Total Cost = \$9,722,844**



Note: Waste disposal cost for PBA buildings not included.

# CO<sub>2</sub> Emissions by Source

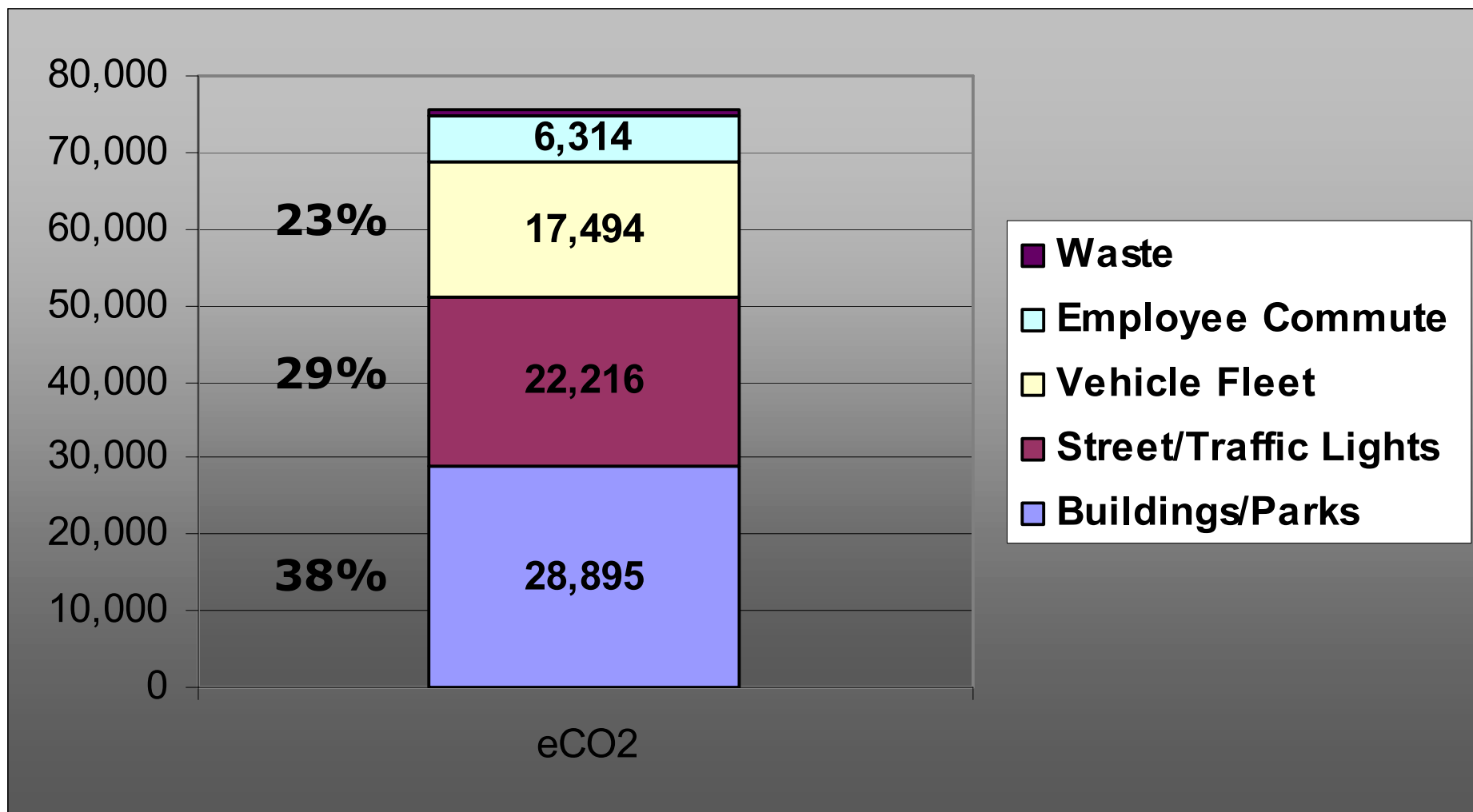
## Total CO<sub>2</sub> = 75,512 tons





# CO<sub>2</sub> Emissions by Sector

## Total CO<sub>2</sub> = 75,512 tons

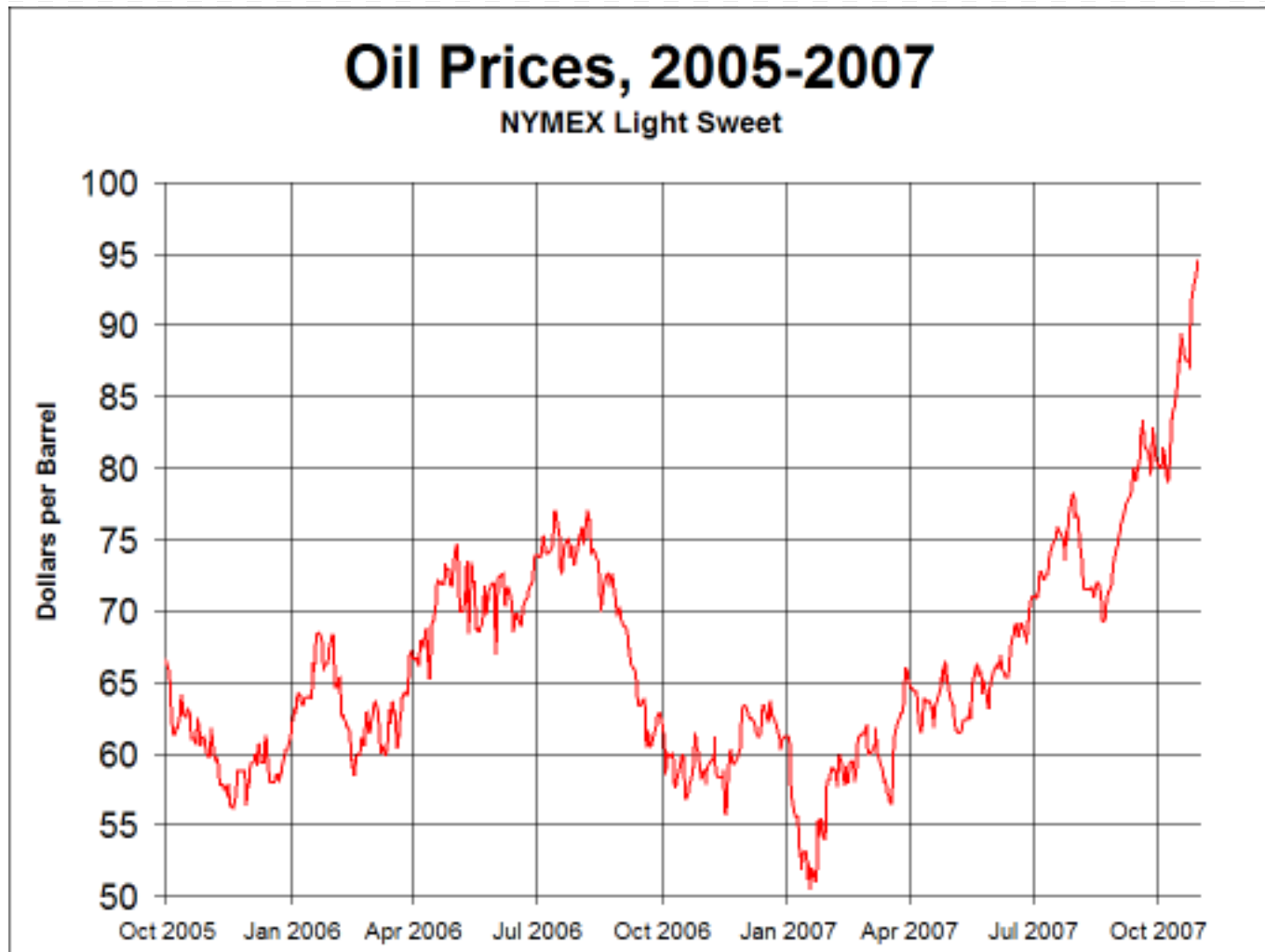




# City Government Top 10 List

|                      | <b>CO2</b>    | <b>% of CO2</b> | <b>Cost</b>        | <b>% of Cost</b> |
|----------------------|---------------|-----------------|--------------------|------------------|
| Streetlights         | 19,297        | 25.6%           | \$2,792,831        | 28.7%            |
| City-County Building | 10,450        | 13.0%           | \$930,365          | 9.6%             |
| KAT Fleet            | 6,985         | 9.3%            | \$1,198,686        | 12.3%            |
| Employee Commute     | 6,314         | 8.4%            | N/A                | N/A              |
| Police Fleet         | 4,910         | 6.5%            | \$2,922,329        | 30.1%            |
