

City of Cambridge  
Climate Protection Action Committee

INTERIM RECOMMENDATIONS  
ON MOVING CAMBRIDGE FORWARD ON CLIMATE PROTECTION

June 2009

## **EXECUTIVE SUMMARY**

In 2002, the City of Cambridge issued a Climate Protection Plan with the goal of reducing greenhouse gas emissions in the city to 20 percent below 1990 levels. Since then, the City has successfully implemented much of its plan. Despite this considerable programmatic success, overall GHG emissions in the city have continued to grow.

In recent years, the scientific community has grown stronger in stating the urgency of the climate crisis. Because of the process of how greenhouse gases accumulate and persist in the atmosphere, authoritative sources have urged that we stabilize and begin to reduce the rate of greenhouse gases very soon – by 2015. Otherwise, it will become increasingly unlikely every year that passes that we will be able to reduce emissions by 80 percent by 2050 and avoid dangerous climate change.

In 2008, the City and the Climate Protection Action Committee, a City advisory body, recognizing the near impossibility of realizing our prior goal in 2010, began an analysis to identify and prioritize carbon reduction challenges and potential responses.

The group identified eight areas initially to pursue and prioritized four for later study. The priority areas include communications and community engagement, measurement and goal setting, building energy use, and transportation. Areas left for later consideration include land use/vegetation strategies, zero waste, adaptation to climate change, and technology. As carbon sequestration becomes a serious topic of policy discussion and technology development, geo-engineering may be added as a ninth area to consider.

This report identifies several priority areas on which the city should focus and offers recommendations for implementation and further research. Specifically, the Committee recommends that the City:

- Address the limitations in the current system for measuring progress and setting goals by collecting data disaggregated to the point where sector-by-sector results can be examined and program results evaluated. In addition, key control variables need to be identified and data needs to be collected, so the effects of weather and development can be accounted for. Finally, a goal-setting process that provides intermediate goals and goals for sectors, reflects best practices, and is subject to periodic review needs to be established.
- Focus on communication and community engagement, to build the broad public support needed for bold, effective action and the awareness needed for widespread individual action. By coordinating, and coordinating with, other groups the City can help ensure that the entire population of residents and businesses is reached and engaged.

- Building energy consumption, particularly in the commercial sector is by far the largest contributor to GHG emissions in Cambridge, and thus represents a massive opportunity. Through a range of techniques, from regulatory change to building energy efficiency labeling to aggressive outreach to building owners, significant conservation in the commercial, and then residential, sector can be achieved.
- Transportation, particularly automobile use, is a major emissions source. Because most vehicle trips in Cambridge are short in length, it is clear that the majority of automobile trips could be replaced by walking, cycling, or public transit. Where automobile use is needed, the City can encourage low carbon and alternative fuel vehicles, such as electric vehicles.

The issue of climate change is critical to our future economy, environment, and welfare. Following the patterns of the past, even those that we have used to encourage efficiency and conservation, are insufficient to reach our goals. More aggressive action is required. Cambridge has much to offer toward solutions. In addition to taking responsibility for our own contribution to the problem, we can develop and demonstrate new instruments to accomplish climate protection and disseminate them to other communities; foster and support local entrepreneurs working on solutions; and join with other communities to urge action at higher levels of government. We should not expect “silver bullets”. Solving the climate crisis will require bold, multi-faceted responses from businesses, institutions, government, and individuals.

The committee will continue to support the city’s efforts as an advisor, a voice representing the community, a communication path to the community, and at times as implementors. We will champion these recommendations, create accountability, and examine the other areas we have identified as potentially important.

## **PURPOSE OF THE REPORT**

The Cambridge Climate Protection Plan was approved by the City Council in December 2002 and incorporates the City's goal to reduce greenhouse gas emissions community-wide by 20 percent below 1990 levels by 2010. As Cambridge approaches 2010 and in light of the lack of sufficient progress toward the goal, the Climate Protection Action Committee (CPAC) with support of Community Development Department staff have begun to assess where the community stands relative to the goal and to consider what strategy is needed beyond 2010.

CPAC is a 24-member body of citizens and community stakeholders that serves in an advisory capacity to the City Manager on the implementation of the Cambridge Climate Protection Plan.

