



*... Local governments creating
a sustainable future*

Starting a Green Government Program in Your Community

Presented by: Ken Cronin, City of Roanoke

Motivation for Change

Whether counties are motivated by global warming, air quality, national security, sustainability or financial savings, they are taking action to reduce harmful greenhouse gas emissions (GHG). Environmental risks and potential costs for inaction, meeting shrinking budgets and saving taxpayer dollars, moving the country toward energy independence – pick the goal you'd like, but the bottom line is counties are more aware today of emissions than ever before.

~ *County News Online* – February 25, 2008

First Things First...

- Get commitment to do something
- Assign a person or a group to oversee actions taken
- Track energy usage

What are Communities doing to “Get Started”?

Some of the basics:

- Determining the organization’s carbon footprint
- Local legislation involving energy incentives
- Employee and community involvement
- New energy-efficient buildings
- The big R’s: reforesting, relighting, retrofitting and recycling
- Alternative energy use

Defining your Carbon Footprint

Roanoke joined ICLEI- Local Governments for Sustainability in September, 2006. ICLEI is an international organization dedicated to improving the global environment through local government initiatives.

As part of this process, Roanoke is partnering with the Shenandoah Valley Air Quality Initiative (SHENAIR) at James Madison University and Virginia Tech's Green Engineering Program to evaluate the City's options for climate improvement.

GGC 1,3,26

The ICLEI Model: 5 Milestones

1. Conduct a baseline emissions inventory and forecast. Commonly called a “Carbon Footprint.”
2. Adopt an emission reduction target for the forecast year.
3. Develop a Local Action Plan.
4. Implement policies and procedures.
5. Monitor and verify results.

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Virginia ICLEI Members

- Albemarle County
- Arlington County
- Town of Blacksburg
- City of Charlottesville
- City of Harrisonburg
- City of Norfolk
- City of Roanoke
- Roanoke County
- Town of Warrenton

Roanoke City Council Initiative: Tax Break for Energy-Efficient Buildings

- Roanoke was the first city in Virginia to adopt this special tax rate
- Provides a five year, 10% real estate tax decrease if building is 30% more energy efficient than required by the Virginia Uniform Statewide Building Code
- Certification as an energy-efficient building must be made by a qualified, registered design professional or contractor not related to the applicant
- Exemption commences on July 1st following the approval date

Roanoke City Council Initiative: Clean and Green Campaign

- Designed to accelerate efforts already in place to make Roanoke attractive and *environmentally sound*
- Challenges businesses, civic organizations, neighborhoods and citizens to get involved in cleaning up their properties and *protecting the environment*
- Expectations and goals for appearance of the community will be established with the intent that they will be officially adopted as community standards
- Inspired creation of the Roanoke Business Environmental Leadership Coalition

GGC 25, 26

Roanoke's First LEED Project

• WILLIAMSON ROAD FIRE STATION •



LEED Projects:

- Optimize Site Potential
- Minimize non-renewable energy consumption
- Use environmentally preferable products
- Protect and conserve water
- Enhance indoor environmental air quality
- Optimize operational and maintenance practices GGC 9,10

Reforestation of Roanoke



- Goal of increasing the City's tree canopy from 32% to 40% over the next 10 years.
- Planted 500 trees, exceeding tree losses by 100 trees per year
- Reforested 3 acres of Thrasher Park

GGC 19

Reforestation of Roanoke



- Preserve mature trees through regular maintenance
- Planted trees and shrubs, removing asphalt along the Roanoke River

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Compact Fluorescent Lights



Compact Fluorescent Light

- City of Roanoke has replaced over 700 of our incandescent lights with CFL's.
- CFL's last at least five times as long and use 75% less energy.

