

**Community Sustainability Council  
Greensboro, North Carolina  
January 12, 2009**

A meeting of the Community Sustainability Council was held on Monday, January 12, 2009 in the Plaza Level Conference Room of the Melvin Municipal Office Building, beginning at 3:10 p.m. Members present were: Co-Chair Joel Landau, Co-Chair Bob Powell, Art Davis, Bob Kollar, Joe Venable, Marlene Sanford, Tom Duckwall, Tom Clary, Debbie Leiner, and Carolyn Allen. Staff present were: Dan Curry, HCD; Steve Randall, Energy and Sustainability Program Manager; and Jeryl Covington, Director of Environmental Services.

**1. Approval of Minutes from the December 8, 2008 Regular Meeting:**

Ms. Allen moved to approve the minutes of the December 8, 2008 meeting, seconded by Ms. Sanford. The Council voted unanimously 9-0 to approve the motion. (Ayes: Landau, Powell, Leiner, Venable, Kollar, Sanford, Duckwall, Clary, Allen. Nays: None.)

**2. Report on the December 10, 2009 Workshop on "Building a Sustainable, Local Food Economy":**

Mr. Duckwall attended the workshop and gave an overview to Council members. The workshop was well-attended by producers, retailers, and other individuals interested in food production and distribution. Mr. Duckwall stated that the workshop was an input and information gathering event and he gave a description of some of the topics. A summary of the event can be found on the Farm to Fork website distributed earlier to members. Ms. Leiner commented that some of the important issues on the website include preserving farmland, energy costs of food, food security, and the loss of open space in North Carolina due to development.

Mr. Davis joined the meeting at 3:20 p.m.

**3. Greensboro Carbon Emissions Inventory Update:**

Ms. Covington presented preliminary findings based on her work to determine Greensboro's carbon footprint. Resources that are used for calculating emission factors are mostly governmental and have been used for other greenhouse gas calculations. She stated that the largest municipal sources she has looked at included transportation, water, waste water processing, waste disposal, and utilities. She discussed the interpretation of data, challenges of components such as employee habits, fuel mileage, and the lack of complete information dating back to the 1990 baseline. She is waiting for city departments to finish gathering their data before the project can be completed. (see Attachment 1)

Dr. Francis Nkrumah, who is a Research Associate at A&T State University, gave a presentation to the Council on greenhouse gas emissions. He explained greenhouse gas emissions and pointed out the consequences of global warming and climate change. He reviewed the methodology for his community-focused greenhouse gas inventory along with the energy consumption of his data sources which included residential, commercial, industrial, transportation, and waste. More work remains to be done before an action plan can be formulated. He reiterated the challenge of obtaining data. (see Attachment 2)

Co-Chair Powell stated that the carbon emissions inventory would be discussed in depth at a future meeting and information would be sent to Council members for their review.

**4. EPA Sustainable Skylines Proposal Update:**

Mr. Curry advised the Council that the Sustainable Skylines proposal was submitted to the EPA on time and a decision should be made by April of 2009.

**5. Summary of the Principles of "Peak Oil":**

Co-Chair Landau briefly familiarized Council members with the principles behind peak oil. The urgency of the issue as the finite oil supply levels off and consumer demand increases. He discussed the implications of a shortage in the vulnerable oil supply and the increasing need for an accessible regional food supply. He shared websites with the Council that focus on what national municipalities are doing about these issues. (see Attachment 3)

**6. Update on Status of CSC Survey:**

Mr. Curry stated that 54 people have completed the online CSC survey. The top issues to be dealt with according to the survey were promoting transportation, land use policies to reduce sprawl, education, and maintaining healthy urban forests. He will send current survey results to Council members. It was agreed to leave the survey up for another month.

**7. Planning for Report to City Council:**

Co-Chair Powell suggested that planning for the report to City Council should begin with a template containing category topics and subcommittees should be formed to pursue the topics. The Council discussed topic development and strategies, possible budget implications, and the introduction of incentives. They decided to have a separate work session dedicated to creating a preliminary report to present to City Council. Co-Chair Landau stated that he would investigate the possibility of having an intern help with the details.

Members agreed to hold the next meeting on February 9, 2009 from 1:00 p.m. until 5 p.m. The first two hours will be spent planning the report, and the regular meeting will commence at 3:00 p.m. Co-Chair Powell will e-mail Council members reminding them of the new time. A list will also be sent out to members to allow them to sign up for the subcommittee of their choice.

**8. Items from Co-Chairs:**

- **Cool Cities Workshop**

The Cool Cities Workshop will be held January 24, 2009 in Winston-Salem. The workshop will focus on things that local governments can do to reduce carbon emissions to improve energy efficiency.

