

Toward A Sustainable Future

Cambridge Growth Policy

UPDATE 2007

ENVIRONMENT AND SUSTAINABILITY





Harvard's 90 Mount Auburn building has a geothermal system for heating and cooling.

Environment and Sustainability

Sustainability was defined in the 1993 growth policy document as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” This underlying principle for the growth management effort continues to be an important overarching goal for the community. Progress towards sustainability has been made in the intervening years, but much more needs to be done, particularly in the area of climate change. The growth policies articulated in the 1993 plan, and noted in the sidebars in this document, address particular topics such as land use, urban design, transportation, housing, and economic development; they should also be considered holistically, recognizing that meeting the goal of sustainability requires a series of actions spanning the entire range of planning endeavor. In addition to considering traditional planning topics, the achievement of a sustainable future requires addressing issues of public health, greenhouse gas emissions, energy use, and waste management—topics that have gained importance locally and nationally in the intervening years.

Cambridge Climate Protection Plan

Since May 1999, Cambridge has been a member of the Cities for Climate Protection (CCP) campaign, a project of the International Council for Local Environmental Initiatives (ICLEI), which is a worldwide association of municipal, county, and other local governments that addresses environmental problems at the local level. As part of its CCP commitments, the City has set a target of reducing greenhouse gas (GHG) emissions by 20 percent below 1990 levels by 2010. Strategies and actions to achieve this reduction are outlined in the *Cambridge Climate Protection Plan*, adopted by the City Council in December 2002. The Mayor and City Council have also endorsed the U.S. Mayors Climate Protection Agreement, supported by the U.S. Conference of Mayors. The agreement commits the signatories to strive to meet or surpass the Kyoto Protocol target, calls on state and federal governments to do the same, and urges the U.S. Congress to pass the Climate Stewardship Act. As of November 2006, 326 U.S. mayors have signed the agreement.

There is a national trend of increasing GHG emissions, and in Cambridge, GHG emissions increased by 27.2% between 1990 and 2003. This increase is attributable to a combination of factors including emissions from transportation and solid waste disposal, but it is primarily related to commercial and institutional building energy consumption.

The New England Regional Assessment, funded by the federal government in August 2001, predicted that average temperatures in our region are likely to increase by 6 to 10 degrees Fahrenheit within the next 100 years. Among other effects, this may create habitat for disease-carrying insects that do not now live here; change rain and snowfall patterns, affecting water supplies, agriculture, and the frequency of flooding; cause changes in natural habitats that will eliminate some species from

our area and introduce new ones; and cause sea-level rise and greater coastal storm damage. The Union of Concerned Scientists' report on Northeast climate impacts, issued in October 2006, projects that sea levels will rise by 2 to 3 feet by the end of the century, with even greater increases if emissions are not controlled. This effect could expose areas along the Charles River to increased risk of storm surge flooding.

The vision of the *Cambridge Climate Protection Plan* is to be smarter and more resourceful about the manner in which buildings use energy, people and goods are transported, and waste is managed. Cambridge is in a position to apply many existing technologies and approaches to tackle this problem and to take advantage of emerging trends and resources in energy, transportation, land use, and waste management that hold promise to change for the better the way our city works and the way we live. A committee of residents, businesspeople, institutional representatives, and City staff has been established to advise the City and monitor the implementation of the plan.

Land Use and Energy

Cities are warmer than surrounding, less-developed areas. This urban heat island effect results from the greater percentage of hardscaped, heat-absorbing surfaces in urban areas, fewer trees and other vegetation to offset the effect of hard surfaces, and lower albedo, or solar reflectivity of surface materials. The resulting increase in temperature not only increases smog, but also results in higher energy use, further aggravating the situation.