| Public Service Fleet | 4,033         | 5.3%            | \$686,596          | 7.1%             |
| Traffic Signals      | 2,918         | 3.9%            | \$193,136          | 2.0%             |
| Convention Center    | 2,085         | 2.8%            | \$296,177          | 3.0%             |
| Safety Building      | 1,912         | 2.5%            | \$178,690          | 1.8%             |
| World's Fair Park    | 1,857         | 2.5%            | \$178,812          | 1.8%             |
|                      | <b>60,761</b> | <b>79.8%</b>    | <b>\$9,377,622</b> | <b>96.4%</b>     |

# A note on oil prices...



Data from: <http://octane.nmt.edu/gotech/Marketplace/Prices.aspx>

## Community Data

- 1612.7 mill kWh electricity
- 78.9 mill therms natural gas
- 148.5 mill gallons gasoline
- 31.5 mill gallons diesel
- 248.4 thou tons waste



# City Government is small potatoes.....

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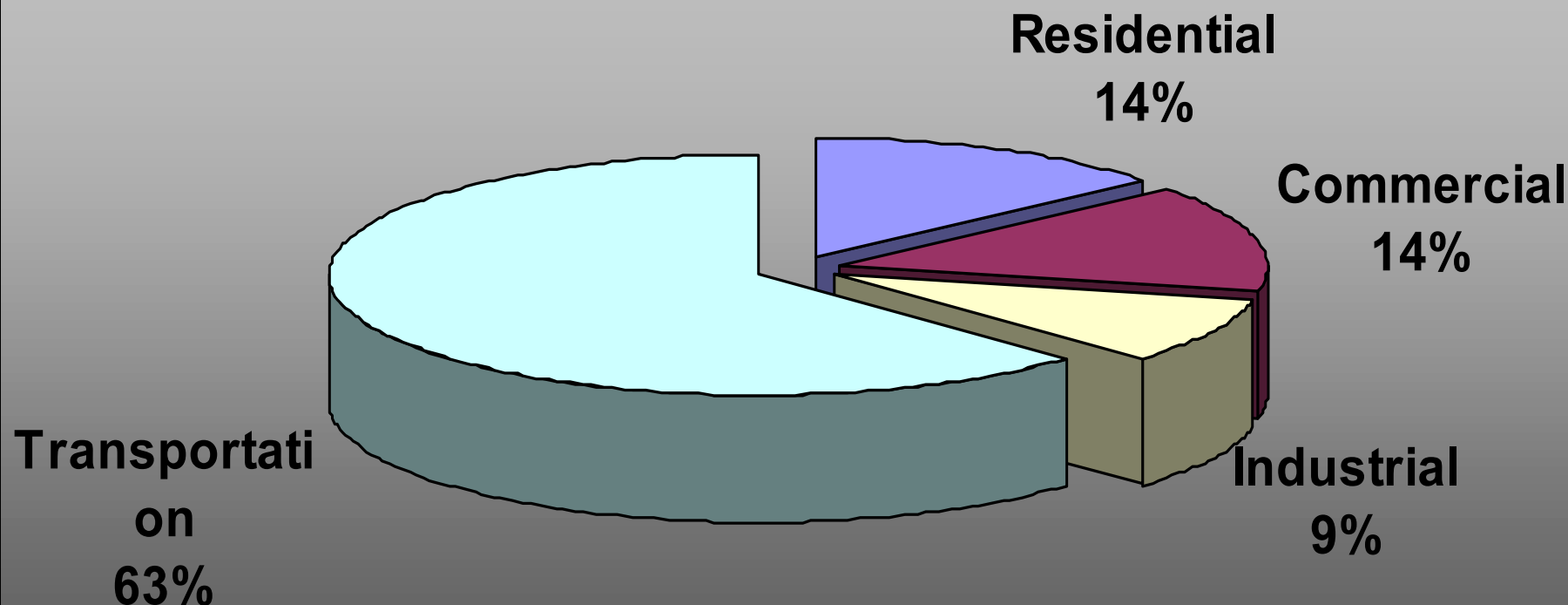
- 1.6% of community energy consumption (measured in MMBTUs)...
- 2% of overall eCO<sub>2</sub> emissions...



