

# Greenhouse Gas Emissions Inventories: Blacksburg Case Study

VML Green Government Challenge Forum  
Richmond, May 7, 2009  
Roanoke, May 8, 2009

## Why Climate Action Planning?

- Climate Change has become one of the defining problems of the century and there has been a significant response from international, national, state, and local communities
- At the local level, CAP requires a commitment from elected officials, staff, and a community constituency.
- For Blacksburg:
  - Mayor Ron Rordam signed the U.S. Mayors Climate Action Agreement to reduce GHG emissions and develop a climate action plan and established a Task Force on Sustainability & Climate Change to figure out how to do that.
- For Virginia Tech:
  - President Charles Steger charged the university Energy & Sustainability Committee to develop a Climate Action Commitment specific to the University.

## What is a Climate Action Plan?

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Following ICLEI's protocol:

1. Conduct a baseline GHG emission inventory and forecast
2. Adopt an emissions reduction target
3. Develop a local Climate Action Plan
4. Implement policies and measures
5. Monitor and verify results

## Some hints on GHG Inventory

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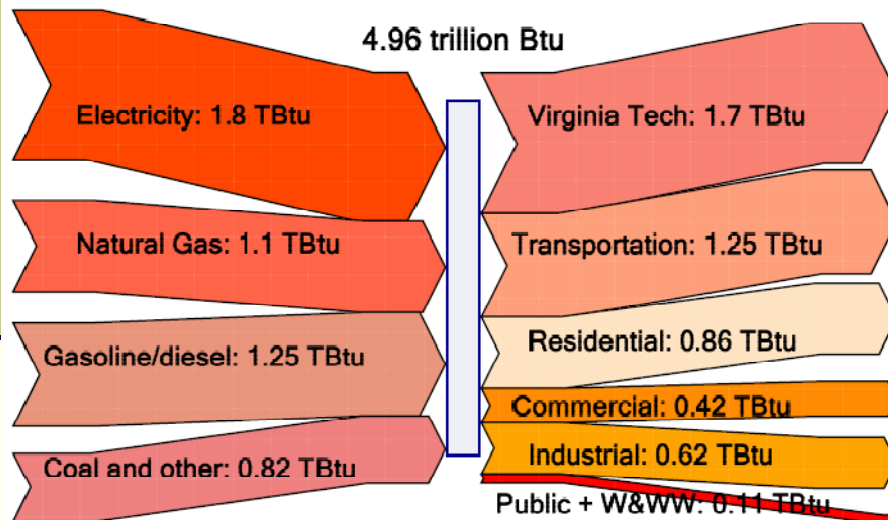
- Join ICLEI, get software
- Partner with utilities
- Partner with local college/university
- Don't get paralyzed by data & details
- Try to identify 2-3 actions to implement early