- **CERT Presentation**

There will be a CERT workshop on February 26, 2009 at A&T State University on sustainable energy alternatives and low income communities.

- **Global Warming Teach-In**

There will be a nationwide event taught through schools on global warming on February 5, 2009. Details can be found in an earlier e-mail sent to Council members.

Co-Chair Landau informed members of a film series on sustainability held every month on the UNC-G campus. The next film, titled *Waste Equals Food*, will be shown on January 29, 2009 at 6:30 p.m. at Weatherspoon Art Gallery. A discussion will be held following the film. He also reminded the group that an organizational meeting of Sustainable Greensboro will be held Tuesday, January 27, 2009.

**9. Items from Group Members:**

- **Update on E-mails to the CSC Website**

Co-Chair Landau advised members that the problem receiving e-mails to the CSC website has not been resolved. He shared the emails that have been forwarded to him until the problem can be fixed.

**10. Items from Staff:**

Ms. Covington stated that there will be a meeting on January 13, 2009 in Winston-Salem regarding new regulations on ozone and the impact on this area.

Co-Chair Landau advised the Group that there are three vacancies on the Council as Ms. Yarbray, Mr. Brady, and Mr. Allen have withdrawn. Members discussed plans to find replacements to fill the empty seats.

Mr. Clary left the meeting at 5:09 p.m.

**11. Items from the Public:**

Beth McKee-Huger spoke from the audience and informed the group that the 2009 Housing Summit will be held on February 26, 2009. She distributed brochures and invited members to attend.

**12. Acknowledgement of Absences:**

Mr. Davis moved to acknowledge the absence of Mr. Hoekstra, seconded by Ms. Allen. The Council voted unanimously 10-0 to approve the motion. (Ayes: Landau, Powell, Leiner, Venable, Kollar, Sanford, Duckwall, Clary, Allen, Davis. Nays: None.)

\* \* \* \* \*

**13. Adjournment:**

There being no further business before the Group, the meeting adjourned at 5:12 pm.

Respectfully submitted,

Joel Landau and Bob Powell  
Co-chairs

JL-BP:sm/jd



City of Greensboro  
Greenhouse Gas Calculations  
January 12, 2009

# **Greenhouse Gas Emission Calculations**

- International Council for Local Environmental Initiatives
- The Climate Registry –GHG Protocol
- U.S. Environmental Protection Agency
- Source Emission Calculation

# Municipal Emission Sources

- Transportation
- Water and Wastewater Processing
- Waste Disposal
- Utilities







# Vehicle Summaries

- Car (Normal Usage) – 247
- Car (Severe Usage) – 233
- Light Vehicles – 439
- Medium Vehicles – 176
- Heavy/Sanitation – 96
- Heavy Sewer – 6
- Heavy Other – 22
- Trailed Equipment – 97
- Off-Road/Construction/Tractors – 314

# Alternative Fuel Vehicles



- Flex-fueled (E-85) – 95
- Bio-diesel (E-85) – 809

Source: Finance Department – Equipment Services

# Vehicle Annual Mileage Summaries

- Car (Normal Usage) – 11,300 miles
- Car (Severe Usage) – 15,000 miles
- Light Vehicles – 12,950 miles
- Medium Vehicles – 10,800 miles
- Heavy/Sanitation – 11,300 miles
- Heavy/Sewer – 7,000 miles

**Source: Finance Department Equipment Services Division**

# Vehicle Average Age Summaries

- Car (Normal Usage) – 4.7 years
- Car (Severe Usage) – 2.6 years
- Light Vehicles – 4.1 years
- Medium Vehicles – 6.8 years
- Heavy/Sanitation – 5.8 years
- Heavy Sewer – 7.4 years
- Trailed Equipment – 6.7 years
- Off-Road/Construction/Tractors – 7 years

Source: Finance Department Equipment Services Division

# Fuel Usage (CO<sub>2</sub> Eq)

## 2007-2008

Unleaded – 43,651 gallons (383.34 MTeCo<sub>2</sub>)

Diesel – 44,684 gallons (448.94 MTeCo<sub>2</sub>)

## 2000-2001

Unleaded – 40,624 gallons (356.76 MTeCo<sub>2</sub>)

Diesel – 35,144 gallons (353.09 MTeCo<sub>2</sub>)

