A globe of Earth is shown on the left side of the image, set against a background of a blue, textured surface that resembles water or a similar material. The globe shows continents and oceans. The background has a gradient from light blue at the top to dark blue at the bottom.

**Town of Chevy Chase**  
**Greenhouse Gas Assessment**  
Final, January 2009

# Local and State Government Climate Protection Efforts

- U.S. Mayors' Agreement (2/05)
  - Town signed it in 2006
  - Seek to meet Kyoto target: 7% reduction in GHG emissions from 1990 levels by 2012
- Montgomery County
  - Goal: 80% reduction in GHGs below current levels by 2050
- MD State
  - Under consideration

# What the Town is Doing

- Some direct actions to reduce our GHG impact
  - Offset street light emissions, distribute CFLs, etc.
- More programs to promote awareness and encourage actions by Town residents
- Formal steps required under Mayors' Agreement:
  - Inventory our greenhouse gas (GHG) emissions. Assessment
  - Set a goal and develop a plan to reduce these emissions
  - Implement plan
  - Measure and report on progress
- Climate Protection Committee is coordinating the Town's work on climate issues

# The GHG Assessment: Estimate GHG Impact of Activities by the Town and Residents

Sources of GHGs that we cover in the assessment:

1. Energy use in our homes
2. Our use of vehicles
3. Land use changes
4. Local gov't services (e.g., leaf pickup, street lights)
5. Major installations in Town (e.g., CCES)

What we don't cover in the assessment:

1. Impact of many of our purchasing and consumption decisions
2. Impact of our actions away from Town
3. Impact of others' actions when in Town

# Important Characteristics of the Town that Affect GHG Emissions

- Overview: map, population, demographics.
- Our homes
- How we use our vehicles
- Our environment, how we use our land

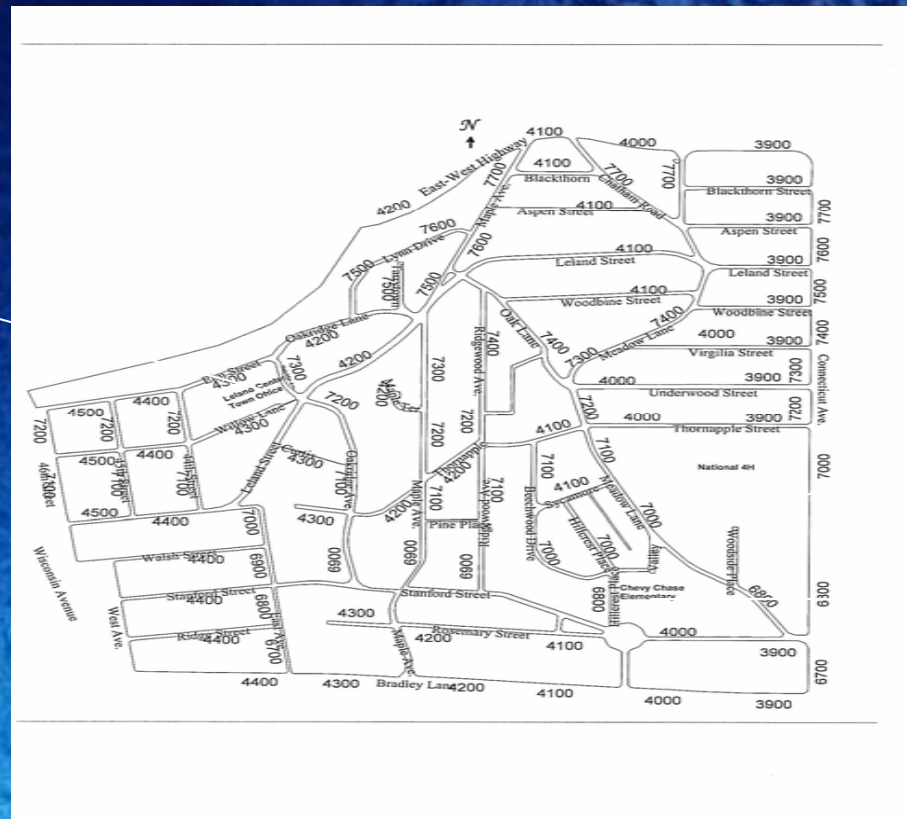


# Information Sources for the GHG Assessment

- Town GHG survey, late 2007
  - More than 150 responses; 15% of homes in Town
  - Answers match well against Census; survey data seems representative
- Detailed energy usage data from 35 homes
  - Used to calibrate a US DOE model so we can simulate homes in Chevy Chase and answer “what if” questions
- Other Town, County, national (2000 Census) and utility data