GGC 2,30

Old T12 Lamps with Magnetic Ballasts in Municipal South



New T8 Lamps with Electronic Ballasts

T8 lamps are 10% more efficient than T12

Electronic Ballasts are 30% more efficient than Magnetic



City Jail Pneumatic Controls

Before



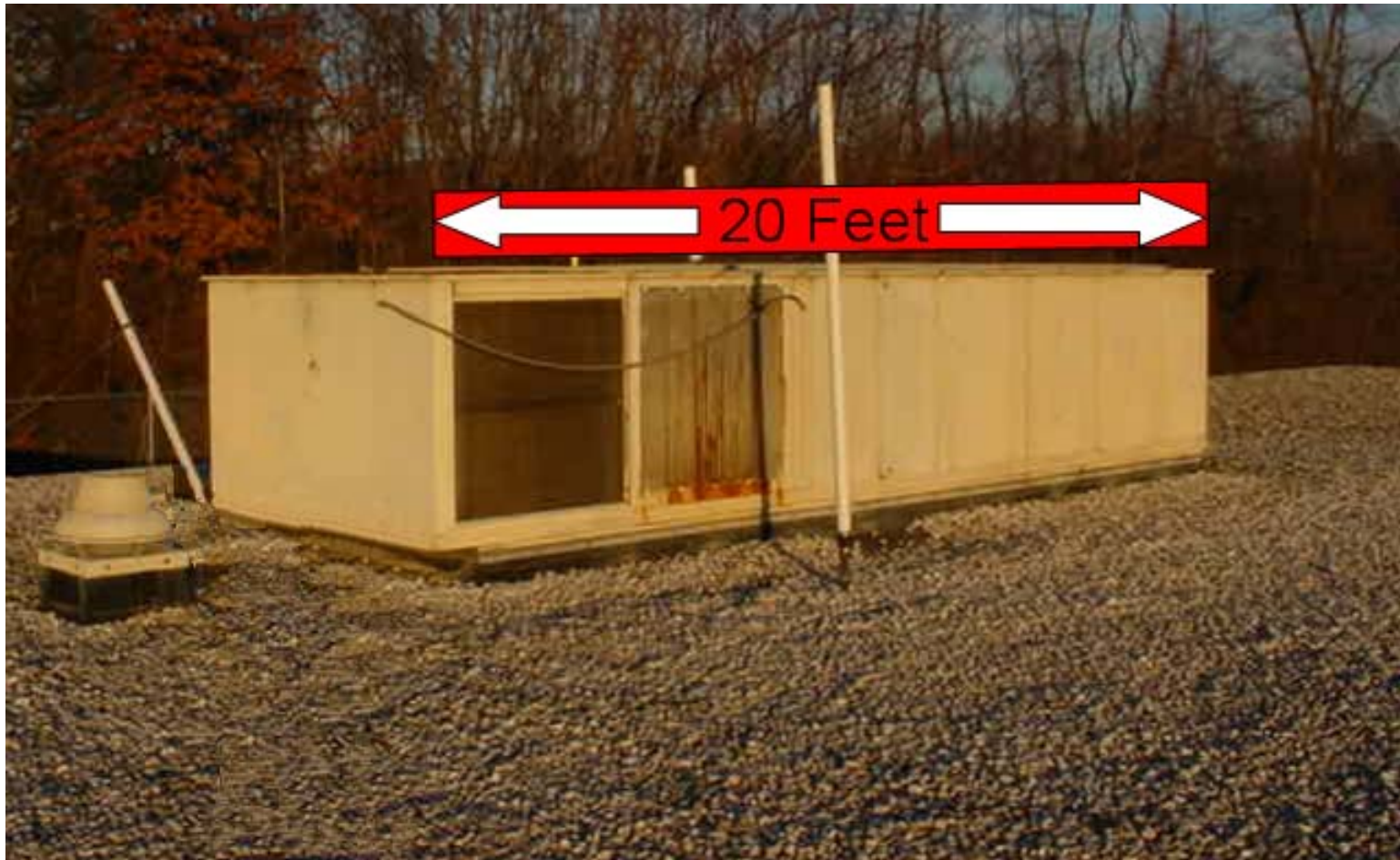
Direct Digital Controls (DDC)

After



GGC 2, 30

Melrose Library (before) Electric Air Conditioner



Melrose Library (after)