This report is an interim evaluation that will be submitted to the City Manager and the Community Development Department for consideration. It provides an interim evaluation of progress since 2002 and initial recommendations, which CPAC recognizes are not nearly sufficient or comprehensive enough to close the significant gap between the goal and actual emission trends. The Committee intends to solicit comments and responses from all interested parties so that the recommendations contained here can be further informed with more information and broader opinions. The Committee will continue to refine these recommendations and, following further analysis and investigation, endeavors to help the City develop a strategy that will provide the major response that is needed to match the scale of the climate change challenge.

The Committee must also note that it has not tackled the issue of climate change adaptation. Scientists inform us that the planet is already locked into a certain amount of climate change that will cause impacts related to sea level rise, temperature increases, and changes in precipitation patterns. Cambridge needs to begin assessing its vulnerabilities, such as those posed by future storm surge flooding, and develop strategies to adapt to the changing climate conditions with which we will have to contend. The challenge for mitigation strategies is to minimize the amount of climate change by stabilizing and decreasing greenhouse gas concentrations in the atmosphere as much as possible.

## **CAMBRIDGE'S ROLE IN CLIMATE PROTECTION**

Climate change is a global problem caused by the buildup in the atmosphere of greenhouse gases, primarily carbon dioxide, mostly from the cumulative emissions from activities that burn fossil fuels such as coal, oil, and natural gas to heat and cool our homes, provide lighting, run our appliances, and propel our cars and trucks. Humans are emitting greenhouse gases about twice as fast as the earth can absorb them. We have to reduce the rate of greenhouse gas emissions so that it is lower than the capacity of the planet's oceans and forests to absorb them and to prevent runaway climate change. The best scientific advice indicates that emissions on the order of 80 percent below current levels by 2050 are necessary to cap global temperature increases at about 2 degrees Celsius. It is also critical to understand that the rate of emissions must be stabilized and begin to decrease very soon. Authoritative sources recommend that emission rates begin to decline by 2015. Otherwise, it is unlikely that we will be able to reduce emissions by 80 percent by 2050.

Climate change is a big, global problem. Yet, Cambridge is a contributor, albeit a tiny one, to the problem. Since we are confronting a problem that results from cumulative emissions, it makes sense that cumulative solutions are also required, including many on the local level.

Cambridge also possesses unique resources that can be used to develop solutions. The Committee sees four areas where Cambridge can contribute to climate change solutions:

- Take responsibility for Cambridge's contribution of greenhouse gases, and take action to reduce them dramatically;
- Develop and demonstrate new instruments to accomplish climate protection that can be disseminated to other communities;
- Foster and support local entrepreneurs working on climate change solutions; and
- Join with other communities to urge action at higher levels of government

Cambridge has been involved in climate change initiatives since 1999. Our efforts have helped to spread the Cities for Climate Protection campaign around the Commonwealth and region. And many of our policies and programs have provided useful examples to other communities of how to implement effective action.

The City and the community have developed and implemented numerous mitigation measures since 1999, many of which are innovative. The Climate Protection Plan presented 99 recommended short, medium, and long term actions, most of which have been implemented in whole or in part by the City or other community stakeholders. There are also other significant actions that have taken place in Cambridge that were not specifically mentioned in the plan. Among the more significant actions that have taken place since 1999 are:

- Formation of the Cambridge Energy Alliance to tackle energy use in existing buildings;
- Startup of ZipCar carsharing services with 200 cars now available in Cambridge;
- Harvard University's Green Campus Initiative, which was transformed into the Office of Sustainability upon the institution's adoption of a goal to reduce greenhouse gas emissions by 30% by 2016;
- Formation of the MIT Energy Initiative to research and develop new and cleaner energy technologies;
- Launch of the NSTAR Green program offering a green power option to small ratepayers;
- Launch of the City's Green Taxicab program, offering incentives to convert taxicabs to hybrid models;
- Adoption of green building design based primarily on the U.S. Green Building Council's LEED system by the City, institutions, and many companies;
- Formation of green community groups such as Green Decade Cambridge, Greenport, HEET, and the Sustainable Business Network;
- Major expansion of bicycle and pedestrian-friendly infrastructure which has led to the doubling of bicycling in Cambridge and one of the lowest rates of single occupancy vehicle travel in the country;
- Management of parking supply through pricing strategies, such as increased meter fees, elimination of free on-street parking for commuters, and careful review of development project parking proposals;
- Launch of the Compost that Stuff program for businesses and organizations, and expansion of recycling services.