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# Community Consumption by Sector

**Total MMBTU = 35,896,731**

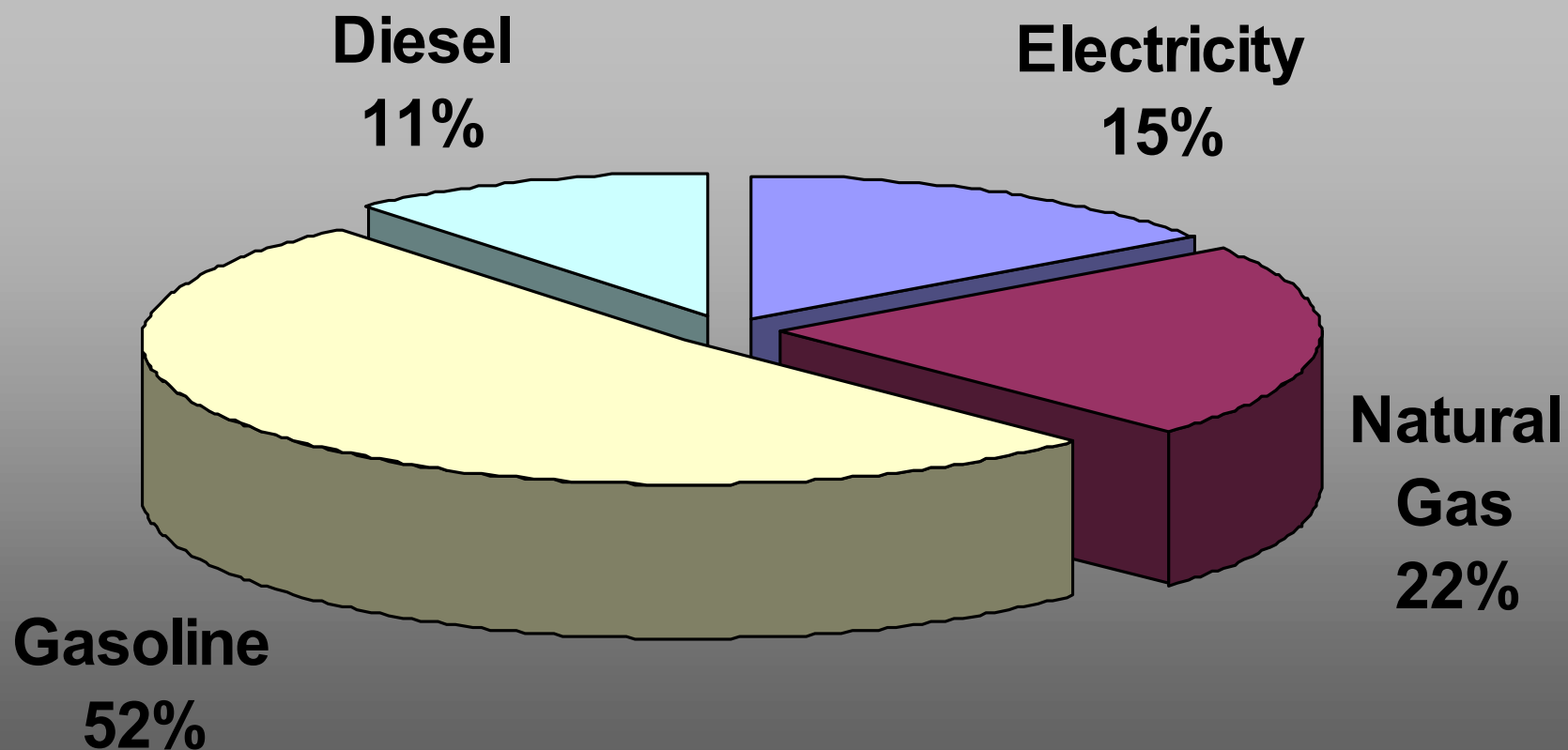




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# Community Consumption by Source

