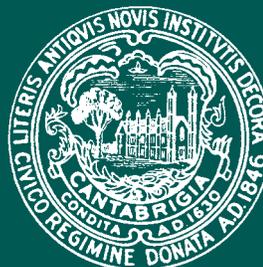




# CAMBRIDGE

## Climate Protection Action Committee

### 2005 ANNUAL REPORT



City of Cambridge

Robert W. Healy, City Manager  
Richard C. Rossi, Deputy City Manager

*Cambridge City Council*

Kenneth E. Reeves, Mayor  
Timothy J. Toomey, Jr., Vice-Mayor  
Marjorie C. Decker  
Henrietta Davis  
Anthony D. Gallucio  
Craig A. Kelley  
Brian Murphy  
E. Denise Simmons  
Michael A. Sullivan

*Climate Protection Action Committee*

Alison Field-Juma, Chair  
Richard Mattila, Vice-Chair  
Betsy Boyle  
Karen Carmean  
Brett Feldman  
John O'S. Francis  
Steven Lanou  
Steve MacAusland  
Musa Pam  
Alison Sander  
Suzanne Shepard  
Gosia Sklodowska  
Terrence Smith  
William Zamparelli

*Participating City Staff*

*Community Development Department*  
Beth Rubenstein, Assistant City Manager  
Susan Glazer, Deputy Director  
Susanne Rasmussen, Environmental &  
Transportation Planning Director  
Rosalie Anders, Project Manager  
John Bolduc, Environmental Planner  
Stephanie Anderberg, TDM Planner  
Jean Clark, PTDM Officer

*Electrical Department*  
George Fernandes, Director

*Public Works Department*  
Lisa Peterson, Commissioner  
John Nardone, Assistant Commissioner  
Ellen Katz, Fiscal Director  
Randi Mail, Recycling Director

*Purchasing Department*  
Cynthia Griffin, Purchasing Agent

*Traffic, Parking & Transportation Department*  
Susan Clippinger, Director  
Wayne Amaral, Traffic Operations Manager

*Cover Design By*  
Robin Shore, Community Development  
Department

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*Cover Photographs (in order from the top)*

Cambridge Savings Bank, presentation of  
Energy Star Label for the headquarters building  
in Harvard Square

Recycling bins at CAST Apartments,  
Columbia Street, Homeowner's Rehab, Inc.

GreenFuel Technologies Corp. algae-based  
bioreactor pilot project at MIT power plant

Petali Fresh Flowers, Harvard Square, 2005  
GoGreen Award winner in Transportation/Small  
Business

Hybrid vehicle car-sharing, ZipCar

Cambridge Climate Leader logo

## **EXECUTIVE SUMMARY**

The Climate Protection Action Committee is an advisory body appointed by the City Manager to assist the City in implementing the Climate Protection Plan. The 2005 Annual Report is the second to be issued and evaluates the current status of Cambridge's efforts to achieve the goals of the plan.

The ICLEI Cities for Climate Protection program continued to expand in 2005, as the number of U.S. local government partners grew to 170 and to 23 in Massachusetts. ICLEI also established a Northeast Capacity Center in Boston, strengthening the organization's support to participating local governments.

New evidence strengthened the scientific consensus on global warming. Scientists documented an association between increasing hurricane intensity and warming sea temperatures. Scientists also began to assess and debate the risks that the planet is approaching a tipping point with regard to dangerous levels of climate change impacts. To emphasize this point, 2005 was the warmest year on record or tied with 1998 depending on the scientific source.

The greenhouse gas emissions inventory was not updated for this report. However, a number of trends in energy, transportation, and waste have been analyzed. It appears that emissions have continued to increase, however the rate of increase slowed since 2003 to rates seen before 1998. Commercial and institutional building energy use continues to be Cambridge's primary source of greenhouse gas emissions. Positive trends seen in 2005 data include a continuing decline in residential energy use, a leveling off of vehicle registrations in Cambridge, and continued improvement in the city's recycling rate.

In 2005, the use of renewable energy by Cambridge businesses and residents became more common. Many local businesses and institutions are purchasing renewable energy certificates and solar photovoltaic installations have grown to about 111 kilowatts.

The City continued to work on several fronts to reduce emissions from municipal operations. The Energy Management Work Group collected energy consumption data for City facilities for the first time. In FY2006, the City consumed about 38 million kilowatt-hours of electricity, 829,000 therms of natural gas, and 543,246 gallons of fuel oil. These figures establish a benchmark with which to measure future progress in reducing consumption. City departments continued to assess and implement energy efficiency upgrades such as lighting and HVAC system improvements. The Traffic, Parking & Transportation Department converted just over 50% of traffic signals to LEDs and planned to complete the project in FY2007. The City Manager issued an Energy Star Purchasing Policy to require that departments buy energy efficient equipment. The City Council passed a Policy Order setting a goal that 20% of the municipal electricity load come from renewable sources.

In the community, the universities continued to develop and expand their sustainability initiatives in energy efficiency, renewable energy, green buildings, alternative fuel vehicles, and reduced waste disposal. MIT President Susan Hockfield announced that energy would be a priority of her tenure and established the Energy Research Council to develop a plan. Harvard University expanded support for the Green Campus Loan Fund. More businesses were seen undertaking actions to reduce emissions, particularly from energy use. Biogen IDEC installed a 5 megawatt combined heat and power system at its Kendall Square campus. Through the Community Development Department's Energy Star Recruiting pilot project, 10 new businesses enlisted as official Energy Star partners and undertook assessments of potential energy efficiency improvements in their buildings. Based on this success, the program was expanded into the Cambridge Climate Leader program, which also incorporates the transportation and waste sectors. Genzyme Center and Pfizer joined early as partners.

Overall, climate protection activity appeared to expand across all sectors during 2005. The Committee continues to see the need to significantly expand the participation of the private sector and residents in meeting the goals of the Climate Protection Plan. For 2006, the Cambridge Climate Leader program will be a focus of these efforts to engage businesses and organizations. The organics collection service offered by the Public Works Department also offers a new opportunity for some businesses and organizations to achieve significant greenhouse gas emission reductions. Renewable energy will also be of increasing significance as the City considers the options for acquiring more for its municipal electricity supply.