# Town Characteristics Affecting GHGs: Overview

Leland Center



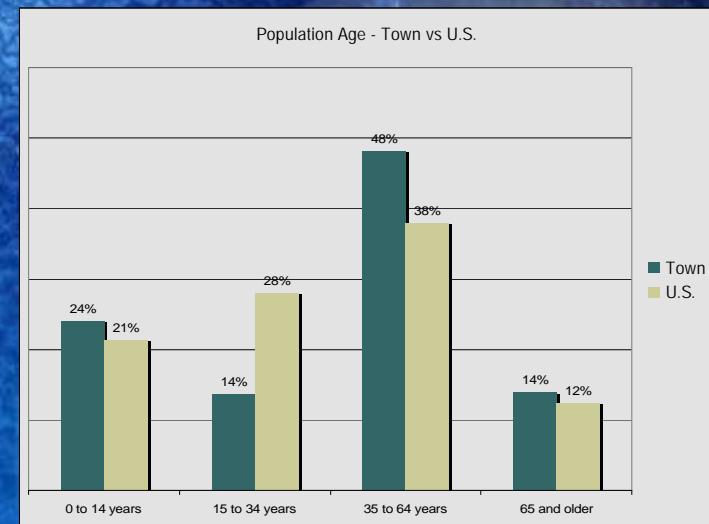
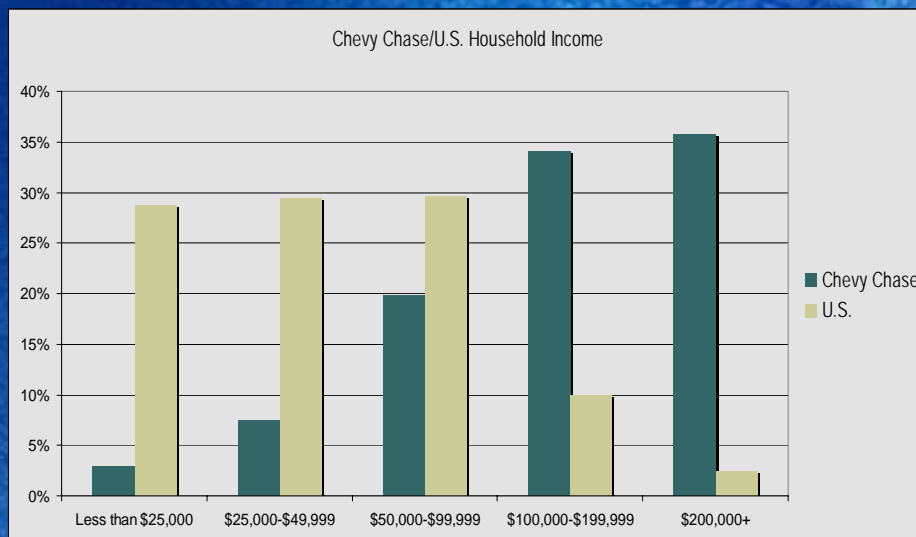
4-H Center

CCES

- Nearly all residential: no industry, no commercial
- 3 institutions: CCES, Leland Center, 4-H Center