Roof top Heat Pump



Roanoke: First Local Government in SW Virginia to Use Biodiesel



- Biodiesel is biodegradable and non-toxic.
- Biodiesel typically produces 60% less net carbon dioxide than petroleum based diesel.
- Biodiesel makes the USA less dependent on foreign oil. GGC 14

Roanoke: First Local Government in SW Virginia to use Ethanol



Pumping Ethanol from Corn 1933

- City currently uses 10% Ethanol blend
- Corn Ethanol produces 22% less net Carbon Dioxide than Gasoline
- Ethanol makes the USA less dependent on foreign oil

Propane Lawn Mowers



- City has purchased 3 replacement propane mowers to test
- Propane mowers reduce ozone emissions and can be used on “ozone action days.”
- 85% of propane is produced domestically making us less dependent on foreign oil.

LED Traffic Lights



- Replacing incandescent lights with LED lights at 60 major intersections.
- LED's use 85% to 90% less energy and have a significantly longer bulb life.



Money Isn't All You're Saving

Products that have the Energy Star rating prevent greenhouse gas emissions by meeting strict energy efficiency guidelines. The City of Roanoke purchases the following Energy Star rated products:

Computers

New Lights

Monitors

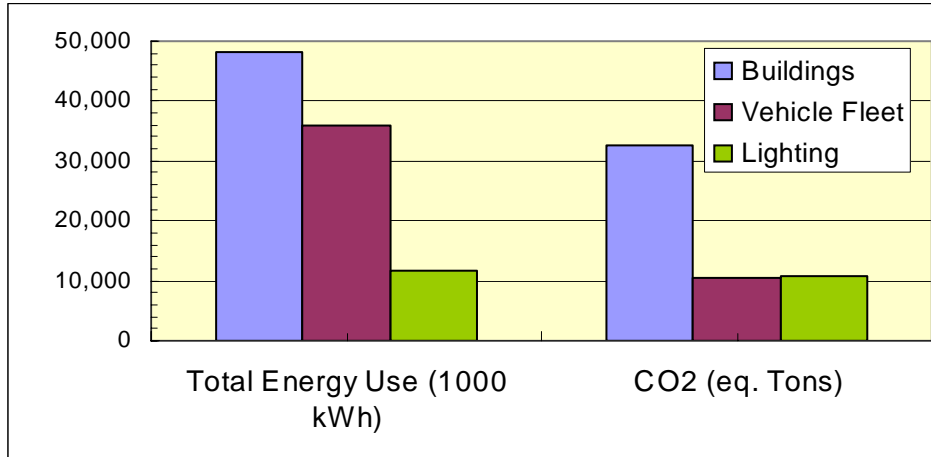
HVAC Equipment

Okay...

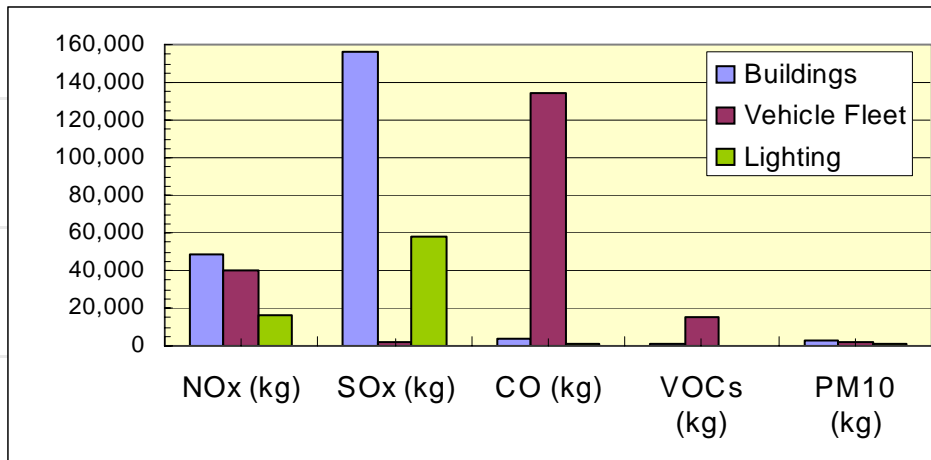
Changes were made...

What difference did it make?