**Total MMBTU = 35,896,731**



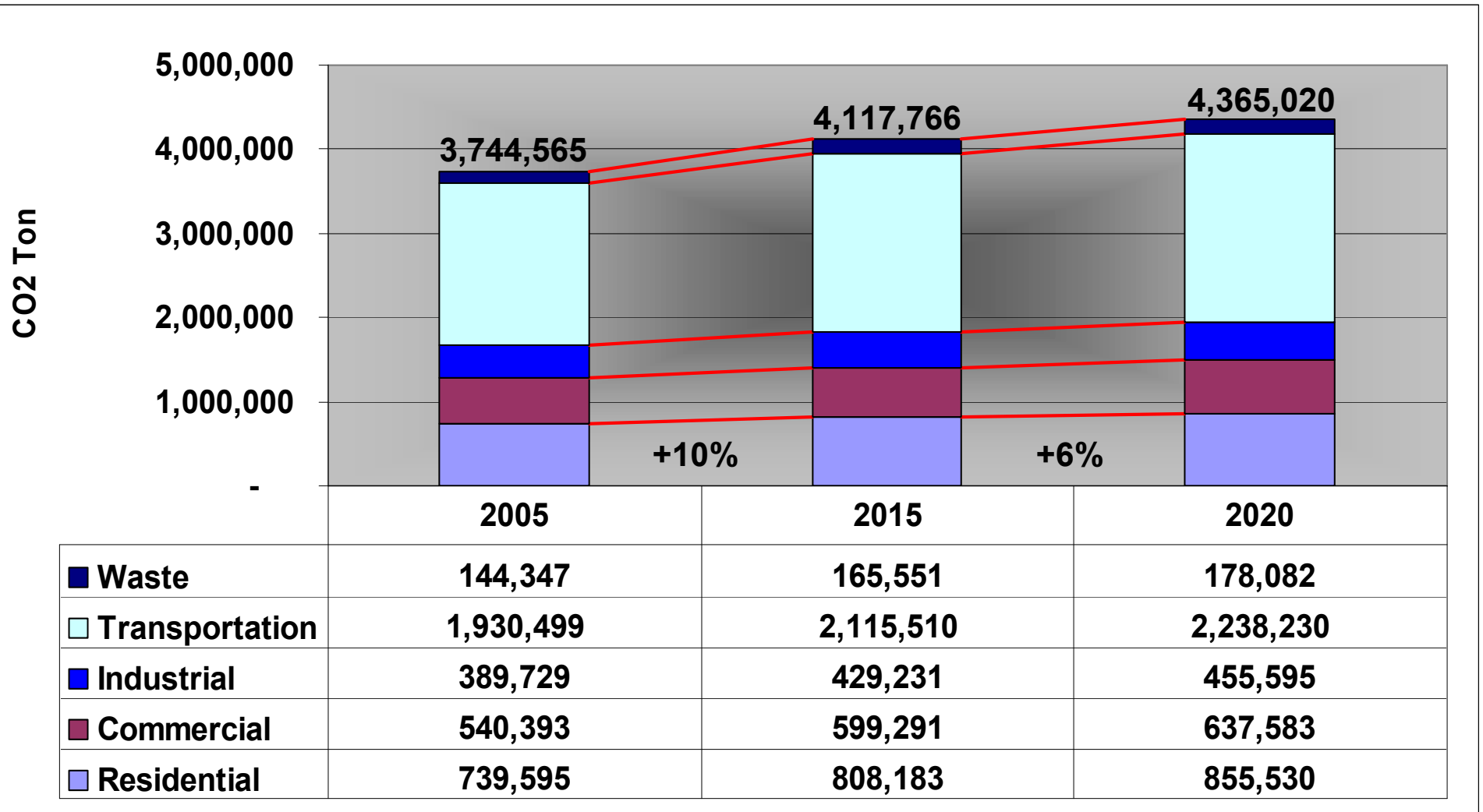


# Criteria Air Pollutant Emissions Direct & Indirect

| <b>CAPs</b>         | <b>NOx<br/>(tons)</b> | <b>SOx<br/>(tons)</b> | <b>CO<br/>(tons)</b> | <b>VOC<br/>(tons)</b> | <b>PM10<br/>(tons)</b> | <b>Total<br/>(tons)</b> |
|---------------------|-----------------------|-----------------------|----------------------|-----------------------|------------------------|-------------------------|
| Diesel              | 2,238                 | 93                    | 1,734                | 236                   | 96                     | 4,396                   |
| Electricity         | 1,969                 | 6,528                 | 150                  | 17                    | 130                    | 8,794                   |
| Gasoline            | 4,395                 | 263                   | 49,245               | 5,079                 | 97                     | 59,078                  |
| Natural Gas         | 795                   | 159                   | 211                  | 42                    | 25                     | 1,232                   |
| <b>Total (tons)</b> | <b>9,397</b>          | <b>7,043</b>          | <b>51,339</b>        | <b>5,373</b>          | <b>348</b>             | <b>73,501</b>           |