**PURPOSE OF THE ANNUAL REPORT**

This is the second annual report of the Climate Protection Action Committee, an advisory body appointed by the City Manager to assist the City in implementing the Climate Protection Plan. Part of the committee’s charge is to monitor activities and report annually on the status of efforts to achieve Cambridge’s goal of reducing greenhouse gas emissions by 20 percent below 1990 levels by 2010. This annual report covers activities in 2005.

**CITIES FOR CLIMATE PROTECTION**

Membership in the Cities for Climate Protection (CCP) program has continued to expand. Over 170 U.S. communities have joined. In Massachusetts 2 communities joined CCP in 2005 -- Reading and Belmont -- bringing the total to 23 members in Massachusetts.

Cities for Climate Protection is a program of ICLEI-Local Governments for Sustainability, an international association of local governments working on environmental problems. ICLEI created a staff presence in the Northeast by establishing their Northeast Capacity Center in Boston. The Northeast Program Officer works with member communities to provide technical assistance and also recruits new members.

<b>Massachusetts Cities for Climate Protection</b>	
Amherst	Arlington
Barnstable	Belmont
Boston	Brookline
Cambridge	Falmouth
Gloucester	Lenox
Lynn	Medford
Natick	Newton
Northampton	Reading
Salem	Shutesbury
Somerville	Springfield
Watertown	Williamstown
Worcester	

Cambridge also participated in two other municipal climate protection initiatives. On April 25, 2005 the City Council passed a Council Order to endorse the U.S. Mayors’ Climate Protection Agreement initiated by Mayor Greg Nickels of Seattle. Over 200 U.S. mayors have signed the agreement and the U.S. Conference of Mayors has added its support.

Mayor Michael Sullivan was also invited to the Sundance Summit, which was a gathering of mayors conferring on climate protection held in July 2005. The event was hosted by Salt Lake City Mayor Rocky Anderson and actor/director Robert Redford. Mayor Sullivan was a featured speaker on transportation issues.

## STATE AND REGIONAL ACTIVITY

At the state level, the Regional Greenhouse Gas Initiative dominated the work. Seven Northeastern states signed an agreement to go forward with the initiative to set up a regional cap and trade system for carbon dioxide emissions from power plants. Massachusetts Governor Mitt Romney and Rhode Island Governor Donald Carcieri decided not to join at this time. Massachusetts is continuing to work on implementing the regulations limiting CO2 emissions from the so-called "Filthy Five" power plants.

## CLIMATE SCIENCE

Climate science made major advances in 2005 and deepened our understanding that climate change is real and already underway.

2005 was either a record-breaking year for annual mean global temperature or a tie with 1998 depending on the source. However, the high average surface temperatures in 2005 are significant because the increase in 1998 was boosted by the El Nino effect, which was not a factor in 2005.

Scientists found that the oceans are also warming and it is due to human activity. Signs were also reported that the North Atlantic Conveyor Belt is slowing, which could have major implications for Europe's climate.

The idea of reaching a climate tipping point was heavily discussed in science journals. Studies concluded that even if we are able to keep atmospheric concentrations of greenhouse gases at today's levels, the inertia in the ocean system could raise global mean temperatures by 2 to 4 degrees Celsius by the year 2400 and sea levels by 100 centimeters (39 inches). However, measures are not currently on track to stabilize atmospheric greenhouse gases near today's concentrations.

Other scientists have looked at the risk of exceeding a 2 degree Celsius increase in temperature at varying concentrations of greenhouse gases. The 2 degree C level is considered a threshold at which climate change impacts start to become more dramatic. At the 550 ppm level for CO2, it is estimated that there is a 68 to 99 percent chance that the 2 degree threshold will be exceeded. Current CO2 levels are about 380 ppm and are rising about 2 ppm per year. 400 ppm is considered a "safe" level, or a level at which the probability of seeing a 2 degree increase is 20 percent or less.

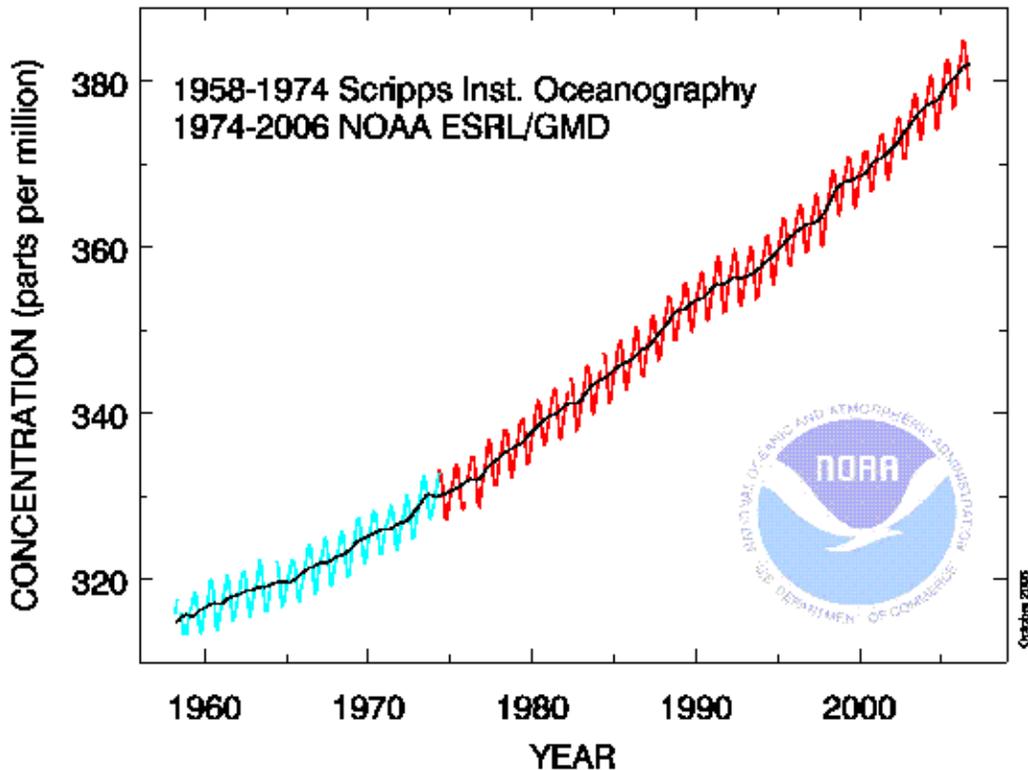
### **20 Hottest Years on Record**

Rank	Year
1	2005
1	1998
3	2002
4	2003
5	2004
6	2001
7	1997
8	1990
9	1995
10	1999
11	2000
12	1991
13	1987
14	1988
15	1994
16	1983
17	1996
18	1944
19	1989
20	1993