Roanoke Municipal Baseline Summary



Roanoke Municipal Greenhouse Gas Emission Summary by Sector (2005)

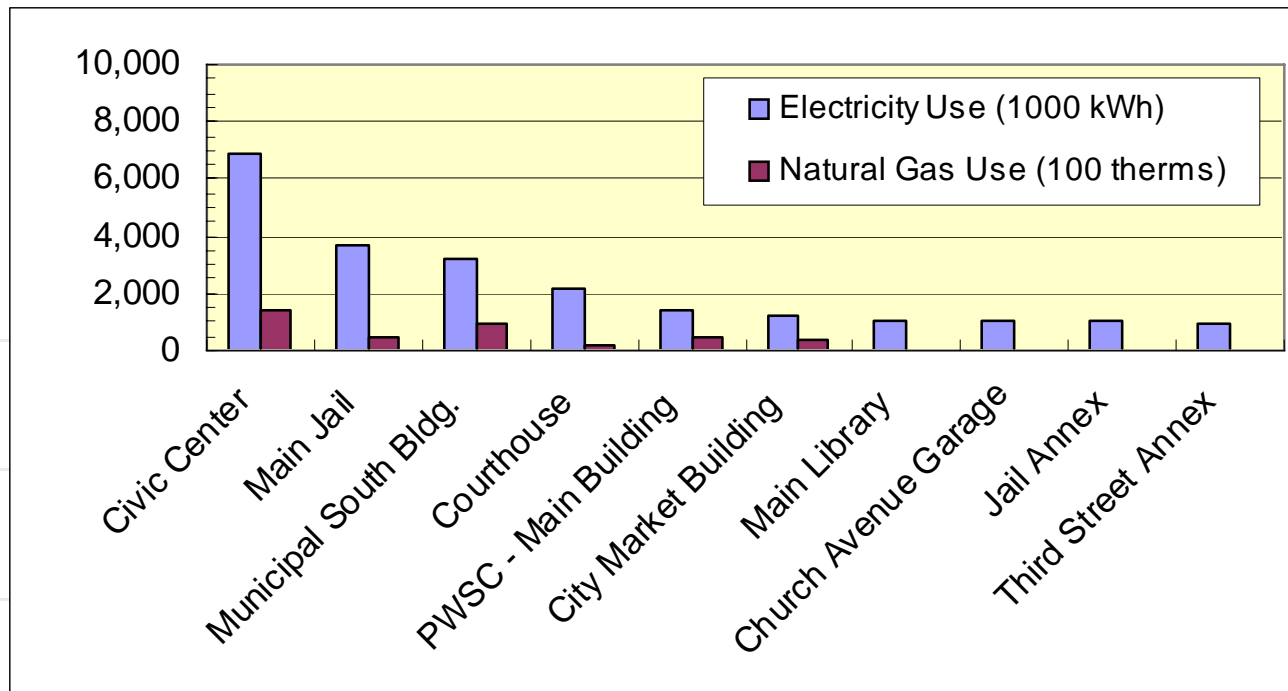


Roanoke Municipal Criteria Air Pollutant Emission Summary by Sector (2005)

Roanoke Municipal Baseline Summary

- **Building Sector**

- 63 entries analyzed in building category
 - Administration, fire stations, libraries, parking garages, police, parks and recreation, jail
 - City Market Building has highest energy use and cost per square foot