# Community CO2 Emissions - BAU



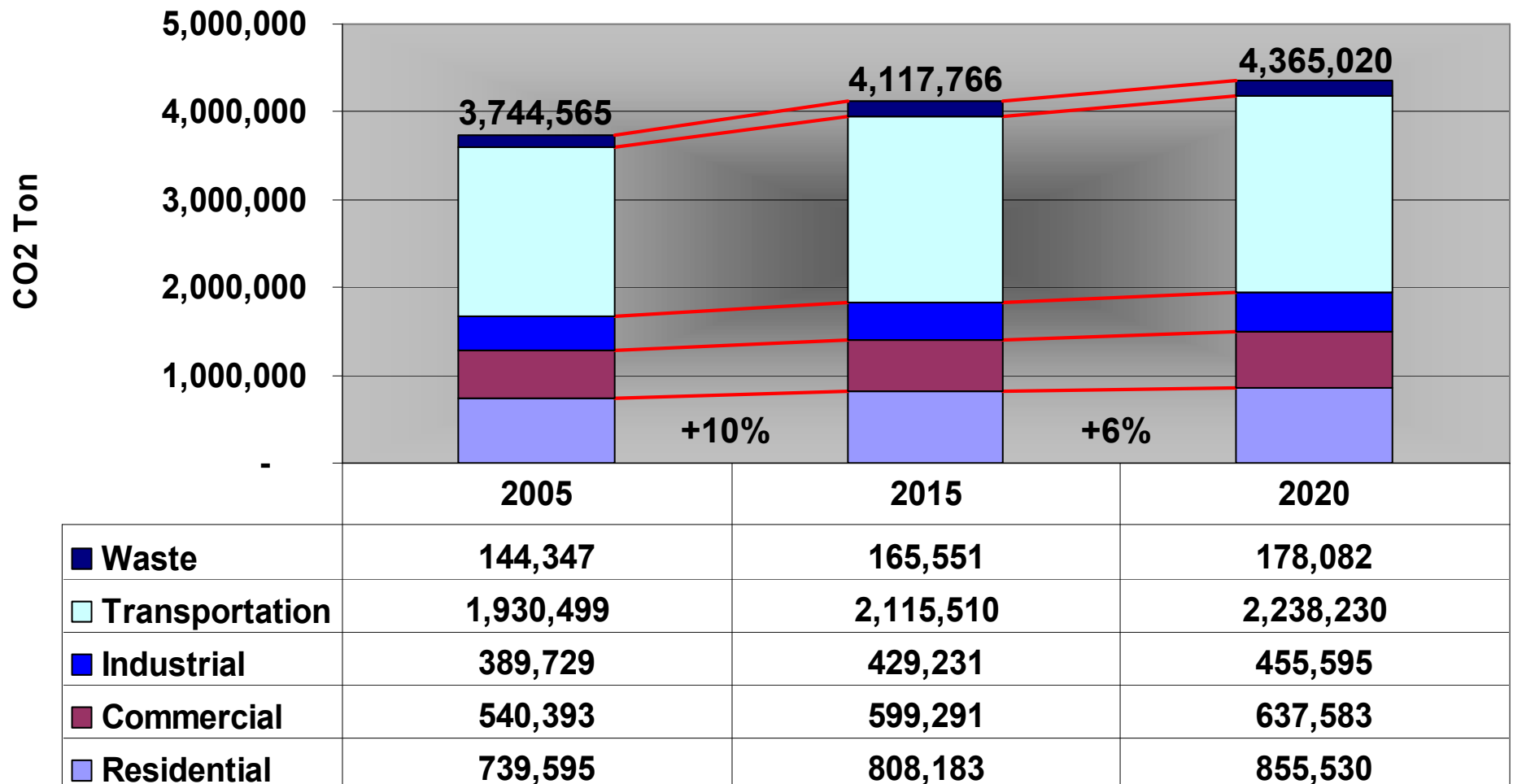


# Working Groups

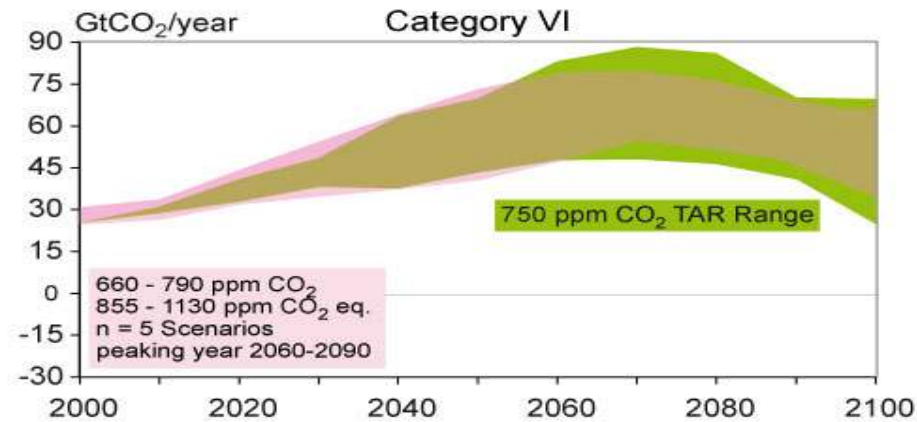
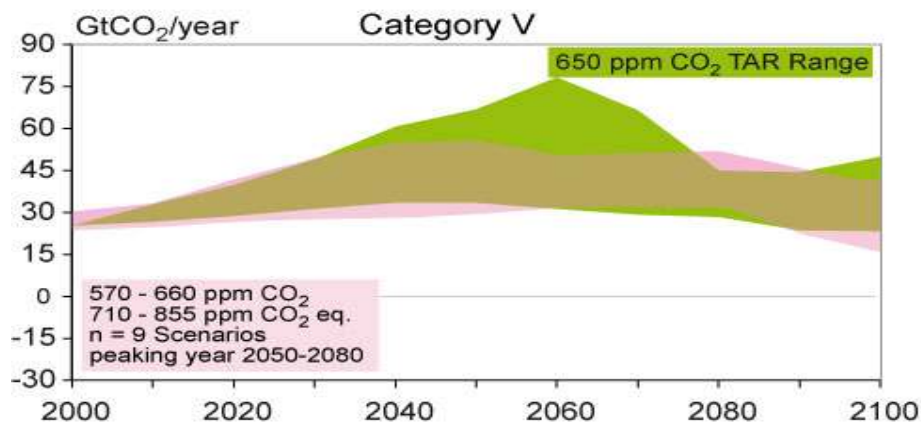
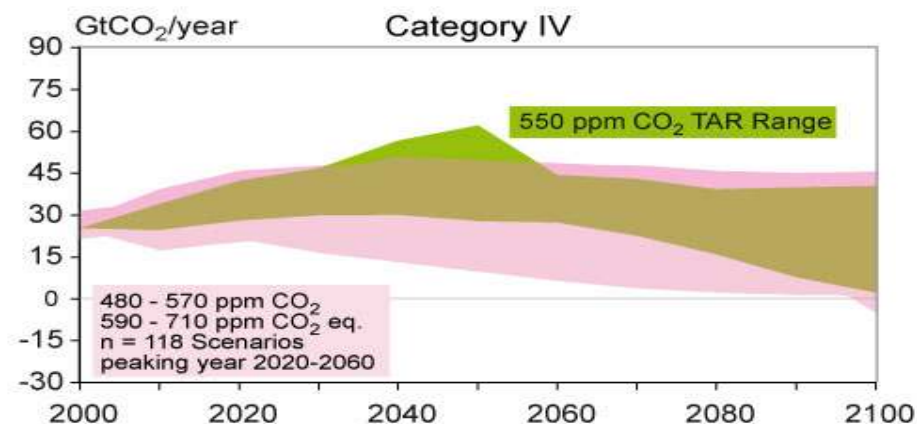
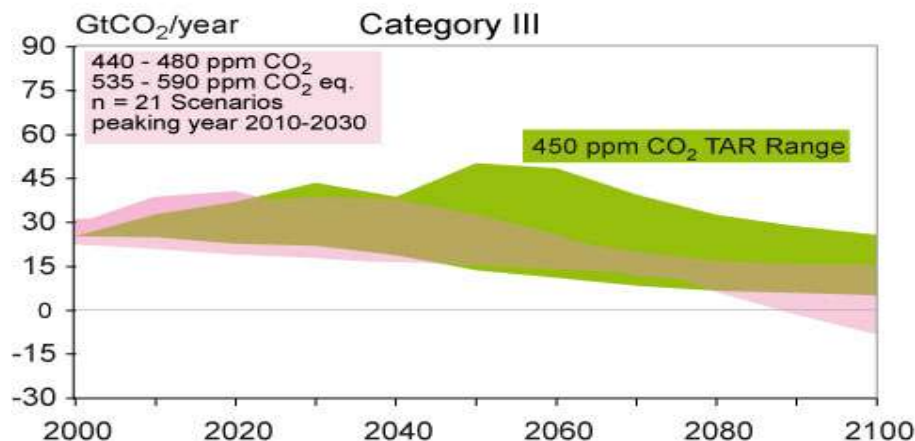