The key mechanisms to address the urban heat island effect are to increase the amount of vegetation that shades heat-absorbing surfaces and to increase the albedo of surfaces. This includes interventions at both public and private levels, such as increasing the number of street trees, adopting policies to encourage the planting of trees in parking lots, construction of green roofs, encouraging the installation of





The City Hall Annex has been renovated to LEED standards.

white roofs, and the use of lighter-colored road and sidewalk surfaces. The Department of Public Works is developing a GIS-based inventory of street trees and trees in City parks, and the Community Development Department has assessed the tree canopy cover of Cambridge. As of September 2000, the city had a tree canopy cover of about 20 percent, which is typical of urban communities. The assessment estimated that Cambridge's urban forest provides at least \$7.5 million annually in environmental services such as stormwater mitigation and air pollution attenuation.

Leadership in Energy and Environmental Design (LEED)

Energy use associated with buildings accounts for about 82% of Cambridge's greenhouse gas emissions—18% from residential buildings, and 64% from nonresidential (commercial, industrial, and institutional) buildings. Dramatic reductions in building energy use are necessary to meet the City's GHG reduction goal. Green buildings, also characterized as "high-performance" buildings, typically save on energy costs and contribute significantly to improved health and productivity of building occupants.

The project review special permit process, adopted as part of the 2001 Citywide Rezoning for review of all large projects in the city, requires proponents to outline how the proposed development performs on the LEED checklist. The evaluation criteria encourage building and site design that use "natural resources and energy resources efficiently in construction, maintenance, and long-term operation of the building, including supporting mechanical systems that reduce the need for mechanical equipment generally and its location on the roof of a building specifically." Compliance with LEED certification standards and other evolving environmental efficiency standards is encouraged.



The Genzyme building received a platinum rating from LEED. Its many green features include mirrors on the roof that track the sun to send light down into the beautiful atrium at the heart of the building's interior.

Cambridge has made a commitment to green design of both new and substantially renovated municipal buildings. Recent construction such as the renovated City Hall Annex, the Russell Field Athletic Center, the ongoing Main Library renovation, the West Cambridge Youth Center, and planned new Police Department headquarters all incorporate many green design elements. The City Hall Annex has received a LEED Gold rating, and the Russell Field fieldhouse is expected to receive a LEED Silver rating. The award-winning City Hall Annex incorporates a ground source heat pump system in place of a conventional boiler and air conditioning system, has a 26 kilowatt solar photovoltaic array, and features an energy efficient building envelope and daylighting strategies. As a result, the Annex uses half of the energy per square foot compared to other City buildings.

Green building design has been embraced by institutions and some private developers in Cambridge. As of November 2006, four buildings in addition to the Annex have received LEED certification. In addition, three others have been registered with the intent of achieving LEED, and owners of other projects have indicated plans to seek LEED certification. Genzyme Center in Kendall Square is the first building in the Northeast to have achieved LEED Platinum rating, and is the largest

Platinum-rated building in the country to date. Genzyme's headquarters, which is located on a remediated brownfield site, features a double-wall façade system to reduce solar gain, an atrium that serves as part of the ventilation system and daylighting strategy, a 20 kilowatt solar photovoltaic system, water conserving features, and environmentally friendly building materials.

Harvard University is using LEED extensively for its major projects. To date, five Harvard projects have received LEED certification and nine others have been registered with the intent to achieve LEED certification in Cambridge and Boston. Harvard has applied to the U.S. Green Building Council for a LEED Platinum rating on the recent renovation of 46 Blackstone Street. MIT has adopted a LEED Silver Plus goal for its projects. The Stata Center and the Brain and Cognitive Sciences Building have been registered for LEED certification.

Energy Efficiency and Renewable Energy in Existing Buildings

While ensuring that new buildings are constructed in an environmentally-conscious manner is important, the existing building stock is and will continue to be the more significant source of environmental impacts. To address energy use in its own facilities, the City has established the Energy Management Work Group, an inter-departmental committee working to improve energy performance at municipal facilities. The work group is setting up a Web-based energy information system to track usage, conducting engineering assessments of buildings, and implementing upgrades such as boiler replacements, lighting improvements, and replacement of motors.