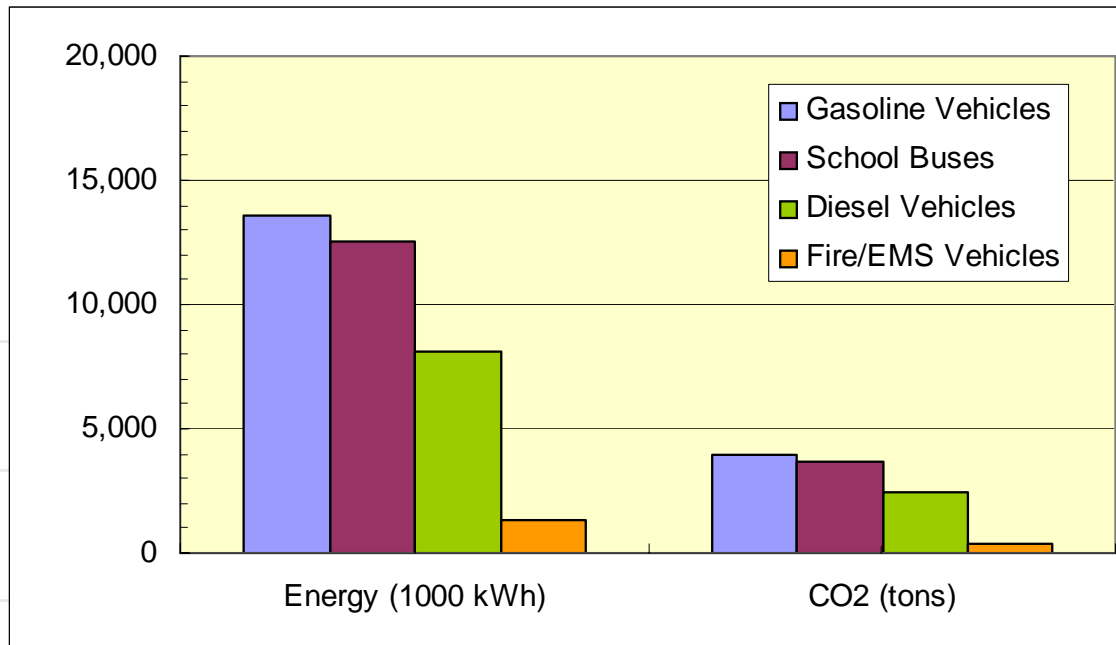


Roanoke Municipal Buildings – Top 10 Energy Users

Roanoke Municipal Baseline Summary

- **Vehicle Fleet Sector**

- Fleet fuel consumption/mileage considered for city vehicles from fuel purchases
 - *Municipal Vehicles, Fire/EMS, School Buses*