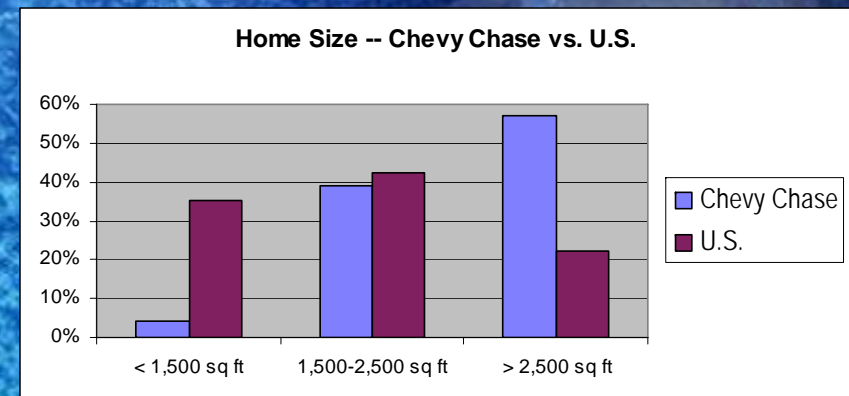
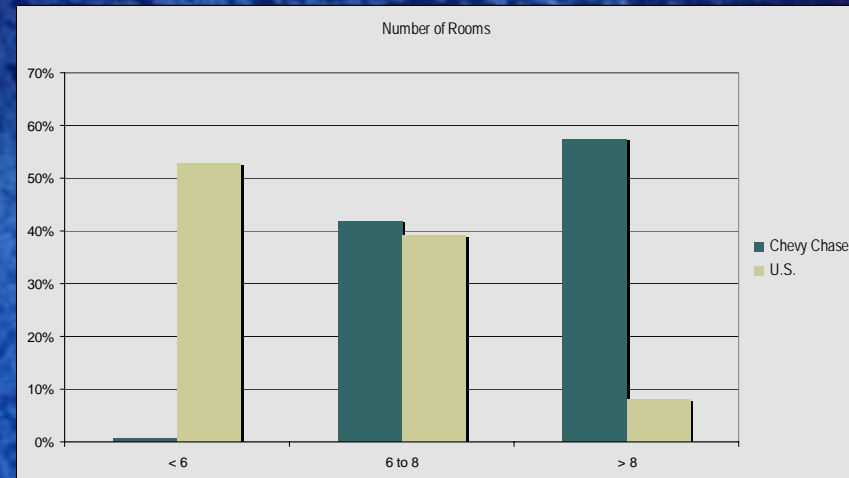
# Town Characteristics Affecting GHGs: Demographics (2000 Census)

- 2,726 population (2,758 in 2007)
- 1,021 homes
- High household income – high consumption
- Different age mix than US as a whole



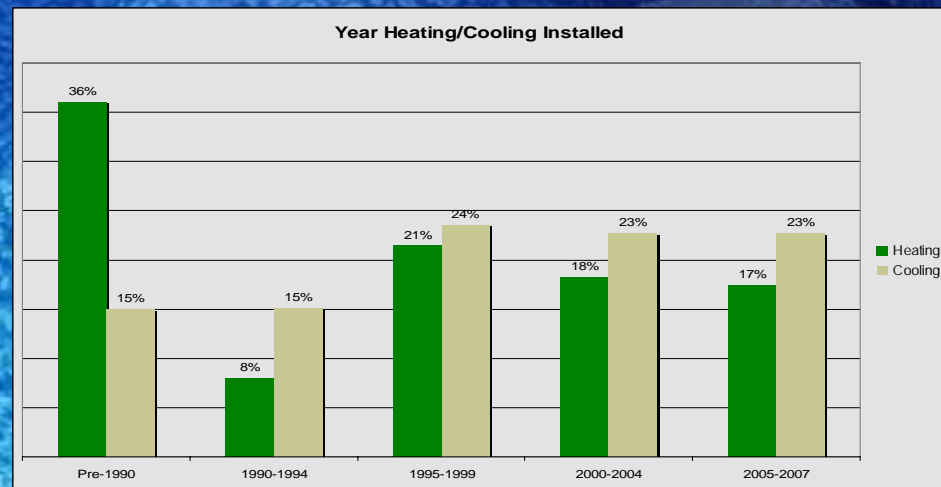
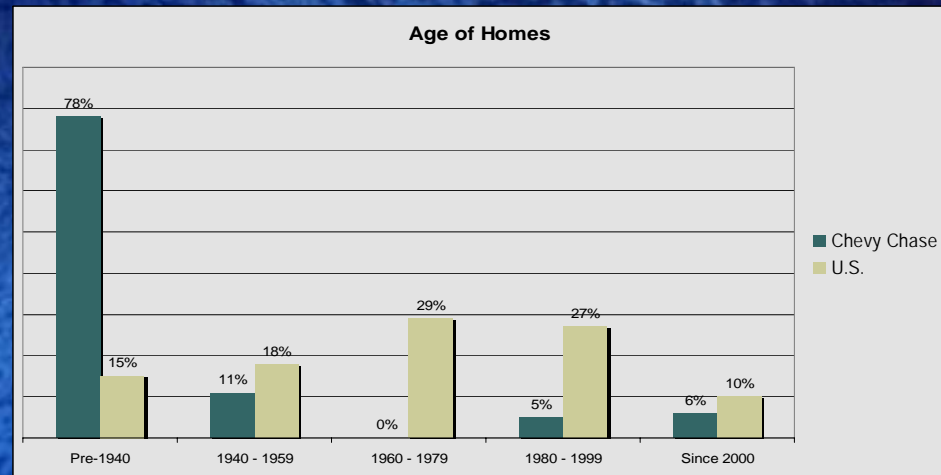
# Town Characteristics Affecting GHGs: Our Homes