*Source: Union of Concerned Scientists*

The impact of climate change on hurricanes was hotly debated in 2005. Papers by Kerry Emanuel of MIT and Peter Webster et al. of Georgia Tech attributed increased hurricane intensity at least in part to climate change. The total number of hurricanes was not reported to increase, although Webster et al. reported that the number of Category 4 and 5 storms went up over a 30-year period.

### Atmospheric CO<sub>2</sub> at Mauna Loa Observatory



### GREENHOUSE GAS EMISSION TRENDS

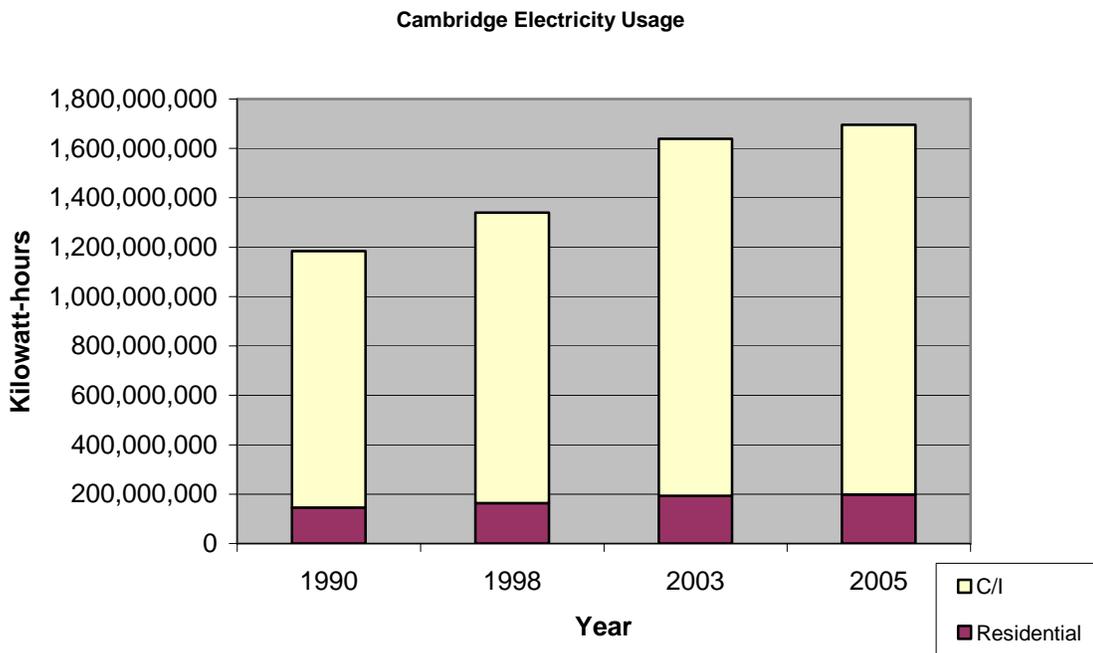
In the 2004 Annual Report, Cambridge's greenhouse gas emissions inventory was updated. Since some sources of the data used to create the inventory are not reported regularly, the full inventory is not updated this year. Instead related trends are reported to help assess progress toward Cambridge's emissions reduction goal.

#### Electricity

Total electricity consumption continued to rise in 2005, but the rate of increase appears to have slowed to a level seen prior to the late 1990s building boom. The table below shows total usage in the four years for which have data have been compiled. Between 2003 and 2005, usage increased at an average annual rate of 1.72 percent, compared to 4.47 percent between 1998 and 2003, and

1.65 percent between 1990 and 1998. Electricity consumption accounts for 593,639 tons of CO<sub>2</sub>, with most of that coming from the commercial, institutional, and industrial sector (88%).

YEAR		1990	1998	2003	2005
	<b>Units</b>				
Residential	KWH	146,096,000	163,928,000	193,869,000	198,060,572
C/I	KWH	1,037,539,000	1,176,216,000	1,445,695,000	1,498,050,574
Total	KWH	1,183,635,000	1,340,144,000	1,639,564,000	1,696,111,146
CO <sub>2</sub>	Tons	414,272	469,050	573,847	593,639