# Water and Wastewater Processing



	<b>TZ Osborne</b>	<b>North Buffalo</b>	<b>Total (Mgal)</b>
1990	5327.75	5638.6	10966.35
1991	5234.02	5756.5	10990.52
1992	5531.73	5347.8	10879.53
1993	6118.33	5378.7	11497.03
1994	6194.01	5224.8	11418.81
1995	6152.91	4951.5	11104.41
1996	6609.27	5420.1	12029.37
1997	6311.94	5504.2	11816.14
1998	7003.03	4856.3	11859.33
1999	6928.49	4247.2	11175.69
2000	7116.7	4399.51	11516.21
2001	6592.59	4820.4	11412.99
2002	6790.44	5181.3	11971.74
2003	8424.63	4660.32	13084.95
2004	7329.54	4150.54	11480.08
2005	7036.29	3944.5	10980.79
2006	6499.34	4097.87	10597.21
2007	6613.67	4127.86	10741.53
2008	7877.42	2424.89	10302.31

## Water Supply Data

2000	12,242,795,000
2001	10,843,548,000
2002	8,593,897,000
2003	10,108,554,000
2004	10,753,167,000
2005	9,889,659,000
2006	10,587,499,000
2007	9,910,037,000
2008	9,478,406,000



# Waste Disposal Summaries



<b>Phase I</b>	<b>Phase II</b>	<b>Phase III</b>	<b>Total Waste Volume</b>	
2,995,161	3,500,618	2,210,721	<b>8,706,500</b>	<b>Total</b>
1,257,968	1,470,260	928,503	<b>3,656,730</b>	<b>MTeCO2</b> (0.42)
453,764	530,340	334,922	<b>1,319,026</b>	<b>MTeCO2</b> (0.15)

Annual tons since 1965

# Utilities

- Piedmont Natural Gas
- Duke Energy

October 1, 2007 – September 30, 2008

142,140,811 kwh

CO<sub>2</sub> = 1.05 lbs/kwh

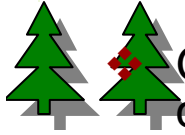
 **GREENHOUSE GAS (GHG) EMISSIONS**  
 **INVENTORY AND FORECAST: A CASE**  
**STUDY IN GREENSBORO**

**D R A F T**

Dr. F. Nkrumah, Prof. R. Powell & Dr. H. Singh  
Center for Energy Research & Technology (CERT)  
North Carolina A&T State University

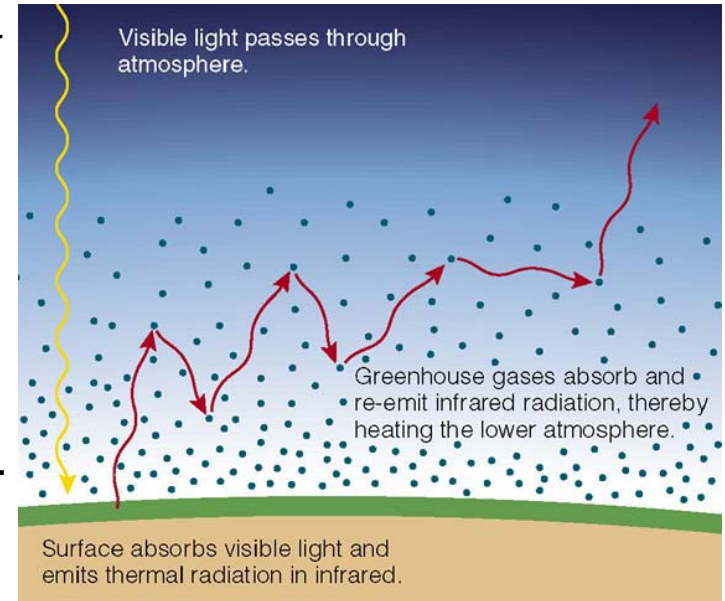
January 12, 2009

# GREENHOUSE GASES (GHGs)



Greenhouse gases are those gaseous constituents both natural and anthropogenic—of the Earth’s atmosphere that absorb infrared radiation emitted from the Earth’s surface, the atmosphere, and clouds.

- ❖ These gases trap energy in the Earth’s atmosphere and cause the *greenhouse effect*—the trapping of heat in the lower atmosphere—and influence the global climate.
- ❖ Water vapor (H<sub>2</sub>O), carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) are the primary greenhouse gases in the Earth’s atmosphere.