- All are single-unit, detached homes. No apartments. 31% of U.S. population is in attached or multi-unit housing.
- Our homes are 50% larger than national average. Our median: 2700 sq ft. U.S. median: 1800 sq ft.



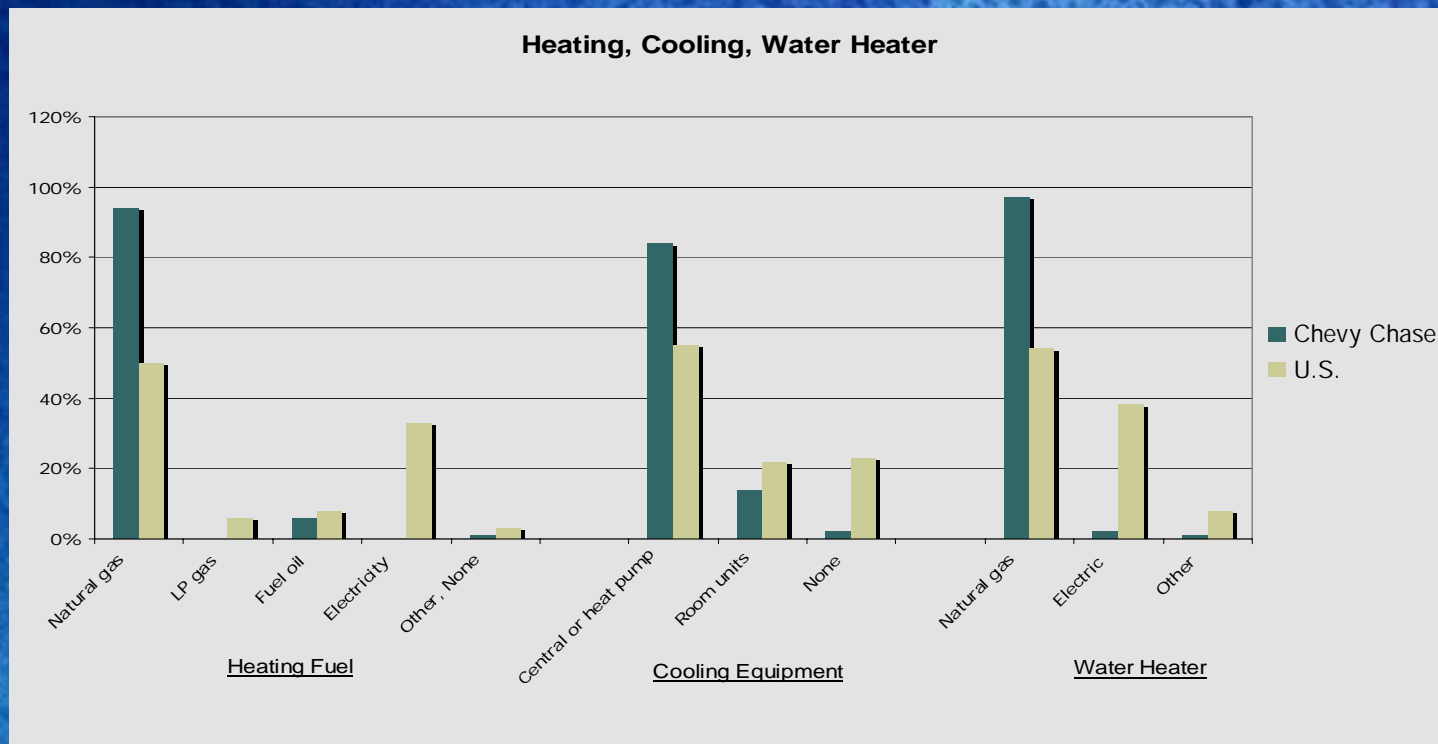
# Town Characteristics Affecting GHGs: Our Homes