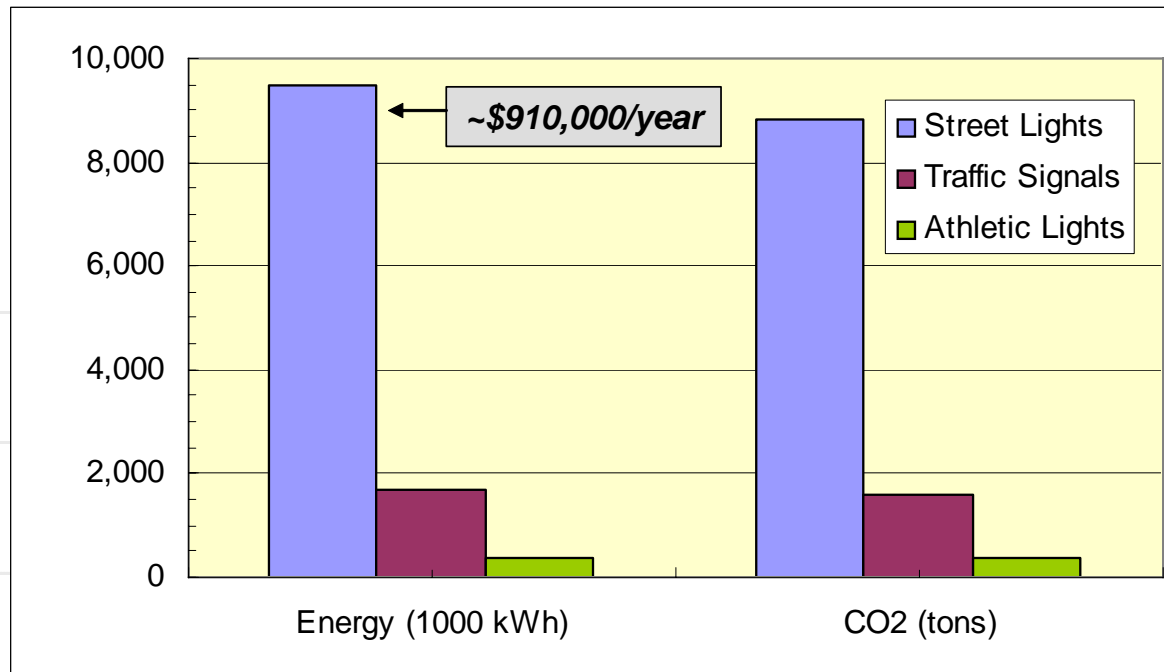


**Roanoke Municipal
Greenhouse Gas
Emission
Transportation
Summary (2005)**

Roanoke Municipal Baseline Summary

- **Lighting Sector**

- Streetlights (~10,000)
- Traffic signals (~150)
- Athletic facility lights



**Roanoke Municipal
Greenhouse Gas
Emission Lighting
Summary (2005)**

Roanoke Municipal Measures - Implemented

Measure	CO ₂ (eq. tons)
1. Municipal South Building Upgrade	
• HVAC upgrade (~50% energy reduction)	-217
• 694 40W T-12 lights changed to 32W T-8 lights (~20% energy reduction)	-135
2. Eureka Park Recreational Center Boiler Upgrade	
• 40-yr old boiler replaced with new, efficient boiler (~10% energy reduction)	-5
3. Light Bulbs	
• 460 - 60 W incandescent light bulbs replaced with 14 W CFL bulbs	-86
• 300 - 90 W exterior halogen lights replaced with 23 W CFL bulbs	-82
4. Vehicles	
• Low-sulfur diesel (LSD) fuel replaced by ultra-low sulfur diesel (ULSD)	
• Biodiesel blend increased first to 2% (B-2) and then to 5% (B-5)	-303
• Ford Escape hybrid SUV's purchased to replace standard gasoline sedans	-5
TOTALS	-833
Emission Reduction Relative to 2005 Baseline	-1.5%

Roanoke Potential Measures - Municipal

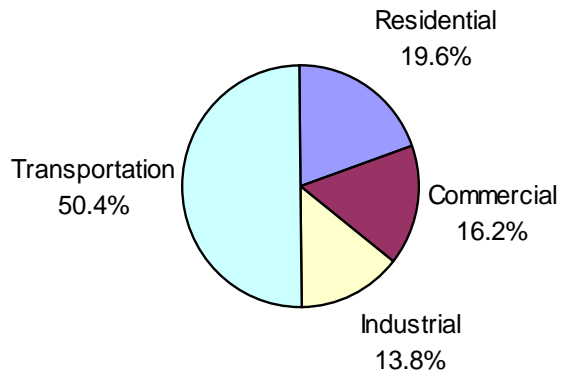
- Analysis Results:

Measure	Energy (kWh)	CO ₂ (eq. tons)
B-20 Diesel (use in all city diesel vehicles)	0	-1247
Ethanol (E-10 use in all city gasoline vehicles)	0	-395
Building Lights (replace 40W T-12 lights with 32W T-8 lights in all city buildings)	-1,696,925	-1,575
LED Traffic Lights (replacement of all in city)	-1,447,785	-1,344
Energy Star Equipment (Exit Signs and vending machines)	-84,513	-78
Energy Star Boilers (6 buildings)	-632,294	-133
Annual Totals	-3,861,517	-4,772
Reductions for target year (2012) from baseline (2005)	-0.4%	-4.7%

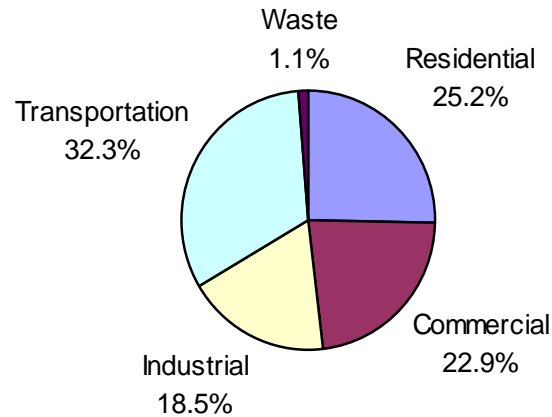
	NO _x (kg)	SO _x (kg)	CO (kg)	VOC (kg)	PM ₁₀ (kg)
Reduction from 2005	-1.0%	-4.4%	-5.1%	-1.4%	-4.1%