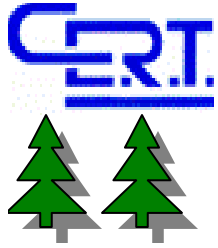


*Carbon Dioxide (CO<sub>2</sub>) - A naturally occurring gas, which is also a by-product of burning fossil fuels, biomass burning, land-use changes, and other industrial processes is the principal greenhouse gas being emitted by human activities.*



# GREENHOUSE GAS EMISSIONS DUE TO HUMAN ACTIVITIES

- ❖ **CARBON DIOXIDE:** Hydrocarbon (fossil Fuel) Combustion (power plant, transportation, oil-gas refinery, .....)
- ❖ **METHANE:** Livestock, manure, waste-water treatment, landfills and fuel production
- ❖ **NITROUS OXIDE:** Hydrocarbon combustion, industrial processes, denitrification of manure and soil nitrogen
- ❖ **FLORINATED HYDROCARBONS:** Refrigeration, dry cleaning, chemical manufacturing
- ❖ **WATER VAPOR:** Increased temperature from other GHGs



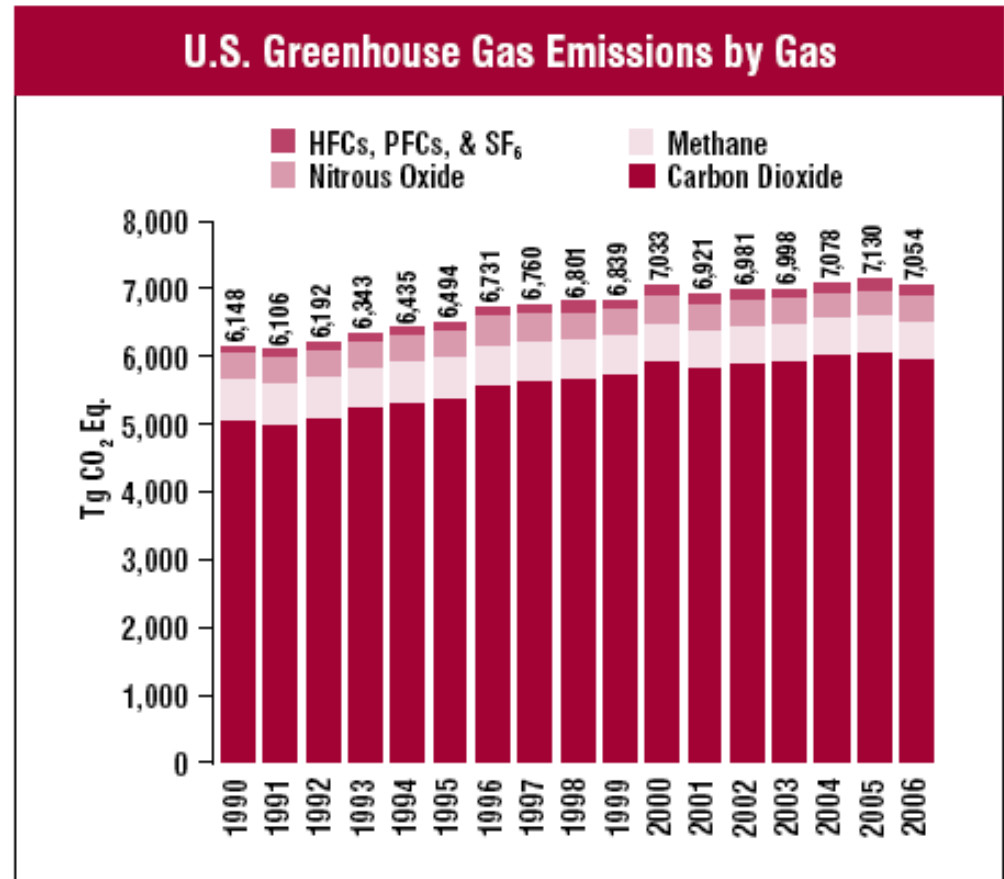
# GLOBAL WARMING POTENTIAL OF GREENHOUSE GASES

<i>GAS</i>	<i>ATMOSPHERE LIFETIME (YEARS)</i>	<i>GLOBAL WARMING POTENTIAL (100 YEARS)</i>
Carbon Dioxide (CO <sub>2</sub> )	50-200	1
Methane(CH <sub>4</sub> )	9-15	25
Nitrous Oxide (N <sub>2</sub> O)	120	298
HFC-134A	15	1,300
HFC-404A	>48	3,260
Sulfur Hexafluoride (SF <sub>6</sub> )	3,200	23,900



# UNITED STATES GHG EMISSION TREND (1990-2006)

- ❖ Emission are dominated by CO<sub>2</sub>.
- ❖ Percentage of CO<sub>2</sub> slightly increases from 1990-2006
- ❖ The proportion of CO<sub>2</sub> is about 80% of the total emissions while the rest remains almost constant