- Homes are older, suggesting lack of energy efficiency
- But heating and cooling systems are much newer, reflecting better efficiency

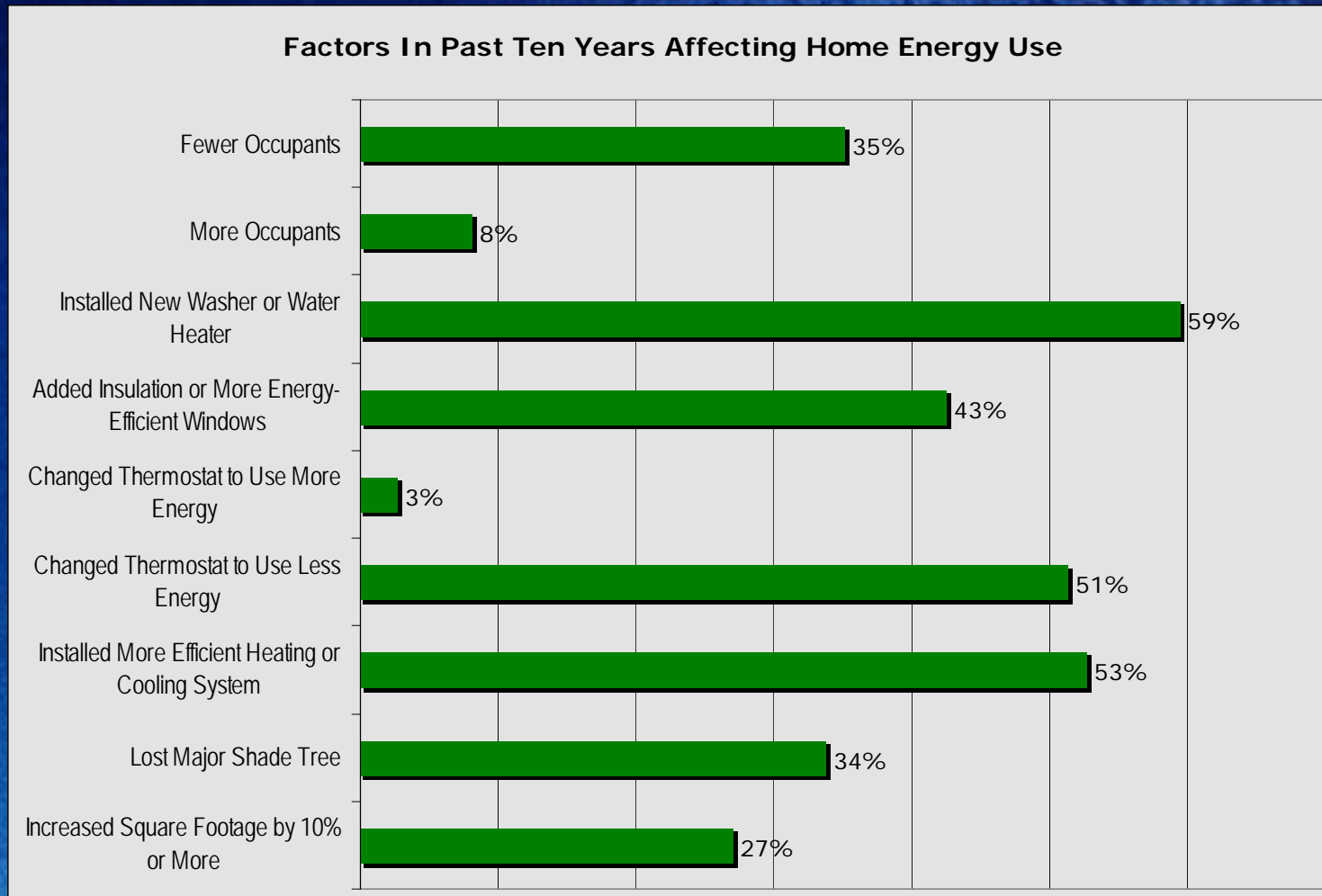


# Town Characteristics Affecting GHGs: Our Homes

- Also, cleaner fuels and better equipment are used for heating and cooling



# Town Characteristics Affecting GHGs: Home Energy Use Changes Over Time



# Town Characteristics Affecting GHGs: Trends in Home Energy Use

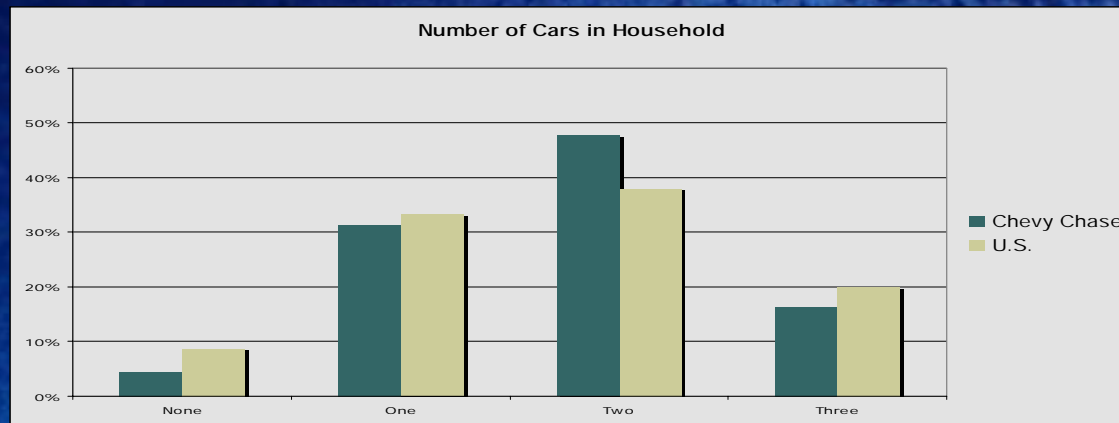
Average Annual Home Energy Use in Chevy Chase