Despite these significant steps, along with many other actions, Cambridge has experienced a major increase in GHG emissions since 1990. While much of that increase occurred before the city began working on climate change, it is still necessary to address the increase in emissions.

With the recent national elections, it is clear that change is in the air. The Committee anticipates that significant resources and policies will soon begin to emanate from the federal government. In addition, recent state laws such as the Green Communities Act, Global Warming Solutions Act, and Green Jobs Act are beginning to be implemented and will offer resources for community action.

## **STATUS OF CAMBRIDGE GOALS**

The City of Cambridge has two greenhouse gas reduction goals. In December 2002, the City Council adopted the Cambridge Climate Protection Plan, which includes a goal of reducing greenhouse gas (GHG) emissions community-wide by 20 percent below 1990 levels by 2010. In April 2007, the City Council adopted a policy order calling for the city to reduce its carbon dioxide emissions by 80% by 2050. To track progress, the City uses the greenhouse gas emissions protocol developed by ICLEI-Local Governments for Sustainability. Full emissions inventories for the Cambridge community have been done for 1990, 1998, and 2003. According to the inventories, emissions increased from 1.16 million tons CO<sub>2</sub> in 1990 to 1.48 million tons CO<sub>2</sub> in 2003, or a 27 percent increase. Emissions from municipal government activities account for about 3% of total Cambridge emissions.

The increase between 1990 and 2003 is largely related to energy use in commercial and institutional buildings. The emissions increase appears to be due to the significant growth in the square footage of commercial and institutional buildings and population. Harvard and MIT have also performed GHG emission inventories for their campuses and report comparable GHG emission increases during the same period.

While commercial and institutional emissions increased significantly, emissions associated with residential building energy use decreased by 25% from 352,430 tons CO<sub>2</sub> in 1990 to 253,226 tons CO<sub>2</sub> in 2003. We believe that an acceleration in residential renovations contributed to increased energy efficiency and lower GHG emissions.

The full emissions inventory is not updated regularly. However, the Community Development Department and the CPAC track indicators annually, including electricity and natural gas use in Cambridge, and report those figures in the CPAC Annual Report. Electricity and natural gas use in buildings is responsible for about three-fourths of Cambridge's GHG emissions. Since 2003, consumption of those energy sources has been relatively stable, although there was an increase in 2007.

Cambridge's emissions increase is, unfortunately, not uncommon. We are unaware of any community that has claimed an emissions reduction in absolute terms. Some communities, such as Portland, Oregon have claimed a per capita emissions reduction. However, there are factors working in Portland's favor, including the availability of carbon-free hydro power for electricity generation and the development of a new light rail system.

## **THE ISSUES**

The overarching climate change issue in Cambridge is that a large, multifaceted, aggressive response is needed to significantly reduce greenhouse gas emissions. There are no "silver bullets." All sectors of the community – residents, businesses, institutions, government – must be active. It is clear that Cambridge needs to retrofit its existing building stock to make it much

more energy efficient; ensure that new development is as efficient as possible; significantly increase the use of renewable and other clean energy supplies; minimize fossil fueled, single occupancy automobile trips; adopt non-carbon fuel transportation technology; and eliminate as much waste as possible.

Given the available resources, CPAC chose four areas to address in its initial recommendations.

We looked at two basic issues—how to help foster action and the issue of measurement and goal-setting. We also looked at the two largest contributors to global warming -- energy use associated with buildings and transportation.

*Measurement & Goals:* Determining what to measure, measuring greenhouse gas emissions, and evaluating the results of actions are all complicated processes. It is often impossible to measure the results of a particular action, and actions often have unanticipated results. For example, local factors such as intensive development, and factors on the national and state level such as the slower-than-anticipated adoption of stricter CAFÉ standards, complicate efforts to accurately measure the results of actions and to set goals that are helpful. As we gain more experience with taking action on global warming, questions have arisen as to what an appropriate goal or set of goals is for Cambridge.