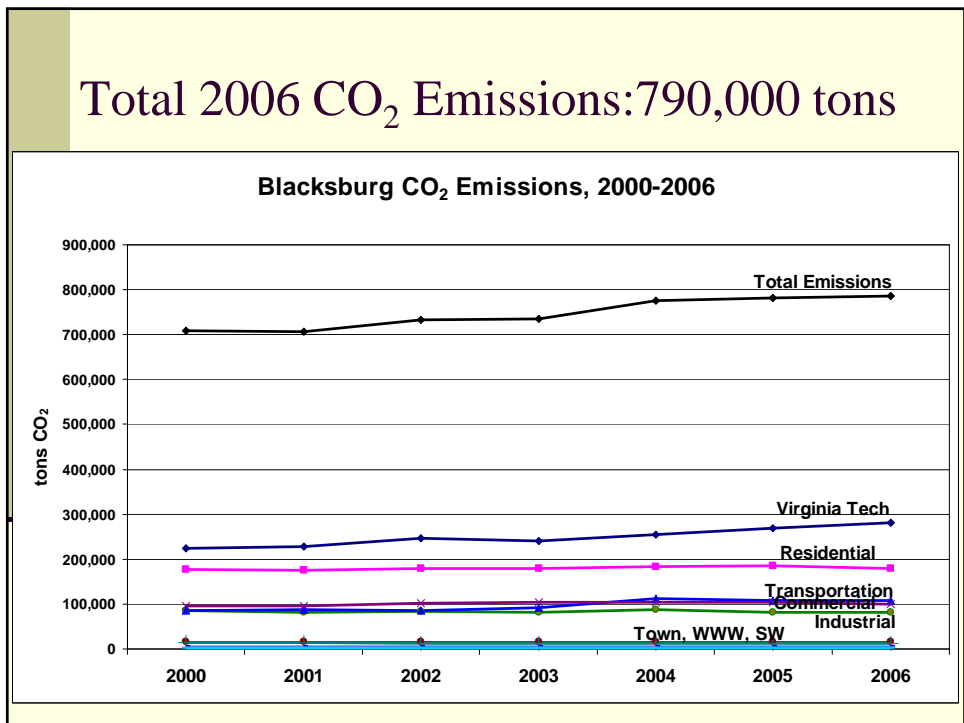
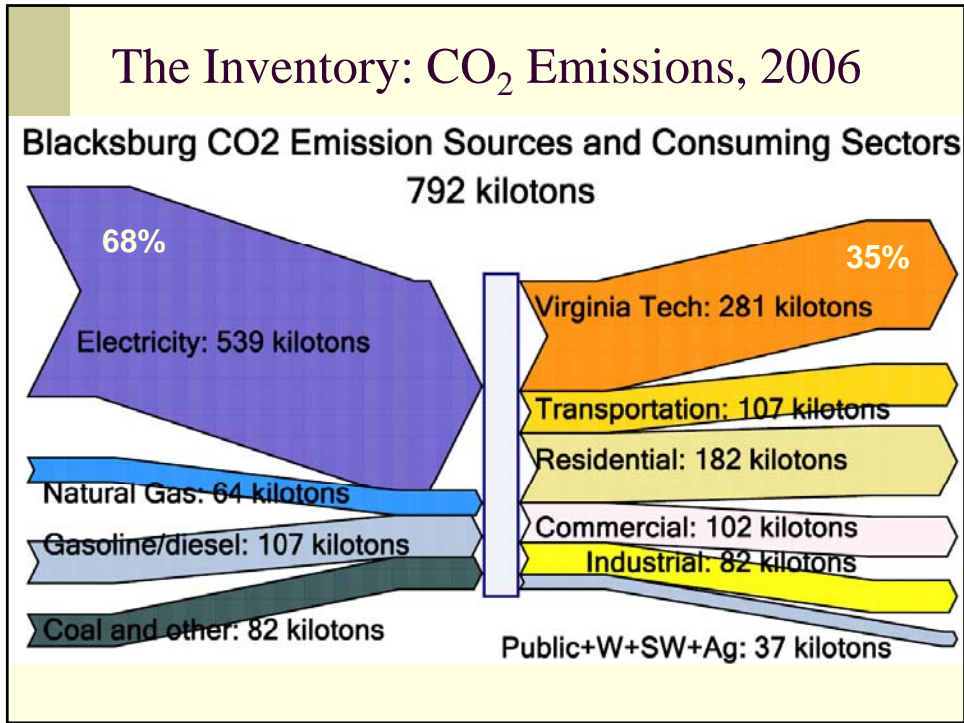
## The Blacksburg GHG Inventory

- Completed in March 2008 by Virginia Tech Urban Affairs & Planning students in spring and fall 2008 classes
- Combined Blacksburg and Virginia Tech energy use and emissions
- Basis for subsequent study of emission reduction goals and strategies