	2004	2005	2006	2007
Electricity (kW-hr)	13,287	15,081	14,705	15,015
Natural Gas (therms)	1,450	1,395	1,142	1,152

# Average Home in Chevy Chase: Energy Bills and Cost-Effective Savings Options

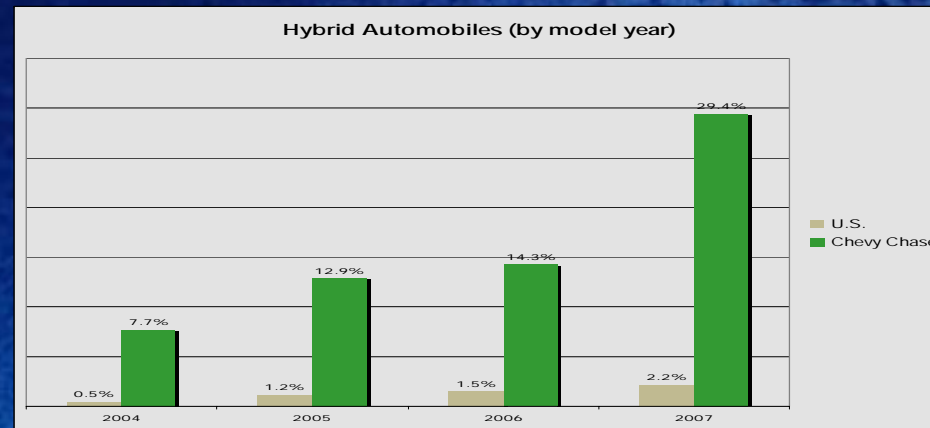
Item	Annual Bill	After Upgrades	Savings/yr
Entire Home	\$4,321	\$2,964	\$1,267
Heating	\$1,865	\$1,203	\$662
Cooling	\$852	\$672	\$180
Hot water	\$292	\$176	\$116
Major appliances	\$582	\$392	\$190
Lighting	\$289	\$170	\$119
Miscellaneous	\$351	\$351	\$0