*Communications & Engagement:* The second area of recommendations, communications and engagement, looks at the issue of creating community consensus for bold, effective action. To date, individuals, families, businesses, governments, and institutions have not been persuaded of the need for major actions, and doing so soon. While there is widespread recognition in the scientific community that our present ways of living are unsustainable and, unless we make dramatic changes in how we find and use energy, the changes that global warming will inevitably bring will be unplanned and catastrophic. This message -- that change is inevitable and it is in our hands to make it positive or negative -- has been frequently repeated in the media, but it has not yet been fully understood by most people. Substantial outreach to every sector of the community to develop positive action is vital.

*Building Energy Use:* Energy associated with building use is by far the largest contributor to greenhouse gas emissions in Cambridge. Cambridge has a large building stock, much of it relatively old. Based on the 2003 emissions inventory, the non-residential sector -- institutions, commercial, and industrial building -- account for 64% of the City's greenhouse gas emissions. The residential sector accounts for 18%. If Cambridge is going to be successful in substantially reducing its greenhouse gas emissions, it is clear that building energy use, particularly in the commercial and institutional sectors, must be a major focus.

*Transportation:* The other major source of greenhouse gas emissions in Cambridge is transportation. The primary issue, and the easiest to tackle from a local infrastructure perspective, is automobile use. Because most vehicle trips in Cambridge are short in length, we know that the majority of automobile trips could be replaced by walking, cycling, or transit. Where automobile use is needed, the City can encourage low carbon and alternative fuel vehicles, such as electric vehicles. The City has undertaken a number of initiatives under the Vehicle Trip Reduction Ordinance and the Parking and Transportation Demand Management Ordinance to encourage people to shift their travel choices, including significant investment in the transportation infrastructure for sustainable modes of transportation and the adoption of a regulatory requirement that projects that create new parking must offer transportation incentives

to reduce employee commuting. The committee recommends actions to build on the significant policies and programs that have been implemented to date in the transportation sector. All of these issues are systemic and are in no way unique to Cambridge.

To tackle the issues, we are aware that our most important asset is that just as the issues touch virtually every aspect of our lives, so can the solutions. It is not naïve to suggest that creating a dramatically more energy-free community will have many benefits. There are jobs to be had making buildings energy efficient and keeping them that way; in building and maintaining renewable energy sources; in developing and using regular ways of carrying out business that are much less grid-intensive; and in operating expanded public and private community transportation.

Other benefits are easy to list. People working and living in high-performance buildings that are more energy efficient are generally healthier and more productive. Fewer cars on the road mean cleaner air, less asthma, and safer streets for children and seniors. Less dependence on internal combustion machines to get around and carry out daily tasks means healthier, fitter residents. A cleaner community can thrive in many ways.

While such benefits can seem difficult to imagine or achieve, the realities of global warming move them from the utopian to the eminently practical, as we struggle to avoid the dystopia that climate change otherwise promises. Given sufficient leadership and vision, we have an opportunity to use the crisis to create a stronger and more livable community.

In choosing the areas of recommended actions, CPAC recognizes that other vital issues remain to be addressed. The Committee intends to subsequently address five other areas: climate change adaptation, zero waste, land use/vegetation strategies, technology, and geo-engineering options.

## WHAT WE KNOW

### *Measurement & Goals*

- **The data underlying the Cambridge GHG inventory is not understood in sufficient detail.** The data used to prepare the GHG inventory is drawn from multiple sources and has been sufficient to provide a “broad brush” perspective on emissions in Cambridge. However, to develop a more useful analysis of emission sources and trends and to help identify specific actions to take and to assess results, the data need to be understood in a deeper way by disaggregating it and obtaining a clearer description of how the data is generated.
- **GHG inventory methodology is an evolving art.** There is no universally accepted methodology for preparing community-scale GHG inventories. The City relies on the protocols and tools developed by ICLEI, the sponsor of the Cities for Climate Protection program. There are many issues that affect the results of an inventory, including how boundaries are drawn around activities that generate emissions, which conversion factors are chosen to translate activities into GHG quantities, and assumptions about how activities generate emissions. Therefore, GHG inventories are not static. They need to be revised and adjusted as the art evolves and better information becomes available.