Roanoke Community Baseline Summary

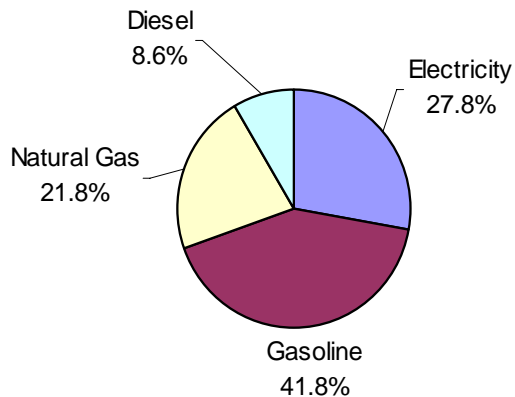
Roanoke Energy Use by Sector (2005)



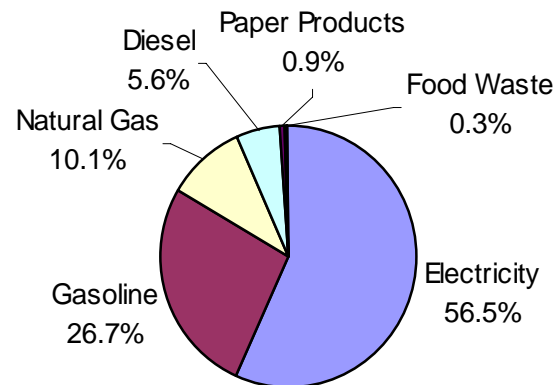
Roanoke CO₂ Emission by Sector (2005)



Roanoke Energy Use by Source (2005)



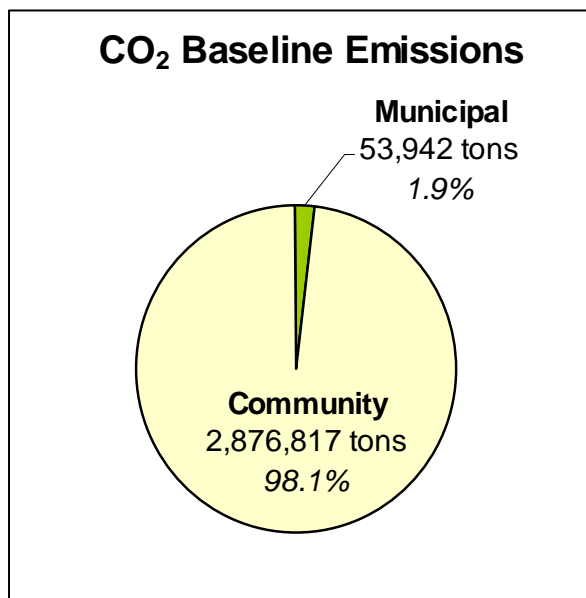
Roanoke CO₂ Emission by Source (2005)



Energy Use:
6.3 billion kWh
(equivalent)

CO₂ Emissions:
2.9 million tons
(equivalent)