Businesses are also working to make their facilities more efficient. Cambridge Savings Bank has been able to attain the federal Energy Star label for seven of its buildings, including the Harvard Square headquarters. Between 2001 and 2004, the bank reduced overall energy use by 13% while expanding its square footage by 16%, reducing its energy use per square foot by 25%. Pfizer, Inc. has been able to reduce its electricity use by 400,000 kilowatt-hours annually, saving about \$50,000 in utility costs per year, through various improvements such as installing occupancy sensors and variable speed drives on air handlers.

Clean Energy and Sustainable Fuels

Cambridge has made a commitment to clean energy, and has contracted with TransCanada, the City's electricity supplier, for 700,000 kilowatt-hours of renewable energy certificates to offset its GHG emissions. The City Council has endorsed a goal of 20% of municipal electricity use coming from renewable sources by 2010. The City is working with ThinkEnergy, an environmental consulting firm, and other consultants to assess its options including the purchase of additional renewable energy certificates, ownership of generation assets, and installation of renewable energy sources in City facilities.

Purchasing of green power, or electricity generated by renewable energy sources, has also become a more common practice among businesses and institutions. For

example, Whole Foods Market is buying enough renewable energy certificates from wind power projects to offset greenhouse gas emissions for all of its stores nationally. Direct installations of solar energy systems have reached 111 kilowatts of capacity in Cambridge. Porter Square Shopping Plaza has the most visible installation, with a 20-kilowatt photovoltaic system lining its roof.

While the City's Transportation Demand Management (TDM) program encourages the use of non-automobile means of transportation, there is also emphasis on ensuring that vehicles use sustainable fuels and generate less pollution. The City has partnered with MIT for an \$83,000 grant from the U.S. Environmental Protection Agency (EPA) to install oxidation catalyst devices in 34 City-owned vehicles. These devices will reduce particulate pollution. In 2003, Daimler Chrysler gave 20 GEM neighborhood electric vehicles to the City for use by several departments. Additionally, the Water Department has a compressed natural gas (CNG) pickup truck that is deployed in the Cambridge watershed. Furthering these efforts, the City Manager established the Green Fleet Committee to develop policies and procedures that incorporate fuel economy and pollution reduction into decisions for purchasing new vehicles.

Harvard University has converted its diesel vehicle fleet to B20 biodiesel, which consists of 20% vegetable oil. Recently, one of its recycling trucks was converted to run on 100% waste vegetable oil collected from one of the dining halls.

Recycling and Waste Prevention

Jointly with MIT, Harvard, the Cambridge Health Alliance, and others, the City has pledged to increase its recycling rate to 40%. The Department of Public Works operates the curbside recycling program for residences and some businesses, a drop-off center, as well as recycling in City buildings, schools, public areas, and at festivals. In September 2006, the Department of Public Works, with support from the state Department of Environmental Protection, launched an organics collection service for private businesses and institutions which will divert food waste and other plant-based waste from landfills and incinerators. Recycling of construction waste has become more common and the state is beginning to impose a ban on construction waste going to solid waste facilities. US Gypsum has started a drywall recycling facility in Cambridge to collect old gypsum board for reuse.

Cambridge Climate Leader Program

The Energy Star Recruitment pilot program enlisted ten businesses in the federal Energy Star program during the spring of 2005. Participants received technical assistance and were referred to NSTAR for rebates. The newly launched Cambridge Climate Leader Program expands this principle to encourage businesses to be more energy efficient, utilize renewable energy, reduce automobile dependence, and reduce waste. In a matter of months, fourteen businesses had enrolled in the program and the level of interest appears to be high. Since 1999, the City has recognized businesses and organizations for their environmental initiatives as part of GoGreen Month, which is held each spring.

Since 2004, the City has organized an Energy Fair as part of Danehy Park Family Day. Participants have included NSTAR, Green Decade/Cambridge, and the Massachusetts Energy Consumers Alliance. In 2006, an annual Home & Energy Fair was launched to provide hands-on demonstrations and practical information for residents interested in energy efficiency and renewable energy. City staff members are also available to organize and help coach Ecoteams, which are resident groups working together to reduce their household energy use, water use, and waste generation.