Source: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2006





# GHG AND CLIMATE CHANGE

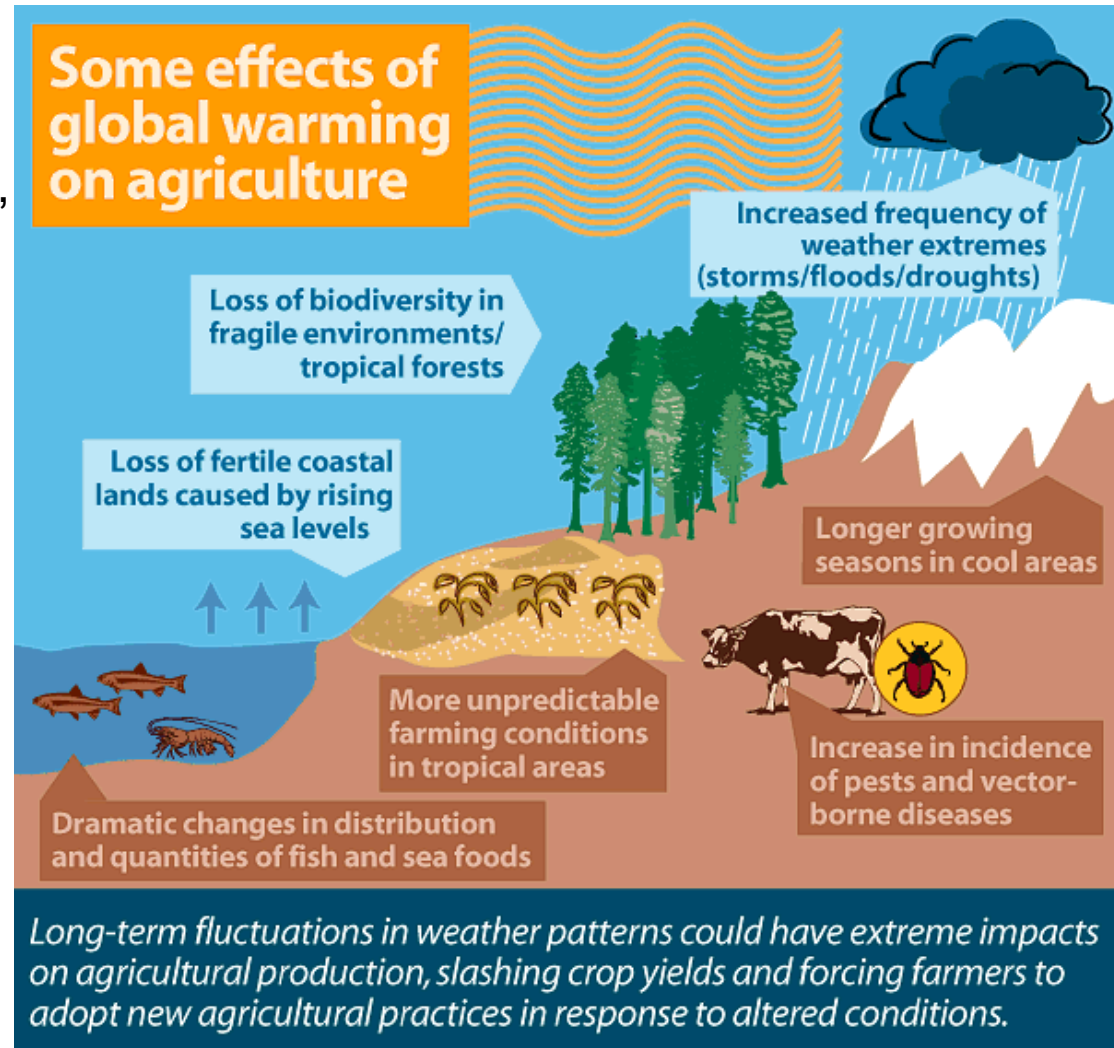
- ❖ Human activities are responsible for the rise in GHG emissions and the consequential Global Warming.
- ❖ According to the current Energy Information Administration release greenhouse gases mostly carbon dioxide was up by 1.4 percent in 2008 as a result of human activities.
- ❖ IPCC “projects that unless urgent action is taken, global emissions in 2030 will be 25% to 90% higher than today” this will result in unprecedented change in the global climate condition.
- ❖ The earth’s mean surface temperature is forecasted to increase from 1.4°C to 5.8°C (IPCC, 2002)

❖ *IPCC WARNING: To stabilize the average global warming to 2°C beyond the pre-industrial level by 2050 will require 50% cut in current levels of greenhouse gas emissions*