# Town Characteristics Affecting GHGs: Vehicles and Their Use



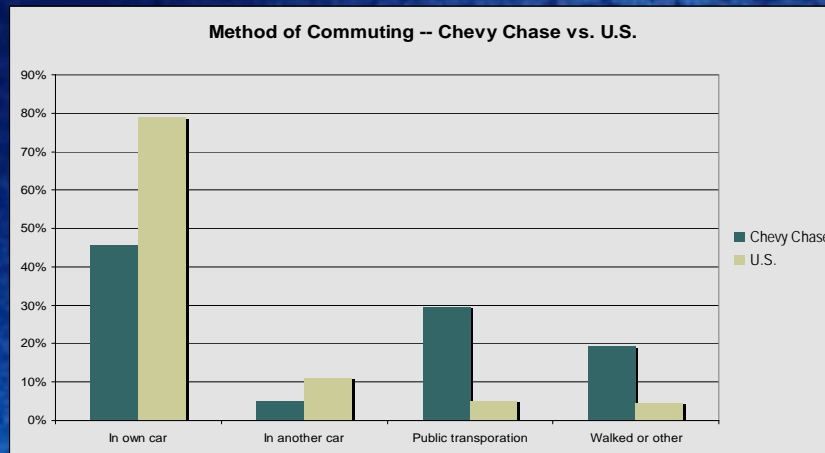
- Median age of vehicles: 5.5 years in Chevy Chase, 9.0 years in U.S.
- Avg. fuel economy: 22.6 mpg in Chevy Chase, 22.4 in U.S.
- Avg. miles car driven/yr: 8,023 in Chevy Chase, 12,427 in U.S.
- Avg. fuel consumed by car/yr: 355 gallons in Chevy Chase, 554 gallons in U.S.

# Town Characteristics Affecting GHGs: Vehicles and Their Use



- New, fuel-efficient nature of Chevy Chase cars seems offset by fuel-inefficient nature of urban driving, leaving mpg same as U.S.
- Lower fuel use per vehicle and per resident in Chevy Chase is largely due to less driving, better mass transit alternatives than in U.S. as a whole

# Town Characteristics Affecting GHGs: Vehicles and Their Use



- More use of mass transit, walking
- About 22% of total miles driven are for commuting; likely more than 22% of total fuel used

# Town Characteristics Affecting GHGs: Land Use

- Carbon is trapped (sequestered) in biomass (e.g., trees) and organic soils (soils with plants normally growing in them)
- Loss of trees, other vegetation, and green space generally means release of trapped carbon
- Loss of green space in Town causes GHG emissions, just like using energy in homes and fuel in cars

# Town Characteristics Affecting GHGs: Land Use

Loss of Biomass, Green Space in Recent Years (rate/yr)			
	# per yr	loss/yr	
"Canopy" trees removed -- private	104	115,301	lbs biomass
"Canopy" trees removed -- Town	20	86,400	lbs biomass
Smaller trees planted -- Town	90	?	lbs biomass
Home additions (enclosed spaces)	35	13,125	ft <sup>2</sup> green space
Other home additions (non-enclosed, e.g., deck)	2	100	ft <sup>2</sup> green space
Home teardown & replace w/larger	10	9,870	ft <sup>2</sup> green space
Other hard-scape (e.g, patios, walls)	39	1,835	ft <sup>2</sup> green space
New sidewalks -- Town	35 ft	140	ft <sup>2</sup> green space

# Town Characteristics Affecting GHGs: Energy Use by Three Institutions

- Chevy Chase Elementary School
  - 441,300 kW-hr/yr electricity
  - 21,900 therms/yr natural gas
  - ? diesel used by XX buses idling/yr
- Leland Center
  - 290,800 kW-hr/yr electricity
  - 6,700 therms/yr natural gas
- 4-H Center
  - Square footage equivalent to 83 Town homes
  - > 2 million kW-hr/yr electricity
  - > 100,000 therms/yr natural gas
  - ? Diesel used by roughly 2,900 buses idling/yr

# Town Characteristics Affecting GHGs: Energy Use by Local Government Services

- Leaf pickup – 1,600 gallons diesel/yr
- Trash collection, trash & treasures, recycling – 2,510 gallons diesel/yr
- Landscape services – 250 gallons gas/yr
- Tree maintenance – 570 gallons diesel, 30 gallons gas/yr
- Police patrols – 5,900 gallons gas/yr
- Road & sidewalk maintenance – 135 gallons diesel/yr
- Sidewalk snow removal (TBD)
- Street lights – 157,000 kW-hr/yr (offset)
- Town vehicle fleet – 4,300 gallons gas/yr
- Yard waste pickup – 500 gallons diesel/yr

# GHG Impacts from Energy Used in Homes

	Qty/yr	tons CO <sub>2</sub> per yr
<i>Avg. Home</i>		
Electricity (kW-hr)	15,015	9.3
Natural Gas (therms)	1,152	6.7
Total		16.1
Heating		5.9
Cooling		3.9
Hot water		1.3
Major appliances		2.1
Lighting		1.3
Miscellaneous		1.6
Total		16.1
<i>Entire Town</i>	1,021	16,399
<i>Per capita</i>	2,758	5.9