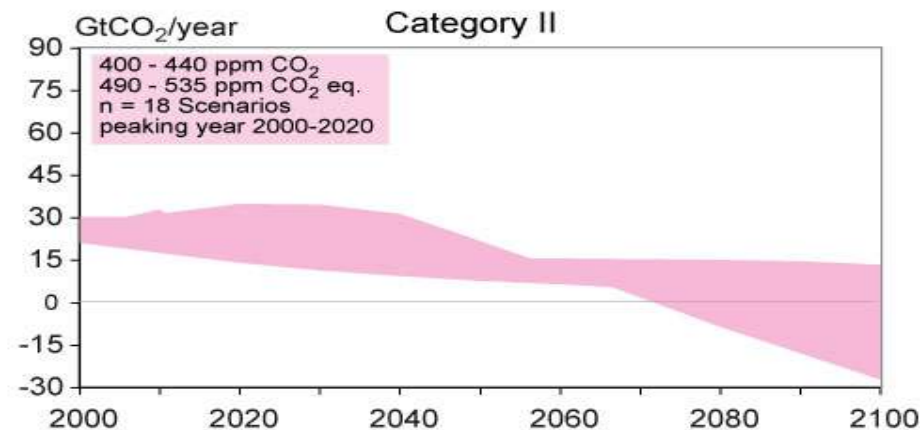
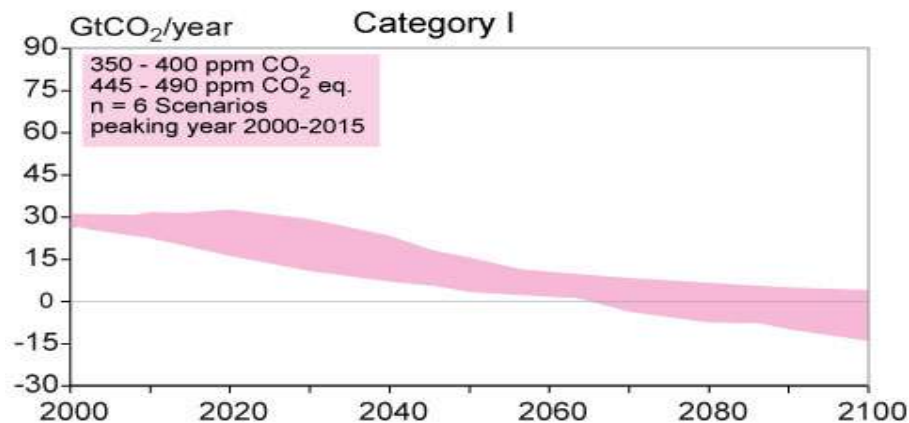
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- **ESPC RFQ Development**
- **Buildings**
- **Transportation / Land Use**
- **Waste / Recycling**