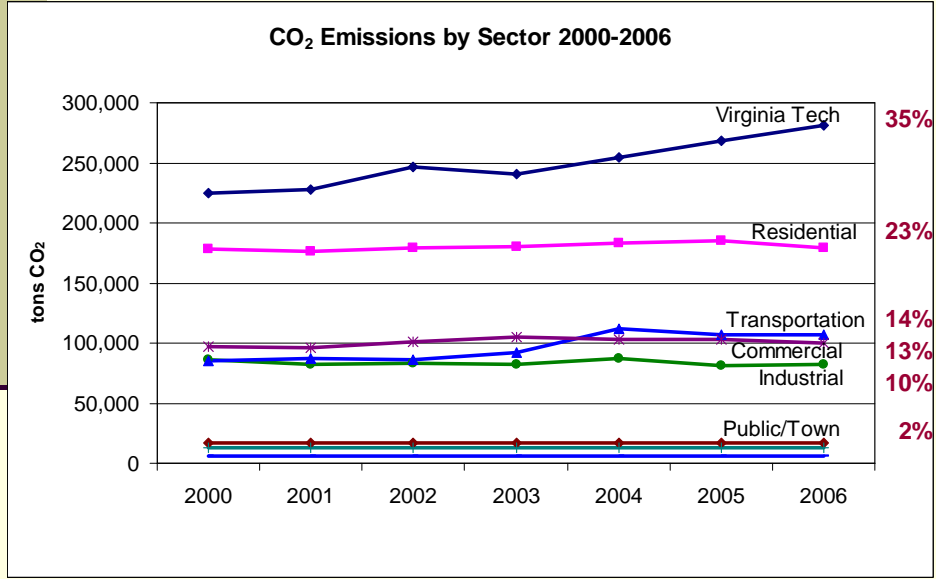
## The Inventory: End-use Energy, 2006

Blacksburg End Use Energy Sources and Consuming Sectors

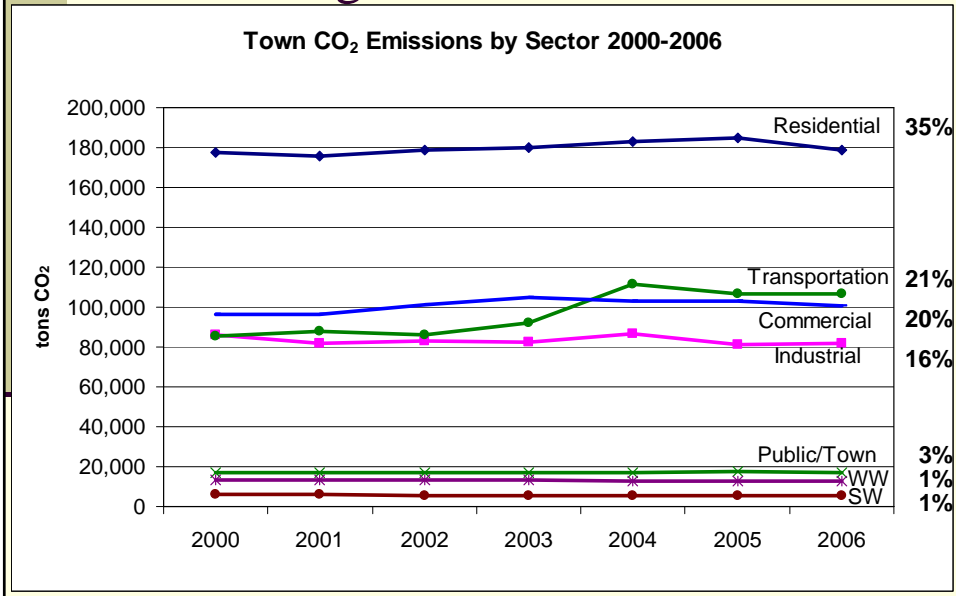




## Blacksburg Emissions with VT



## Blacksburg Emissions without VT



## Moving from Inventory to Action

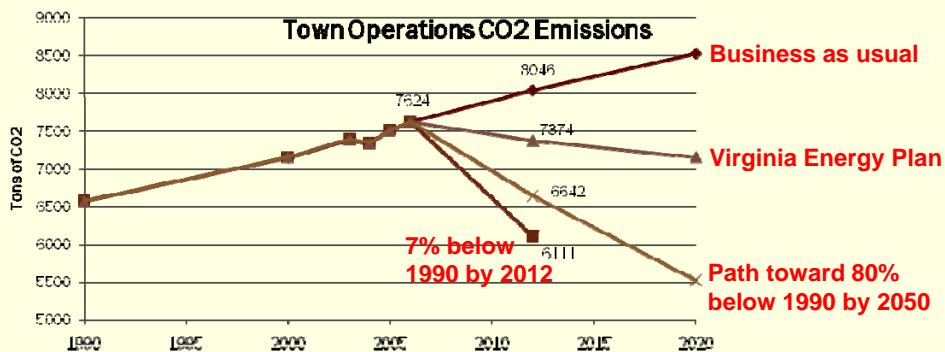
1. What should our target be for emissions reductions?
2. What actions can we take to meet them?

Can we set a target before we know how to meet it?

It's an iterative process...

- look at target options
- analyze actions
- set preliminary target
- implement actions
- monitor progress
- revise target if necessary

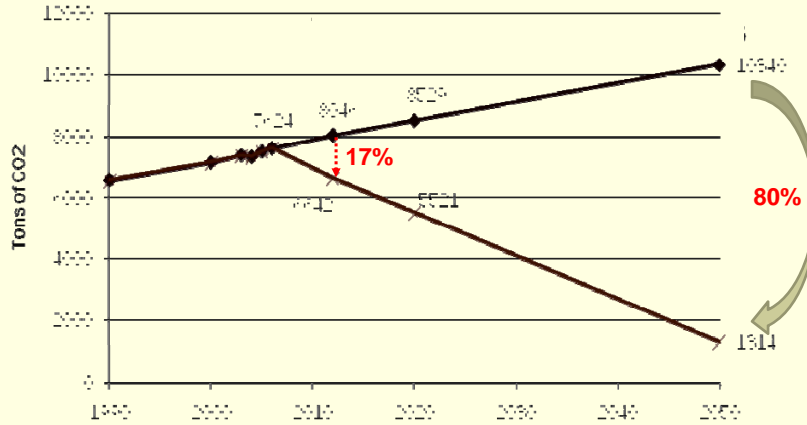
### Town of Blacksburg Operations: Only 2% of total emissions, but a good place to start