# EFFECTS OF CLIMATE CHANGE DUE TO GHG EMISSIONS

- ❖ Human health,
- ❖ Agriculture,
- ❖ Natural ecosystems,
- ❖ Coastal areas,
- ❖ Settlement





# METHODOLOGY FOR GREENSBORO GHG INVENTORY (ICLEI, CACP)

## OVERVIEW OF CACP'S CAPABILITIES

- ❖ Create GHG and criteria air pollutant emissions for base year
- ❖ Forecast and back-cast emissions growth
- ❖ Evaluate measures to reduce emissions
- ❖ Prepare emissions reduction action plans





# GREENSBORO GHG INVENTORY DATA SOURCE

## CATEGORIES OF DATA

- ❖ Residential
- ❖ Commercial
- ❖ Industrial
- ❖ Transportation
- ❖ Waste



TRANSPORTATION



Landfill



INDUSTRIAL



# GREENSBORO INVENTORY DATA COLLECTION FOR THE BASE YEAR 2007

***NATURAL GAS:*** Piedmont Natural Gas

***ELECTRICITY:*** Duke Energy

***TRANSPORTATION:*** NC Department of Natural Resources

***HOUSEHOLD NUMBER:*** Piedmont Triad Council of Government

***WASTE DATA:*** City of Greensboro Environmental Service Dept.

***CENSUS DATA:*** Piedmont Triad Council of Government

***NUMBER OF COMMERCIAL EMPLOYEES:????***

***NUMBER OF INDUSTRIAL EMPLOYEES:????***

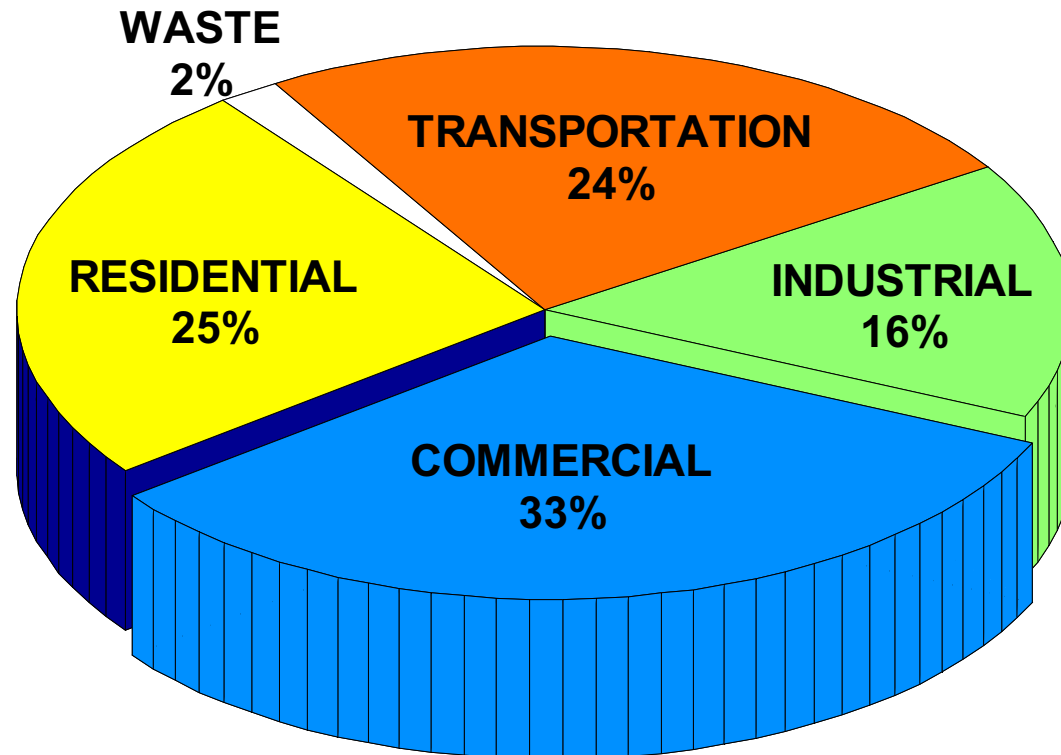


# ENERGY CONSUMPTION BY SECTOR AND GHG EMISSIONS FOR BASE YEAR 2007

<i>SECTOR</i>	<i>ENERGY (MMBtu)</i>	<i>EQUIV. CO<sub>2</sub> (tons)</i>
<i>Residential</i>	11,220,796	1,518,291
<i>Commercial</i>	12,551,659	1,999,662
<i>Industrial</i>	6,920,866	962,413
<i>Transportation</i>	17,328,166	1,485,117
<i>Waste</i>	NA	115,844
<b>Total</b>	<b>48,021,487</b>	<b>6,081,327</b>