# Community CO2 Emissions - BAU

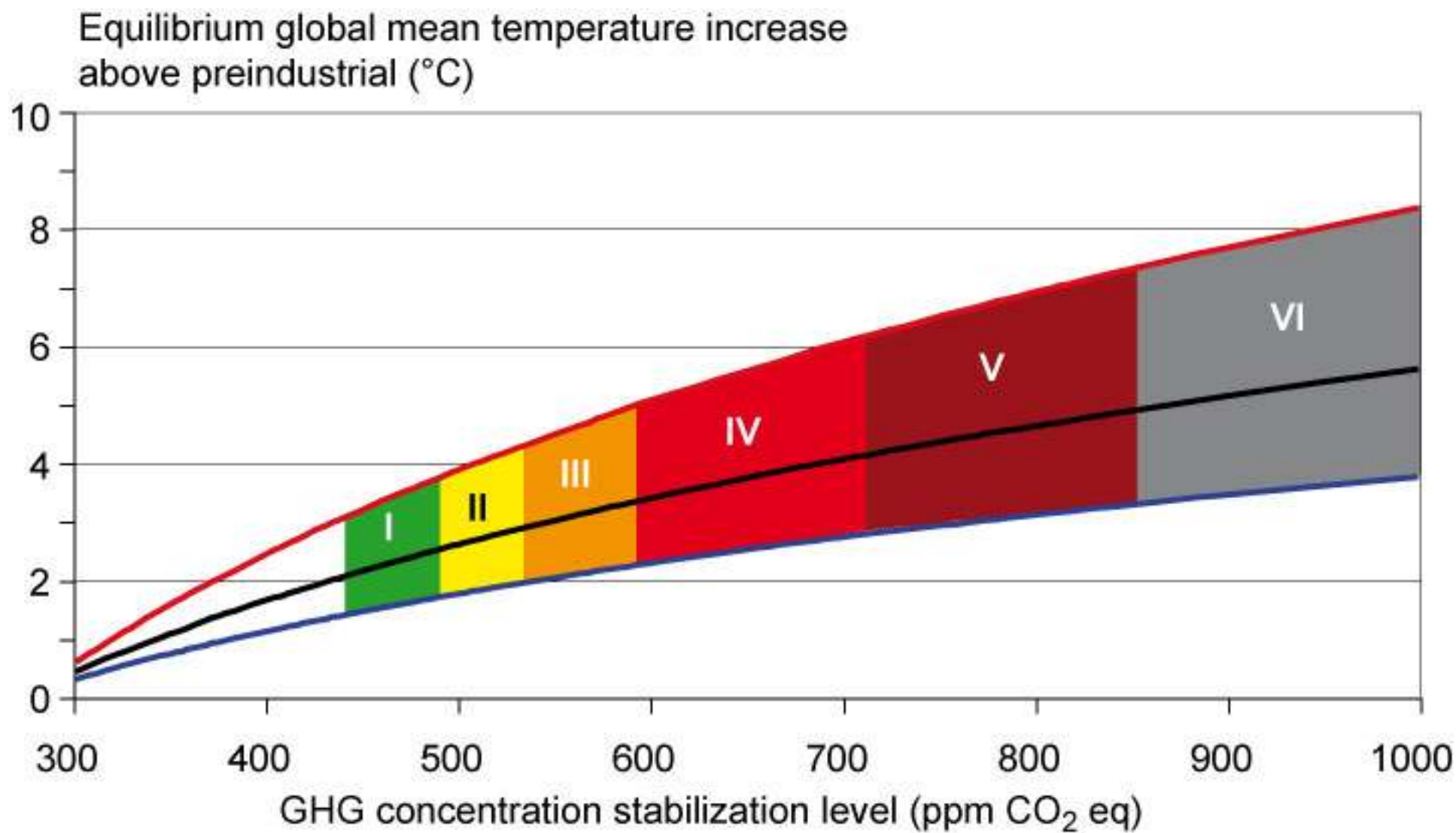


# **Targets: Global Context IPCC 4<sup>th</sup> Assessment Report (November 2007)**



**"SPM7" IPCC, Emission pathways for alternative categories of stabilization levels, 2000-2100**

<http://www.ipcc.ch/graphics/gr-ar4-wg3.htm>



**“SPM8” IPCC, Stabilization scenario categories as reported in Figure SPM7**

**<http://www.ipcc.ch/graphics/gr-ar4-wg3.htm>**

| Category | CO <sub>2</sub> concentration at stabilization (2005 = 379 ppm) <sup>(b)</sup> | CO <sub>2</sub> -equivalent Concentration at stabilization including GHGs and aerosols (2005 = 375 ppm) <sup>(b)</sup> | Peaking year for CO <sub>2</sub> emissions <sup>(a, c)</sup> | Change in global CO <sub>2</sub> emissions in 2050 (% of 2000 emissions) <sup>(a, d)</sup> | Global average temperature increase above pre-industrial at equilibrium, using "best estimate" climate sensitivity <sup>(a, e)</sup> | Global average sea level rise above pre-industrial at equilibrium from thermal expansion only <sup>(f)</sup> | Number of assessed scenarios |
|----------|--|--|--|--|--|--|------------------------------|
|          | ppm  | ppm  | Year   | Percent  | °C   | metres   |                              |
| I        | 350 – 400  | 445 – 490  | 2000 – 2015  | -85 to -50   | 2.0 – 2.4  | 0.4 – 1.4  | 6                            |
| II       | 400 – 440  | 490 – 535  | 2000 – 2020  | -80 to -30   | 2.4 – 2.8  | 0.5 – 1.7  | 18                           |
| III      | 440 – 485  | 535 – 590  | 2010 – 2030  | -30 to +5  | 2.8 – 3.2  | 0.6 – 1.9  | 21                           |
| IV       | 485 – 570  | 590 – 710  | 2020 – 2060  | +10 to +60   | 3.2 – 4.0  | 0.6 – 2.4  | 118                          |
| V        | 570 – 660  | 710 – 855  | 2050 – 2080  | +25 to +85   | 4.0 – 4.9  | 0.8 – 2.9  | 9                            |
| VI       | 660 – 790  | 855 – 1130   | 2060 – 2090  | +90 to +140  | 4.9 – 6.1  | 1.0 – 3.7  | 5                            |



PEW CENTER  
ON  
Global CLIMATE CHANGE

Highlights from Climate Change 2007 Synthesis Report of the IPCC Fourth Assessment Report Summary for Policy Makers

[http://www.pewclimate.org/docUploads/PewSummary\\_AR4.pdf](http://www.pewclimate.org/docUploads/PewSummary_AR4.pdf)