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**Let's assume an ambitious target of 80% reduction in emissions below 1990 levels by 2050. Is this realistic?**

**If a straight-line reduction, what would we need by 2012?**



Will require a 13% reduction from 2006 levels or a 17% reduction from the business as usual projection by 2012.

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## HOW CAN WE REALIZE THIS 17% REDUCTION

Possible actions to reduce energy & emissions:

- Lighting Occupancy Sensors
- LED Exit Signs
- Hybrid Vehicles
- Widespread use of Biodiesel (Blacksburg Transit)
- Aquatic Center Boiler Upgrade
- LED Streetlights
- Expanding Physical Footprint without Expanding the Carbon Footprint

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## Example analysis: Aquatic Center

### Aquatic Center Boiler Upgrade Calculation/ Citation

#### Application Summary

Current Gas Usage 38,928 ccf (2005 data)

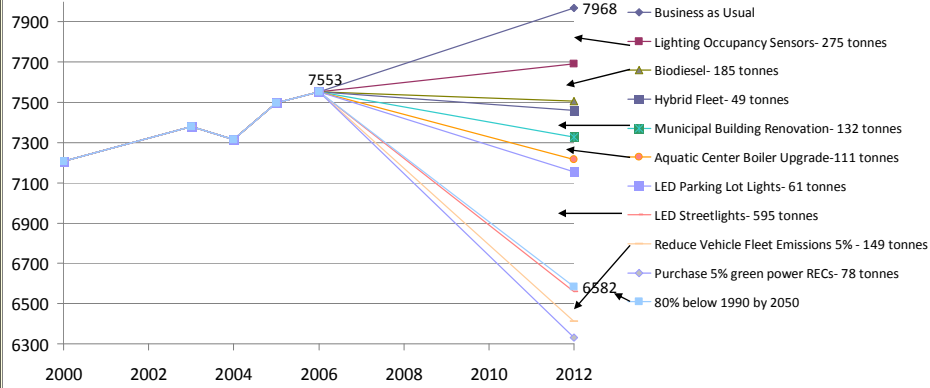
#### Upgrade Analysis (New boiler will double efficiency [Jim Akers])

Boiler Upgrade Cost	\$70,000	Jim Akers
Annual Energy Savings	20,067 therms	0.5 * Current * 1.05
Energy Cost Savings	\$ 27,894	Natural Gas Price *,
CO2 Savings	111 tonnes CO2	

Upgrade Cost	\$70,000
Annual Savings	\$27,894
Simple Payback Period	2.51 years
Annual CO2 Reduction	111 Tonnes/yr

@ \$1.39/therm

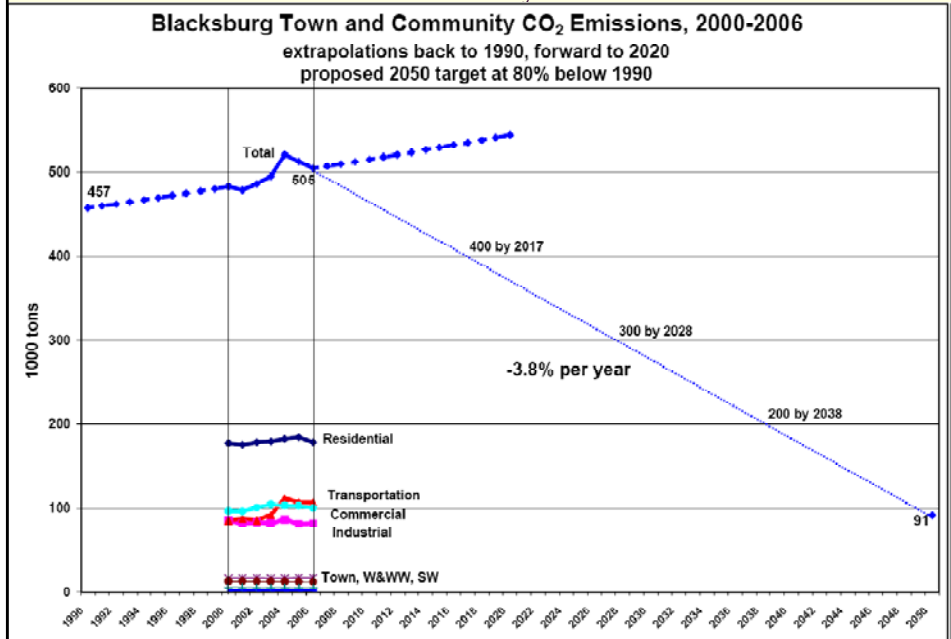
### Implementation of these actions in Town operations