# PERCENTAGE GREENSBORO GHG EMISSIONS BY SECTOR FOR BASE YEAR 2007





# CRITERIA AIR POLLUTANT EMISSIONS BY SECTOR FOR BASE YEAR 2007

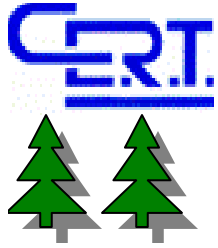
<b><i>SECTOR</i></b>	<b><i>NO<sub>x</sub></i></b> <b><i>(tons)</i></b>	<b><i>SO<sub>x</sub></i></b> <b><i>(tons)</i></b>	<b><i>CO</i></b> <b><i>(tons)</i></b>	<b><i>VOC</i></b> <b><i>(tons)</i></b>	<b><i>PM10</i></b> <b><i>(tons)</i></b>
<b><i>Residential</i></b>	<b>2,390</b>	<b>6,372</b>	<b>277</b>	<b>44</b>	<b>138</b>
<b><i>Commercial</i></b>	<b>3,170</b>	<b>9,440</b>	<b>323</b>	<b>46</b>	<b>194</b>
<b><i>Industrial</i></b>	<b>1,719</b>	<b>4,356</b>	<b>240</b>	<b>36</b>	<b>97</b>
<b><i>Transportation</i></b>	<b>4,835</b>	<b>270</b>	<b>39,408</b>	<b>4,038</b>	<b>135</b>
<b>Total</b>	<b>12,114</b>	<b>20,438</b>	<b>40,248</b>	<b>4,163</b>	<b>565</b>





# CRITERIA AIR POLLUTANT EMISSIONS BY SOURCE FOR BASE YEAR 2007

<b><i>SOURCE</i></b>	<b><i>NO<sub>x</sub></i></b> <b><i>(tons)</i></b>	<b><i>SO<sub>x</sub></i></b> <b><i>(tons)</i></b>	<b><i>CO</i></b> <b><i>(tons)</i></b>	<b><i>VOC</i></b> <b><i>(tons)</i></b>	<b><i>PM10</i></b> <b><i>(tons)</i></b>
<b><i>Diesel</i></b>	1,632	72	1,348	182	63
<b><i>Electricity</i></b>	5,901	19,896	477	53	386
<b><i>Gasoline</i></b>	3,202	198	38,061	3,855	72
<b><i>Natural Gas</i></b>	1,378	272	363	72	44
<b>Total</b>	12,114	20,438	40,248	4,163	565



# RESIDENTIAL SECTOR: BASE YEAR 2007 ENERGY USE, CAP&GHG EMISSIONS

<i>Residential</i>	<i>Energy (MMBtu)</i>	<i>NO<sub>x</sub> (tons)</i>	<i>SO<sub>x</sub> (tons)</i>	<i>CO (tons)</i>	<i>VOC (tons)</i>	<i>PM10 (tons)</i>	<i>GHGs (tons)</i>
<i>Electricity</i>	5,456,746	1,884	6,352	152	17	123	1,162,175
<i>Natural Gas</i>	5,764,050	506	19	125	27	15	356,116
<b>Total</b>	<b>11,220,796</b>	<b>2,390</b>	<b>6,372</b>	<b>277</b>	<b>44</b>	<b>138</b>	<b>1,518,291</b>



# COMMERCIAL SECTOR: BASE YEAR 2007 ENERGY USE, CAP&GHG EMISSIONS

<i>Commercial</i>	<i>Energy (MMBtu)</i>	<i>NO<sub>x</sub> (tons)</i>	<i>SO<sub>x</sub> (tons)</i>	<i>CO (tons)</i>	<i>VOC (tons)</i>	<i>PM10 (tons)</i>	<i>GHGs (tons)</i>
<i>Electricity</i>	8,096,659	2,796	9,425	226	25	183	1,724,422
<i>Natural Gas</i>	4,455,00	374	15	97	21	11	275,240
<b>Total</b>	<b>12,551,659</b>	<b>3,170</b>	<b>9,440</b>	<b>323</b>	<b>46</b>	<b>194</b>	<b>1,99,662</b>



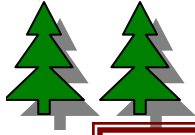
# INDUSTRIAL SECTOR: BASE YEAR 2007 ENERGY USE, CAP&GHG EMISSIONS