**Emerging policy consensus: 80% reduction needed from developed world by 2050**



# Targets: Local Decisions

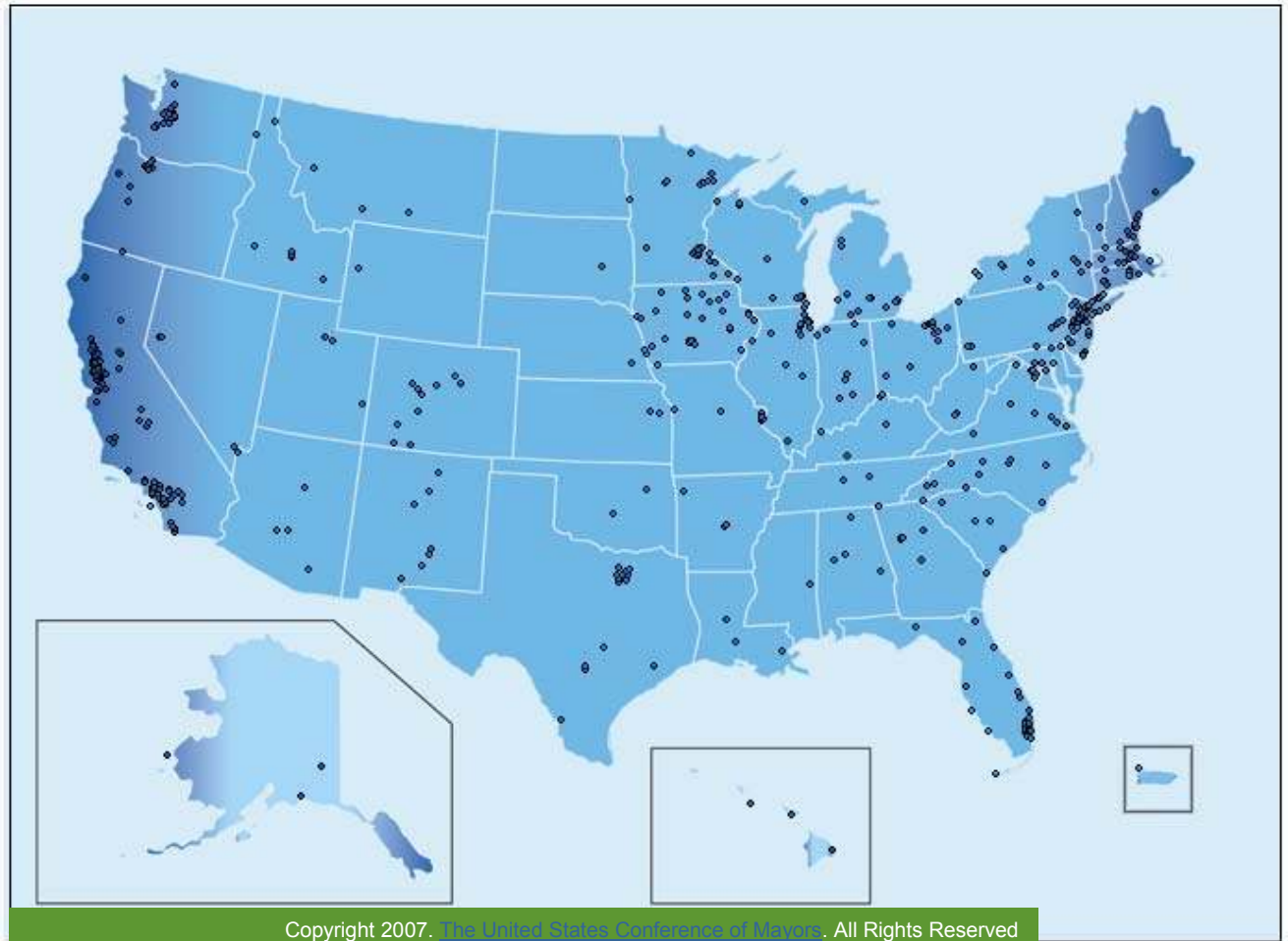
## U.S. Conference of Mayors

### Kyoto: 7% below 1990 by 2012

## 740 U.S. signatories

### Tennessee Cities & Towns

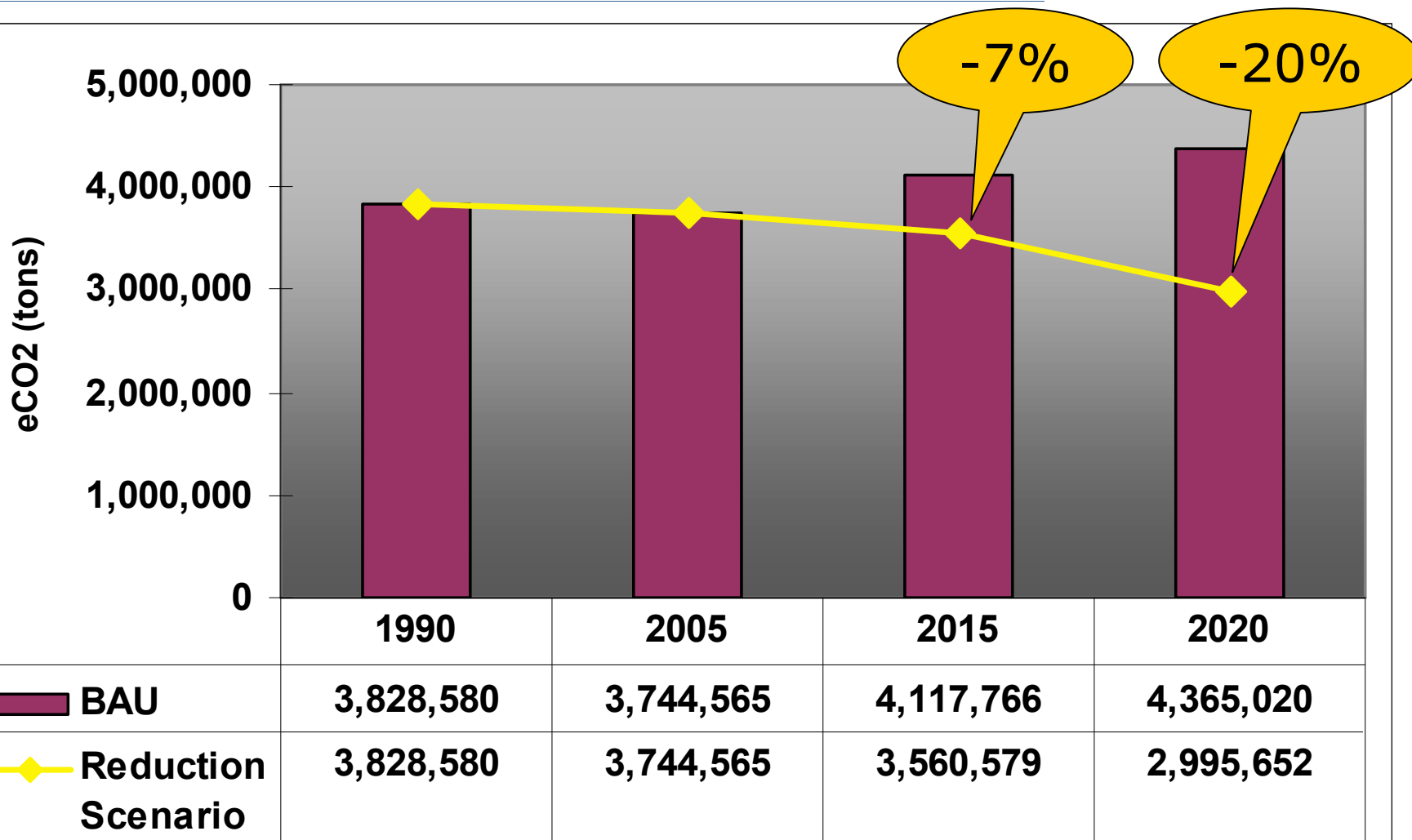
- Chattanooga
- Cookville
- Crossville
- Franklin
- Nashville
- Signal Mtn



<http://www.usmayors.org/climateprotection/ClimateChange.asp>



# Knoxville Emission Reduction Goal?





# Thank You!

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865-215-2680

<http://www.cityofknoxville.org/policy/energy/default.asp>