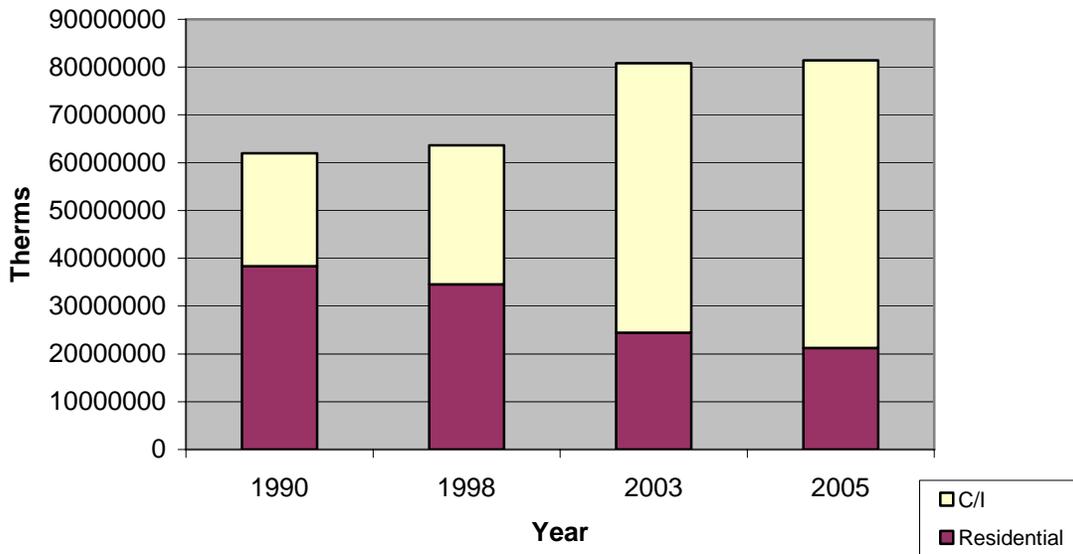


## Natural Gas

Natural gas usage, which is the primary heating fuel in Cambridge, has also risen in a pattern similar to electricity usage. Total natural gas consumption continues to increase, but the rate of annual increase appears to be slowing to levels similar to the early 1990s. Between 2003 and 2005, total consumption increased annually by an average of 0.39 percent compared to 5.39 percent between 1998 and 2003 and 0.33 percent between 1990 and 1998. However, residential usage has continued its downward trend. In 2005, 21,228,325 therms were used in the residential sector, which is lower than the quantities used in 1990, 1998, and 2003. The C/I sector (73.9%) is responsible for most of the city's natural gas usage. The residential sector is more significant (26.1%) for overall natural gas usage than it is for overall electricity usage (13.2%).

<b>YEAR</b>		<b>1990</b>	<b>1998</b>	<b>2003</b>	<b>2005</b>
	<b>Units</b>				
Residential	Therms	38,319,279	34,555,539	24,455,958	21,228,325
C/I	Therms	23,665,743	29,087,039	56,351,046	60,189,938
Total	Therms	61,985,022	63,642,578	80,807,004	81,418,263
CO2	Tons	381983	392197	497973	501740

**Natural Gas Consumption**

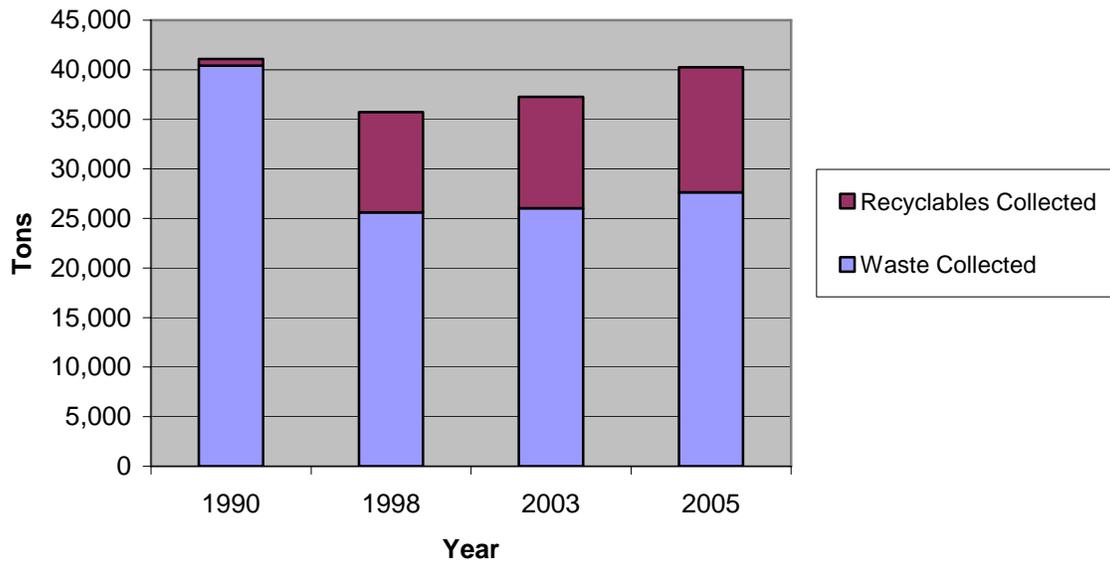


### Waste Disposal & Recycling

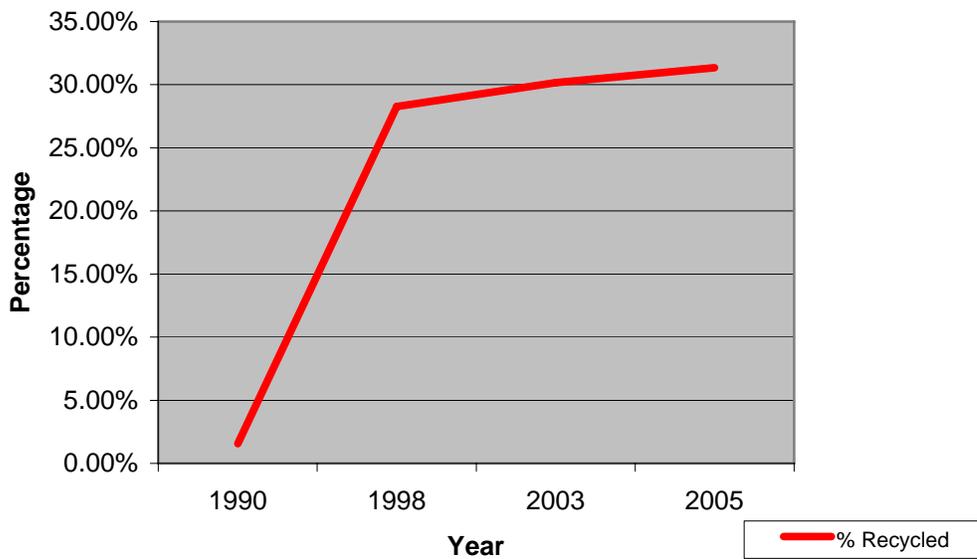
Waste management has been a positive sector in terms of mitigating greenhouse gas emissions. The launch of the City's curbside recycling program in 1990 significantly diverted the amount of waste going to incinerators and landfills. The data is limited to the quantity of waste collected by the City's curbside programs and is primarily composed of residential waste. Waste collected by private haulers is not included due to the lack of centralized data collection. Commercial properties and some large residential complexes are served by private haulers.