<i>Commercial</i>	<i>Energy (MMBtu)</i>	<i>NO<sub>x</sub> (tons)</i>	<i>SO<sub>x</sub> (tons)</i>	<i>CO (tons)</i>	<i>VOC (tons)</i>	<i>PM10 (tons)</i>	<i>GHGs (tons)</i>
<i>Electricity</i>	<b>3,537,277</b>	<b>1,221</b>	<b>4,118</b>	<b>99</b>	<b>11</b>	<b>80</b>	<b>753,367</b>
<i>Natural Gas</i>	<b>3,383,589</b>	<b>497</b>	<b>238</b>	<b>141</b>	<b>25</b>	<b>18</b>	<b>209,046</b>
<b>Total</b>	<b>6,920,866</b>	<b>1,719</b>	<b>4,356</b>	<b>240</b>	<b>36</b>	<b>98</b>	<b>962,413</b>



# TRANSPORTATION SECTOR, BASE YEAR 2007 ENERGY USE, CAP&GHG EMISSIONS

<i>Transportation</i>	<i>Energy (MMBtu)</i>	<i>NO<sub>x</sub> (tons)</i>	<i>SO<sub>x</sub> (tons)</i>	<i>CO (tons)</i>	<i>VOC (tons)</i>	<i>PM10 (tons)</i>	<i>GHGs (tons)</i>
<i>Gasoline</i>	14,336,617	3,202	198	38,061	3,855	72	1,225,462
<i>Diesel</i>	2,991,549	1,632	72	1,348	182	63	259,655
<i>Total</i>	17,328,166	4,835	270	39,408	4,038	135	1,485,117



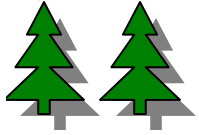
## *REMAINING WORK*

- ❖ *Forecast and back-casting Emissions growth*
- ❖ *Evaluate measures to reduce emissions growth*
- ❖ *Prepare emissions reduction action plans*

## *ADDITIONAL DATA NEEDED*

- ❖ *Number of commercial institutions for the base year and the estimated growth rate*
- ❖ *Area commercial institutions for the base year and the estimated growth rate*
- ❖ *Number of commercial employees for the base year and the estimated growth rate*
- ❖ *Number of industrial institutions for the base year and the estimated growth rate*
- ❖ *Area industrial institutions for the base year and the estimated growth rate*
- ❖ *Number of commercial employees for the base year and the estimated growth rate*

CERT.



*THANK YOU !!!*

“Peak Oil” refers to Production capacity.

**Geology:**

Oil is not in an underground pool, it’s in rock formations, along with water and other substances (sulfur for instance).

Oil floats atop water, so the water creates pressure pushing the oil upwards. Think geyser.

As oil is extracted, the pressure drops. For the remaining oil, quality (purity) drops and the cost of extraction rises. Most of the world’s producing oil fields are in this stage.

Oil is a finite resource. The US was the world’s largest producer in the 1930s and ‘40s; now we produce 8% of the world’s total. Production in the US peaked in the early ‘70s: that is, it’s been in decline since then.

The major oil companies have been awash in cash for decades. They have explored the planet thoroughly. Most economically viable fields have been tapped, with new discoveries peaking in the mid-1960s at around 55 billion barrels per year. In 2005, new yearly discoveries totaled under 9 billion barrels, while consumption was over 31 billion barrels per year.

World-wide, production has peaked or is expected to peak within a few years.

Supply is leveling off, and will soon begin to decline. Simultaneously, demand is climbing rapidly, due to global industrialization (particularly China and India).

Soon global demand will exceed the supply. **THE RESULT WILL BE RISING PRICES COUPLED WITH INCREASING SHORTAGES.**

OPEC’s spare capacity has fallen from over 7 million barrels per day in 2002 to under 2 million in 2006. This means supply is increasingly vulnerable to disruption, be it from political upheaval, sabotage, natural disaster, etc.

World-wide, transportation is 95% dependent on oil. In the US, it was 97% in 2004.

**Implications of the above:**

No capacity for economic growth, or even to maintain current economic activity.

Increased international conflict over oil supplies.

**REDUCED ABILITY TO TRANSPORT FOOD, GOODS, AND PEOPLE.**

Concerted effort is necessary to safeguard our local economy and food supply.

**AT BEST, THE “FOSSIL FUEL AGE” WILL BE A BLIP ON THE GRAPH OF HUMAN HISTORY.**

*Reduce consumption, and produce locally. Relocalization.*

[www.postcarboncities.net](http://www.postcarboncities.net)