Municipal Emissions Are A Small Contribution To The Overall Community Baseline



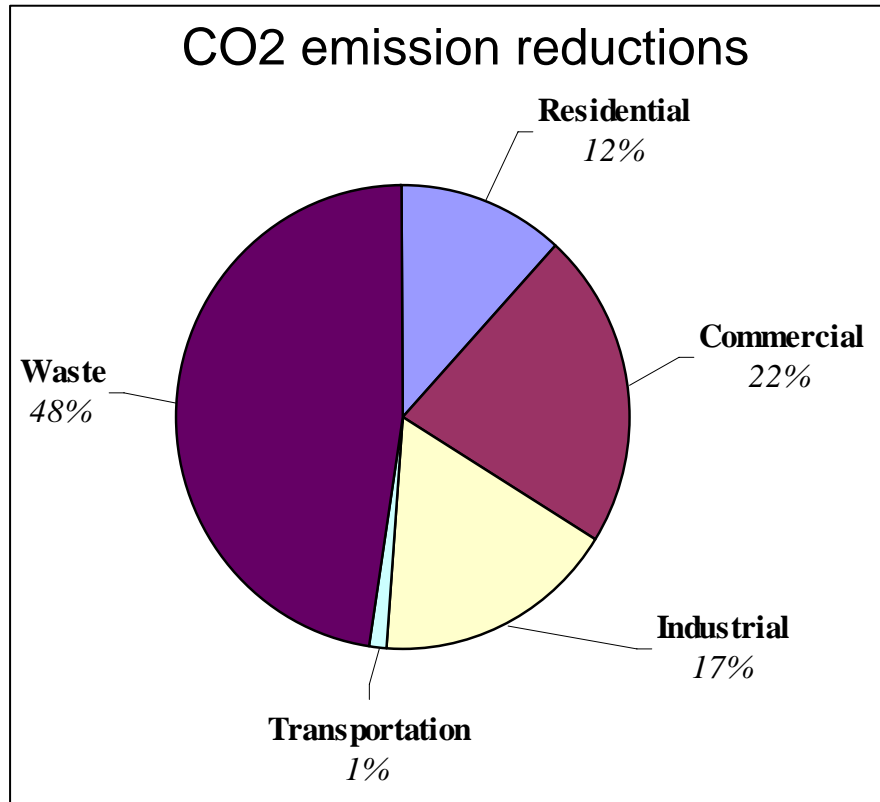
**Roanoke Municipal – Community
Baseline Emission Comparison
(2005)**

Sector	NO _x (tons)	SO _x (tons)	CO (tons)	VOC (tons)	PM10 (tons)
Municipal	116	238	154	18	6
Community	6,391	9,736	24,821	2,600	250
<i>Municipal (%)</i>	<i>1.8%</i>	<i>2.4%</i>	<i>0.6%</i>	<i>0.7%</i>	<i>2.3%</i>

Roanoke Potential Measures - Community

- **Conservative options analyzed in all 5 community sectors:**
 - 1. Waste – increased recycling of solid waste**
 - *Increase total recycling of municipal solid waste (paper, glass, metal, plastic) by 1% (weight) each year (2008 – 2012).*
 - 2. Residential – increased use of CFL lights**
 - *Replace one 75 W incandescent bulb with an equivalent 20 W compact fluorescent light bulb (CFL) in each Roanoke household each year (2008 – 2012).*
 - 3. Commercial and Industrial – energy efficiency measures**
 - *Reduce total commercial and industrial electricity usage by 1% each year (2008 – 2012).*
 - 4. Transportation – increased use of public transportation**
 - *Replace one automobile trip with one public transportation trip per week for 1% of Roanoke's population each year (2008 – 2012).*

Roanoke Potential Measures Results



Sector	Equiv. CO2 (tons)
Residential	-15,656
Commercial	-28,595
Industrial	-22,653
Transportation	- 1,347
Waste	-62,475
TOTALS	- 130,726
Community Total	2,876,827
5 yr. Reduction (%)	-4.5%

- These are simple examples of potential measures that the community could undertake to reduce emissions and energy use - *and save money at the same time.*
- Further analysis and discussion with city staff is required to determine best use of money and resources (ICLEI steps 3 and 4).

Tips for Getting Started. . .

1. Assign a point person responsible to coordinate the work
2. Determine your carbon footprint
3. Get some help. . .colleges and universities have skilled staff to do this work
4. Start doing some stuff. . .do the big R's, reforestation, relighting, retrofitting, recycling
5. Work with your Technology staff to ensure that computer monitors and large printers go into a "power-save" (not screen-saver) mode 30 minutes after last use.

Tips for Getting Started. . .

6. Start an employee recycling initiative.
7. Get the junk out of your fleet...buy hybrids if possible.
8. Install new carpet that is made from recycled materials. Get the manufacturer to commit to pick up old carpet and recycle it.
9. Install low flow or water free urinals.
10. Use biodiesel.

Questions/Comments?

Thank you!