<b>YEAR</b>		<b>1990</b>	<b>1998</b>	<b>2003</b>	<b>2005</b>
	<b>Units</b>				
Waste Collected by City	tons	40,424	25,624	26,022	27,644
Recycling Collected by City	tons	646	10,093	11,235	12,618
Total Waste	tons	41,070	35,717	37,257	40,262
% Recycled		1.57%	28.26%	30.16%	31.34%

### Waste & Recycling



### Percent Recycled



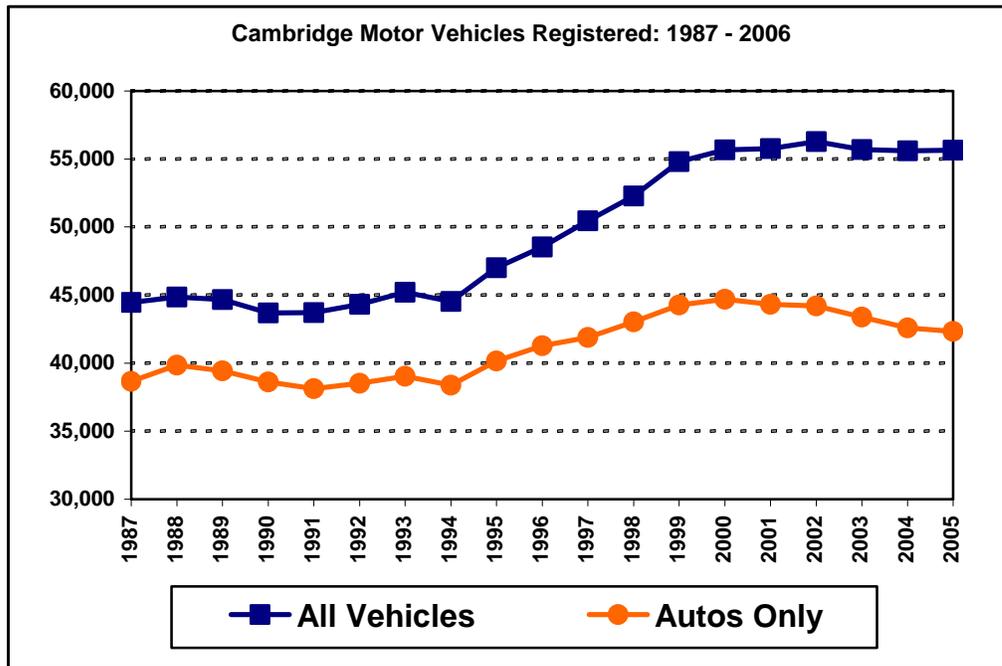
Recycling rates continue to trend upward. However, total waste tonnage also continues to grow.

### Vehicle Registrations

The number of vehicles registered in Cambridge has leveled off at 55,650 automobiles, trucks, and other vehicles. Compared to 1990, vehicle registrations

increased by 10,989 or 24.6%. However, since 2001 when 55,679 vehicles were registered the numbers have been virtually stable. Total vehicle registrations peaked in 2003 at 56,282.

The growth in vehicle registrations since 1990 probably reflects changing demographics in Cambridge as the community became more affluent.



### Transportation Demand Management

The Vehicle Trip Reduction Ordinance, passed in 1992, and the Parking and Transportation Demand Management Ordinance, passed in 1998, establish policies and programs to encourage alternatives to single occupancy vehicle trips.

By requiring transportation demand management plans, 49.2 million vehicle miles are projected to be prevented annually from 37 projects. Assuming the vehicles are primarily sedans, greenhouse gas emissions of about 25,200 tons per year are avoided.

### NSTAR Energy Efficiency

NSTAR reports that in 2005 it spent \$1,356,197 on 1,977 energy efficiency projects in Cambridge and saved 7,280,412 kilowatt-hours of electricity. The bulk of the projects involved rebates for residential lighting and appliances. The bulk of the energy savings came from commercial new construction and retrofits and from the small business solutions program. The carbon reduction benefit was about 2,540 tons.

## Carbon Offsets

Most carbon offsets in Cambridge are associated with the purchase of renewable energy credits. This appears to be an increasingly common practice among businesses and institutions in Cambridge. Green Decade Cambridge is also promoting REC purchases by households.

In 2005, the Cambridge Housing Authority finalized a sale of carbon credits, probably the first instance of the sale of carbon credits originating in Cambridge, to Mirant, owner of the Kendall Square power plant. Mirant was required to obtain carbon offsets under its approval from the state Energy Facilities Siting Board when their facility was expanded. Mirant worked with the City to find at least part of its offsets in Cambridge.

### Cambridge Green Power Purchasers

Cambridge Savings Bank  
City of Cambridge  
FedEx Kinkos  
Genzyme Center  
Harvard University  
Staples  
Starbucks  
Union of Concerned Scientists  
Whole Foods Market

## PV Systems in Cambridge

About 111 kilowatts (DC) of electric generating capacity is supplied by solar photovoltaic systems in Cambridge. PV systems provide a means of generating electricity onsite. Usually, the buildings hosting these systems continue to be connected to the regional grid and are used to offset the total electricity supplied by NSTAR. Production data and other information from two Cambridge systems can be viewed at [www.soltrex.com](http://www.soltrex.com).