# GHG Impacts from Fuel Used by Vehicles

	Qty/yr	tons CO <sub>2</sub> per yr
<i>Average Car</i> Gasoline (gallons)	355	3.5
<i>Entire Town</i> Commuting	1,752 vehicles	6,083
<i>Per capita</i>	2,758 people	2.2

# GHG Impacts of Land Use Changes

	# per yr	tons CO <sub>2</sub> per yr
"Canopy" trees removed -- private	104	76.6
"Canopy" trees removed -- Town	20	57.4
Smaller trees planted -- Town	90	? Less
Home additions (enclosed spaces)	35	17.7
Other home additions (non-enclosed)	2	0.1
Home teardown & replace w/larger	10	13.3
Other hardscape (e.g, patios, walls)	38.5	2.5
New sidewalks -- Town	35 ft	0.2
Total		167.9

# GHG Impacts from Energy Used by Three Institutions

	Qty/yr	tons CO <sub>2</sub> per yr
<i>CCES</i>		
Electricity (kW -hr)	441,300	274
Natural Gas (therms)	21,900	128
Total		402
<i>Leland Center</i>		
Electricity (kW -hr)	290,800	181
Natural Gas (therms)	6,700	39
Total		220
<i>4-H Center (at least)</i>		
Electricity (kW -hr)	2,000,000	1,242
Natural Gas (therms)	100,000	585
Total		1,827
Total for Institutions		2,449

# GHG Impacts of Local Government Services

	Qty/yr	tons CO <sub>2</sub> per yr
<i>Leaf pickup</i>		
Diesel fuel (gallons)	1,600	17.9
<i>Trash collection + Trash and treasures + Recycling (all three activities)</i>		
Diesel fuel (gallons)	2510	28.1
<i>Landscape services</i>		
Gasoline (gallons)(e)	250	2.4
<i>Tree maintenance</i>		
Diesel fuel (gallons)	570	6.4
Gasoline (gallons)	30	0.3
<i>Police patrols</i>		
Off-duty Mty Cty (gas)	4307	42.1
Night time (gas)	1576	15.4
<i>Road &amp; sidewalk maint.</i>		
Diesel fuel (gallons)(e)	135	1.5
<i>Sidewalk snow removal</i>		
	TBD	TBD
<i>Street lights</i>		
Electricity (kW-hr)	157,000	97.5
Offsets purchased	-157,000	-97.5
<i>Town vehicle fleet</i>		
Gasoline (gallons)	4,328	42.3
<i>Yard waste pickup</i>		
Diesel fuel (gallons)	500	5.6
Total for Services		162.2

(e) -- estimated

# Total GHG Emissions/yr Town of Chevy Chase

	tons CO <sub>2</sub> per yr	percent
Entire Town		
Homes	16,399	64.9%
Vehicles	6,083	24.1%
Land Use Changes	168	0.7%
3 Institutions	2,449	9.7%
Local Gov't Services	162	0.6%
<b>Total</b>	<b>25,261</b>	
Per capita total	9.2	
From average home	16.1	
From average vehicle	3.5	

# The Town's GHG Emissions Goal Under the Mayors' Agreement

	Total Town CO <sub>2</sub> emissions	CO <sub>2</sub> emissions per person	CO <sub>2</sub> emissions per household
1990 Estimate	23,938	8.9	23.4
2007 GHG Assessment	25,261	9.2	24.7
2012 Business as Usual	25,647	9.2	25.1
2012 Goal (7% below 1990)	22,262	8.0	21.8
2012 Reduction needed below 2007	2,999	1.2	2.9
% reduction needed	11.9%	12.6%	11.9%

- Starting with the Assessment figure for 2007, we “back-casted” to 1990 based on the MD-statewide rate of emissions growth/capita over this period
- Under the Mayors' Agreement, our 2012 goal is 7% below 1990 levels
- To meet this goal, we need to reduce emissions about 3,000 tons, or 12% below current levels

# Thank You for Helping on the Town of Chevy Chase GHG Assessment

- Catherine Fraas, Jack Palmer, Judy McGuire, Stuart Sessions -- authors
- 150+ Town residents who answered the GHG Survey, and especially to those who provided their historical energy use information
- Dave Walton (Town staff), Eric Coffman (County staff) and many others who provided information
- All of you who provided review and comments