Tracking of Progress

The City maintains and periodically updates a greenhouse gas (GHG) emissions inventory and tracks actions undertaken by all sectors of the community to reduce emissions. The inventory helps the City track its environmental performance and measure progress towards the goal of reducing GHG emissions by 20% by 2010.

Environmental performance is also a growing concern of businesses and institutions. A number of businesses and institutions located in Cambridge track their own greenhouse gas emissions. Businesses that actively manage their environmental performance have been documented to be better risks for investors. Corporate environmental responsibility has also become a factor in recruiting and retaining employees.

There are several Cambridge businesses that are involved with environmental technologies and practices, such as Nuvera (fuel cells), Greenfuel Technologies (carbon capture and algae-based fuel), TIAX (batteries and fuel cells), Metabolix (bio-based plastics), PlanetTran, and ZipCar.



Transportation

Cambridge is eminently walkable due to its density and mix of uses, and the City-wide Rezoning of 2001 incorporated incentives in the zoning ordinance to continue the mixing of uses throughout the city and thus encourage even more walking. Despite the walkable quality of Cambridge, many trips that could be made on foot, by bicycle, or by transit are still made by car. Although transportation is not the most important source of GHG emissions in the city, contributing only about 12% of total emissions, automobile trips still add to the pollution and heat island effect, use nonrenewable fuel resources, create congestion, and also degrade the environment for people using other modes such as walking or bicycling.

Emissions of GHGs and pollutants come from vehicles that use gasoline and diesel. The amount of emissions is a function of the fuel economy of the vehicle and the number of miles traveled. Nationwide, car ownership is increasing at a faster rate than the population, and people are traveling more for work and leisure; at the same time, the recent trend has been toward larger, lower fuel economy vehicles. Together, these trends lead towards more emissions of greenhouse gases and other air pollutants. Working to minimize vehicle emissions and reduce vehicle miles traveled are important both for improved public health and for reducing pollution. The City's bicycle and pedestrian programs are improving facilities for walkers and cyclists (more discussion on this topic can be found in the Transportation section). Additionally, relating building and site design to pedestrian, bicycle, and transit facilities is being encouraged through project review and other means. Since 1998, the City's PTDM Ordinance has required developers who are adding parking to the city's supply to prepare a TDM plan which includes actions to reduce drive alone trips to work, such as subsidizing employees' transit costs.

Stormwater Management and Low Impact Development

The buildings and large amounts of paved areas in cities create impermeable surfaces that do not allow absorption of rainwater and resulting recharge of groundwater, but instead result in runoff to the storm drains. Buildings, streets, parking lots, and pavement all contribute to this problem. Runoff not only burdens the stormwater collection system and increases the possibility of downstream flooding, it also fails to allow an opportunity for the removal of pollutants, which instead get transported to the streams and rivers. In addition, parking lots and paved surfaces often add pollutants, such as oil dripping from engines, to the runoff. Redevelopment of private sites offers the opportunity to begin to address this environmental burden from the past.

All areas within the 100-year floodplain of a water body are subject to review by the Conservation Commission under the state Wetlands Protection Act, which imposes rigorous stormwater management and permeability standards. Parts of Cambridge in the Alewife area and a narrow area adjacent to the Charles River are subject to this review. The City's Department of Public Works has established new regulations



The former Kendall fire station was moved to the front of its site on Main Street, and reused as an inn.

that require all significant development sites to accommodate up to the 25-year storm discharge on-site for a period of time and that encourage the use of Low Impact Development (LID) techniques. LID is an approach to managing stormwater on-site in a sustainable, environmentally sensitive fashion and includes mechanisms such as green roofs, stormwater management wetlands, detention basins, bioswales and rain gardens to manage the quantity, quality, and rate of flow of stormwater.