### Solar Photovoltaic Systems in Cambridge

Alewife Garage	12.0 kw
City Hall Annex	26.5 kw
Genzyme Center	20.0 kw
MIT Building W20	7.2 kw
MIT Building N52	2.3 kw
MIT Hayden Library	11.9 kw
Porter Square Shopping Plaza	20.0 kw
Residential installations (5)	9.4 kw
<u>Union of Concerned Scientists</u>	<u>2.1 kw</u>
<b>TOTAL</b>	<b>111.4 kw</b>

## LEED Projects

Several Cambridge projects have utilized the U.S. Green Building Council's LEED (Leadership in Energy & Environmental Design) criteria. While a number have chosen not to seek official certification, there are now 5 Cambridge buildings that have been officially certified, and 6 others that have registered their intent. In addition, there are projects that do not appear on the registered project list that are expected to apply for certification, including the City's new fieldhouse at Russell Field and Harvard's 46 Blackstone Street renovation.

### **LEED Projects in Cambridge**

#### Certified Projects

Genzyme Center	Platinum
City Hall Annex	Gold
Mather Dunster Renovation/Harvard	Silver
Schlesinger Library/Harvard	Certified
Zero Arrow Street	Certified

#### LEED Registered Projects

Brain & Cognitive Sciences Building/MIT  
Greenworks Building, 160 Second Street  
90 Mount Auburn Street  
Harvard Graduate Student Housing, 10 Akron Street  
Ray & Maria Stata Center/MIT  
675 West Kendall Street/Genzyme

## **CITY INITIATIVES**

### ***Energy Sector***

In fiscal year 2006, the City projects that it will spend \$6,737,812 on building energy (electricity, natural gas, fuel oil). In FY07, the City is budgeting building energy expenditures at \$7,777,512, a 15% increase. These figures include the schools.

The City has reached a milestone in its ability to track actual energy use. In FY06, the City projects that it will use 38,046,510 kilowatt-hours of electricity, 829,025 therms of natural gas, and 543,246 gallons of fuel oil.

The City Manager issued an Energy Star Purchasing Policy for all City departments. The policy requires departments to buy energy-using equipment that carries the federal Energy Star label when it is available. If the type of equipment is not rated by Energy Star, departments must purchase equipment that is in the top 25 percent of its product class in terms of energy efficiency. Where cost is higher, equipment that meets a simple 5-year payback shall be purchased. The policy was developed jointly by the Purchasing, Public Works, and Community Development Departments.

The Public Works Department has undertaken a number of energy assessments of City-owned buildings and has started implementing the recommended improvements. Boiler replacement, HVAC upgrades, lighting upgrades, and conversion of traffic signals to LEDs has reduced electricity usage by 1,320,362 kilowatt-hours and 16,701 therms annually. This results in reducing greenhouse gas emissions by 1,042 tons of CO<sub>2</sub> and saves \$188,746 in annual energy costs.

Traffic signal conversions to LEDs is progressing well. As of March 2006, 52% of all city-controlled intersections have been converted at a cost of \$340,000. The

conversions are saving an estimated 36,000 kilowatt-hours per month (a 51% reduction) and generating about \$5,000 in monthly electricity cost savings. An FY07 budget request will enable the conversions to be completed in the next fiscal year. The Traffic, Parking, and Transportation Department, with the Electrical Department, also implemented lighting upgrades at the First Street Garage, the First Street Traffic Operations Office, and the Green Street Garage.

The Public Library audited all of its buildings and found that the O'Neill, Valente, O'Connell, and Boudreau branches are within efficiency parameters. The Central Square branch lighting and HVAC systems were upgraded with NSTAR support. The Library has also installed Internet-based temperature monitors that can be tracked remotely to assess heating and cooling conditions.

The City Council passed an Order in 2005 setting a goal for 20 percent of the municipal electricity load to be supplied by renewable sources by 2010. The City administration is evaluating options to achieve this goal. In a new contract for municipal electricity, the City included a provision in the contract with TransCanada that 1 percent of the electricity come from renewable sources over and above the state's Renewable Energy Portfolio requirement. This provision will continue to 2012.

### **City Hall Annex PV production**

The solar photovoltaic system on the roof of City Hall Annex produced 33,954 kilowatt-hours of electricity between August 2004 and December 2005. As a result approximately 12.5 tons of CO<sub>2</sub> emissions were avoided.

### **Transportation**

In November 2005, the City suspended the use of B20 biodiesel due to escalating costs. Bidding for a new biodiesel contract resulted in a premium of nearly \$1 per gallon. The City is hopeful that biodiesel prices will moderate relative to conventional diesel and that use of B20 can resume.

Under a joint proposal by MIT and the City, the US Environmental Protection Agency awarded an \$83,000 grant to retrofit 32 diesel vehicles with pollution control devices. Installation was expected to commence in 2006. While the pollution controls will not directly reduce greenhouse gas emissions, they will reduce the conventional pollution emissions associated with diesel use.

### **Land Use**

*Green Buildings* – In keeping with City policy that all new municipal construction and major renovations use the LEED green building standards, the Main Library Expansion project was designed to meet LEED Certified level and design on the new Police Headquarters began using a LEED-based integrated design process.

City Hall Annex officially received a LEED Gold rating from the US Green Building Council in September. The Russell Field Fieldhouse was nearing completion, after which documentation will be submitted to the USGBC.

*Urban Forestry* – The Public Works Department commenced development of a GIS-based tree inventory. The inventory was conducted using aerial photographs and field surveys. The surveys used hand-held data recorders to document every City-owned tree. The system will enhance the City’s ability to manage the urban forest.

The Community Development Department completed an urban forest canopy assessment, which estimated the benefits provided by Cambridge trees. Based on a random sampling method, the assessment found that Cambridge has a tree canopy cover of 20 percent. Using the CityGreen software created by American Forests, estimates were made for the environmental services provided by the city’s urban forest. CityGreen estimated that 171,500 pounds of air pollution are removed annually. Most significantly, the urban forest mitigates 28.7 million gallons of stormwater each year. In total, the annual environmental services provided by the urban forest are estimated at \$7.5 million. The estimate does not take into account the value of energy savings, carbon storage, enhanced property values, or increased livability of the city.