If all of these strategies are implemented by 2012 and the growth rate remains constant, the town will be able to exceed its reduction goal for 2012

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### Mayor's Taskforce Committee recommends this 80% reduction target for the Community as a whole



## Easy Household measures to save Energy and reduce Emissions

- Replace Incandescents with CFLs
- Turn out the Lights that aren't in Use
- HVAC Tune Up
- Install Low Flow Showerheads
- Turn Water Heater Down 140 to 120F
- Turn Off Desktop & Unplug Monitor when not in use
- Replace Gasoline Vehicles with Hybrids
- Eliminate Phantom Load
- Reduce Vehicle Miles Travelled
- Replace Diesel Sold In Blacksburg with B20
- Purchase 5% green power RECs
- Single Family Home Energy Efficiency Retrofit

## Example of analysis to quantify savings

### VMT Reduction

#### Application Summary

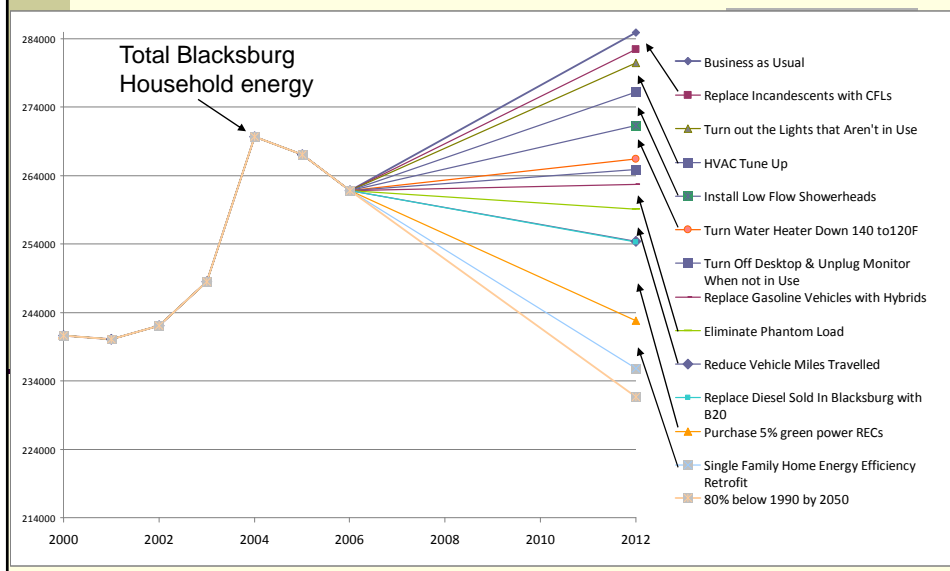
Blacksburg Average MPG 24.79

#### Implementation Analysis

Degree of Reduction 1000 miles/year  
 Penetration Level 100%  
 Community Energy Savings 499,152.88 Gallons gasoline  
 Community Cost Savings \$ 1,722,077.45  
 Community CO2 Savings 4,698.39 tonnes

Household Upgrade Cost	\$0.00
Household Annual Savings	\$139.17
Simple Payback Period	- years
Annual Household CO2 Reduction	0.38 Tonnes/yr

## Household measures could set us on a path toward the 80% reduction goal



## Some Town and Community-wide Actions

- Buildings & Electricity:
  - New buildings: codes/incentives for Green building design
  - Existing buildings: retrofit efficiency programs
  - Integrated renewable energy: rooftop solar PV, thermal
  - New & existing Commercial buildings: lighting, HVAC
  - Role of utilities (APCo, VT Electric) in promoting efficiency, growing their renewable power portfolio
- Transportation and Land Use:
  - Expand and fare-free BT
  - Smart growth
  - Pedestrian/bike/scooter/transit oriented community
- Increase tree canopy to capture carbon (and other benefits)
- Expand recycling, conserve water
- Education and Behavior
  - Involve public schools, VT, and Sustainable Blacksburg