## **COMMUNITY INITIATIVES**

### ***Energy***

*Energy Fairs* – The second annual energy fair was held as part of the 2005 Danehy Park Family Day held on September 24, 2005. The event consisted of information tables and exhibits presented by NSTAR, Conservation Services Group, Mass. Energy Consumers Alliance, NESEA, Green Decade Cambridge, and the Community Development Department. Also, in 2005, planning started for the Home and Energy Fair presented in February 2006 to provide demonstrations and practical information to residents on home energy efficiency and renewable energy opportunities.

*MIP&L* – Six Cambridge places of worship and religious institutions are members of Massachusetts Interfaith Power & Light (MIP&L), a non-profit organization founded to help places of worship of all faiths be better environmental stewards through their energy use. Members have access to energy services, including in-depth audits, financial planning, technical advice, and purchasing of renewable energy certificates.

#### **MIP&L Members in Cambridge**

Christ Church  
Episcopal Divinity School  
First Parish Universal Unitarian  
Friends Meeting at Cambridge  
St. James Episcopal Church  
St. Paul Parish

*Energy Star Partners* – During spring 2005, the Community Development Department conducted a pilot project to engage the business community in an effort to improve their energy efficiency. ICF Consultants was contracted to develop a recruitment and technical assistance program that asked local businesses to join the federal Energy Star program and undertake actions to improve the energy performance of their offices and facilities. Ten businesses signed the Energy Star Partners agreement. ICF conducted basic energy assessments for each business and matched them with engineering services and financial assistance provided by NSTAR.

<b>Energy Star Partners in Cambridge</b>	
Bed & Breakfast Inn	Holmes Unlimited Realty Trust
Bohdi Tree	Hotel Marlowe
Cambridge Family & Children's Service	Hotel Tria
Cambridge Health Alliance	Just a Start Corporation
Camp Dresser McKee	Lesley University
City of Cambridge	MRPA
City Paint & Supply	Passage to India
Fresh Pond Market	Pierce Building
Gravestar	The Resource Technologies Group
Harvard Crimson	ROG, Inc.
Harvard Street Management	Smarter Living, Inc.
Harvest Co-op	Trinity Property Management

*Cambridge Climate Leader* – Based on the success of the Energy Star Recruitment project, the Community Development Department developed the Cambridge Climate Leader program. Using the Energy Star model, the City asks participants to pledge to generally support the goals of the Climate Protection Plan and voluntarily undertake actions to reduce GHG emissions in the areas of energy, transportation, and waste management. The City offers free technical assistance, including the services of ICF International on energy, and public recognition of participants' efforts. Genzyme Center and the Pfizer Research Technology Center were the first to become partners.

*Combined Heat & Power* – Biogen IDEC installed a 5 megawatt combined heat and power system at its Kendall Square campus to supply a highly reliable source of electricity and steam. CHP systems are significantly more efficient than power provided by the regional grid. As energy prices rise and as more businesses seek high reliability power, CHP may be adopted more widely.

**COMPREHENSIVE PROGRAMS**

*Harvard University*

Harvard University is engaged in a comprehensive approach to sustainable campus management through the Harvard Green Campus Initiative (HGCI) and

through the programs and actions of its schools (FAS, HSPH, HMS, HBS, HDS) and departments (University Operations, Dining and Harvard Real Estate Services, Commuter Choice, and Transportation Services programs). Moreover, Harvard is about to finalize a set of aggressive sustainability goals for master planning in Allston.

*Green Campus Loan Fund* – The \$12 million revolving loan fund provides interest-free capital for high performance campus design, operations, maintenance and occupant behavior projects. Since 2000 it has provided over \$7.5 million to 110 projects.

*Green Buildings* – From 2002 to 2006, 5 new construction and renovation projects have received LEED certifications from the U.S. Green Building Council (USGBC), including projects in Boston. Nine others have been registered with the USGBC for LEED certification, including projects in Boston. Many green building projects have achieved energy performances of 30-50% better than state energy code requirements and construction waste recycling rates of over 90%.

*Social Behavior Programs* – Residential Green Living programs were implemented to reach out to over 9,000 undergraduate and graduate residential students. As a result, recycling rates have increased by over 40% and energy use has been reduced by 10-15%.

Other creative and successful social marketing campaigns include the annual environmental CERtoon (campus energy reduction cartoons) competition (139 entries in 2006), the on-line "emPOWER" Harvard pledge (4000 participants in 2005) and the Vision of Sustainability art and design competition (over 100 entries in 2006).

*Research Support* – Harvard schools and departments have also partnered with the HGCI to identify, test and implement new practices including:

- Campus-wide green cleaning service now offered at Harvard
- Biodiesel is now used in all Harvard owned buses
- Trial of kitchen oil to make biodiesel and/or use directly to fuel a recycling truck
- New air quality controls tested on construction machinery
- Large scale indoor environmental quality and productivity study underway to determine building design impacts on productivity at Harvard
- Development of an EPA sponsored Greenteams website to support any university wanting to implement student internship program or a green living program (see <http://www.greencampus.harvard.edu/greenteams>)
- Development of a green building resource website to support continuous improvement in green building renovations and design both at Harvard and other organizations.

## **MIT**

Susan Hockfield was inaugurated as the new President of the Massachusetts Institute of Technology in 2005. In her inaugural address, President Hockfield announced an institute-wide initiative on energy that would seek to bring the talent and resources of MIT to bear on addressing global and national energy needs. An Energy Research Council was established to develop recommendations, with Robert Armstrong of the Chemical Engineering Department and Ernest Moniz of the Laboratory for Energy and Environment as co-chairs. President Hockfield stated:

*A second great opportunity, and a great obligation, is our institutional responsibility to address the challenges of energy and environment. Over the last thirty years, these two words – energy and the environment – have gotten a little tired, not from overuse but from lack of progress. The time for progress is now. I believe that the country and the world may finally be ready to focus on these matters seriously. Again, it is our responsibility to lead in this mission.*

An integral component of this emerging Energy Initiative is to lead by example: MIT has announced the start of a comprehensive initiative to address greenhouse gas emissions from its own campus operations. The initiative will focus on energy conservation, efficiency, sustainable design, and the application of advanced energy technologies, research and education on campus operations.

### ***Cambridge Health Alliance***

Cambridge Health Alliance operates Cambridge Hospital and a network of neighborhood health centers in Cambridge. The Alliance also operates facilities in Somerville and Everett. Through its contract with Sodexo USA Healthcare, the Alliance has developed an Energy Master Plan. The most recently available figures indicate that the program reduced aggregate energy use (electricity, natural gas, and fuel oil) by 5.2 percent between fiscal year 2003 and 2004.

The Alliance has enrolled in the federal Energy Star program and aims to earn an Energy Star Label within 3 years. The Energy Star Portfolio Manager benchmarking system is being used to document and track energy consumption data.

For construction projects, the Alliance has directed its engineering design services firm to comply with the energy efficiency goals of the *Green Guide for Healthcare*. The *Guide* is a rating system developed by the Center for Maximum Potential Building Systems, Hospitals for a Healthy Environment, the New York State Energy Research and Development Authority, and the Merck Family Fund.

By agreement with the US Green Building Council, the *Guide* incorporates elements of the LEED green building rating system.

## **EDUCATION & CIVIC ENGAGEMENT**

*Green Decade Cambridge* – This community organization, which is affiliated with the Massachusetts Climate Action Network, has been working to promote the goals of the Climate Protection Plan. A \$10,000 grant was received from the New England Grassroots Environmental Fund in 2005 to promote the purchase of renewable energy certificates in Cambridge. GD/C has also participated in the Energy Fair and advocated on climate change-related state legislation.

*University Courses* – The Laboratory for Energy and Environment at MIT continued its intersession course on implementing the Climate Protection Plan. In 2005, students focused on a survey of residential energy use and participation in NSTAR energy efficiency programs. The course brought to light the barriers that renters face in improving the energy efficiency of their homes.

The Planning for Sustainable Development course at MIT also focused on the Climate Protection Plan for the second year. Students focused on applying the goals of the plan to MIT campus operations.

At Harvard University, the Green Campus Initiative again shared its experience in sustainable campus management by offering "Sustainability: the Challenge of Changing our Institutions" through the Extension School. The course includes a distance learning option that was utilized by participants across the world. Also through the Extension School, *Strategies for Environmental Management* was taught by Robert Pojasek using Cambridge as its case study.

*GoGreen Awards* – The City recognized Cambridge businesses, institutions, and organizations for their sustainable environmental practices. In 2005, Cambridge Savings Bank, Cambridge Health Alliance, and GreenFuel Technologies were recognized in the energy category; Abt Associates and Homeowners' Rehab were recognized in the waste management/recycling category; and Abt Associates, ZipCar, and Petali Fresh Flowers were recognized in the transportation category.

## **EVALUATION OF PROGRESS**

Since the 2004 Annual Report, the situation regarding greenhouse gas emissions in Cambridge is about the same. It is clear from the trends in electricity and natural gas usage that emissions are likely to have increased in 2005. The good news is that the rate of increase in energy usage and vehicle emissions appears to have moderated compared to the 1998 to 2003 period. In addition, energy use in the residential sector has continued to decline despite a growing population and the waste sector has continued to provide significant emission reductions.

Whether these improvements are related to the efforts of public and private stakeholders or other factors or both is not possible to determine, but the direction of change is encouraging.

It is also encouraging that the breadth of activities that mitigate greenhouse gas emissions is expanding. The adoption of combined heat and power systems, the addition of on-site photovoltaic systems, the acquisition of renewable energy certificates, and the use of biodiesel demonstrate that public and private organizations are finding ways to address their environmental footprint in financially acceptable ways.

The growing engagement of the private sector, particularly our universities and businesses, and the City's commitment to expanding its portfolio of actions suggests that reductions and offsets of greenhouse gas emissions are likely to grow.

Nevertheless, Cambridge faces a continuing challenge to find ways to support stakeholders that are already reducing emissions to go deeper and to engage a significantly larger portion of the commercial, institutional, and residential sectors in emissions reduction.

## **2006 PLANS & OPPORTUNITIES**

*Cambridge Climate Leader* – The City has launched this program to engage businesses, institutions, and other organizations in achieving the goals of the Climate Protection Plan. The program needs to attract significant numbers of participants and to spur real emission reducing actions.

*Renewable Energy* – The City Council has established a goal for municipal government to use a significant amount of renewable energy. This offers the City the opportunity to become creative in how it achieves the goal.

*Energy Fair* – The Home and Energy Fair was successful in its first run in 2006. More residents need to be attracted and encouraged to improve the energy efficiency of their homes and consider using renewable energy. Green Decade/Cambridge is proposing to develop a program aimed at condominium owners, who comprise a significant percentage of the building stock, to help them overcome barriers to action. The City can partner with GD/C in this effort.

*Green Buildings* – Green buildings are no longer just a concept. The design community has enthusiastically adopted the new approach, suppliers of green services and products are growing more numerous, and projects are being built. However, there are significant numbers of projects that are not using green design and efforts need to be made to make the use of LEED a more common practice.

*Funding Opportunities* – The state Department of Environmental Protection and the Massachusetts Environmental Trust have begun to offer financial support for local climate protection efforts, in addition to funding provided by the Renewable Energy Trust and NSTAR's energy efficiency programs. The City is well-positioned to take advantage of these opportunities.

*Organics Composting* – The Public Works Department won grant support to establish an organics composting collection system to pick up food waste and other organics from restaurants, food services, cafeterias, and other businesses and organizations. This service has the potential to divert a significant amount of waste from landfills and incinerators and to reduce greenhouse gas emissions.

*City Initiatives* – The City expects to have an energy information system in place in 2006. This system will enable the City to develop a municipal greenhouse gas emissions inventory and help track the City's progress in reducing emissions. It will also enable the City to directly compare its efforts to those of Harvard and MIT and possibly other entities. The City is also well-positioned to continue improving the energy efficiency of its buildings and continuing its commitment to green building design and construction. Efforts are also underway to develop a "green fleets" policy and procedures to improve the fuel efficiency of municipal vehicles.