- **Defining progress in terms of GHG emissions at the community level is complex.** Cambridge is not an island. The community's GHG emissions are influenced by external forces and factors, including federal and state policies and regulations, the regional system for electricity production, and commuter and air transportation that does not originate or end in the city. In addition, land use patterns, types of economic activity, and the city's place in the regional economy distinguish Cambridge from other cities and towns. These are factors that must be considered when we ask "how is Cambridge doing on its GHG emissions?" A single measurement is not sufficient to characterize progress.

#### *Communications & Engagement*

- **Broad support for bold action is missing.** To be successful, there must be a critical mass of public support across Cambridge for bold action related to the climate crisis. Currently, there is not consensus on the need for action, nor the specific actions that must be taken. While there is high awareness of the existence of the climate crisis nationally, it is not clear how much is known, or what the extent of that knowledge is locally. For Cambridge to realize its goals we must ensure that the level of awareness of the climate crisis is high among residents, businesses, and other organizations across the city and build consensus around a central set of ideas for addressing the issue. When the time for action comes, we must achieve broad-based participation and coordination/collaboration at all levels and from all communities within the city.

Experts indicate that there are several psychological and social reasons for the lack of in-depth action on the crisis. One of these is despair, a sense that the situation is hopeless, which can lead to apathy and/or denial. It is very difficult to take in the enormity of the crisis and the likelihood that we will not be able to stop the destruction. Another reason includes the belief that the crisis is off in the future somewhere, clinging to the uncertainties about the details of how global climate change will unfold as a reassurance that maybe it won't really be all that bad. Another cause is what is called the tragedy of the commons—people ask why they should make sacrifices when their individual sacrifices won't really affect the situation. This cluster of reasons is, perhaps, the biggest issue facing us as we work on climate change.

- **Action must be taken at all levels.** To be successful, Cambridge must successfully persuade individuals, families, businesses and other organizations to begin to quickly and meaningfully reduce their own global warming output. Their actions must be continuous, meaningful, and measurable. Currently, the level of commitment and action vary and there are significant barriers – political, regulatory, financial and other – preventing such action. For Cambridge to realize its goals, action taken at the individual level must be encouraged and supported by community groups, businesses, nonprofits, faith communities, and other organizations. Government must support the work of the community. And at all levels, the barriers to action that currently exist must be removed.
- **True understanding of challenges is limited.** To be successful, Cambridge must make significant and fundamental changes: in terms of individual actions (transportation method, energy usage, etc.), around regulatory policies (building codes, transportation planning, etc.), as well as City operations. What is required to achieve that level of change in behavior is not well understood and few, if any, organizations/governments have been successful at massive changes (without a catastrophe that forced the change). For Cambridge to realize its goals, we must develop a deeper understanding of

the challenges related to the climate crisis, the solutions that are likely to yield the desired results, and how to impact social and other behavior at all levels to support such an effort.

- **Climate change must be understood as more than an environmental issue.** To be successful, Cambridge must make the battle against the climate crisis more than just an environmental issue. Groups across the city, with varying interests and membership, need to understand on a deep level how their core mission, whatever it is, is affected by climate change and how consideration of climate change needs to be part of their agenda. Additionally, the city's commitment must continue to take into account that the various priorities (stronger neighborhoods, anti-poverty issues, affordable housing, green jobs, etc.) represented by these groups are also priorities that need to be addressed to make the social and cultural transformation required possible.
- **Prioritization and patience needed.** To be successful, Cambridge must prioritize its efforts and resources, be patient and put in place a clear, effective and agreed-upon process to ensure the desired impact. It is clear that all resources are not being efficiently used or reaching all required audiences. Plans that are already in place and activities that are already underway should be reviewed and considered as a part of a larger, unified effort. Ineffective activities must make way for effective activities, which must be identified and expanded as needed. In short, as a community and a government, Cambridge must commit to pursuing only the actions that produce the desired results.

#### *Building Energy*

- **Energy use in buildings is the main source of greenhouse gas emissions in Cambridge.** Based on the City's greenhouse gas emissions inventory, about 80 percent of GHG emissions in Cambridge are the result of using electricity, natural gas, and fuel oil to heat and cool interiors, provide lighting, and run equipment. While new development is important to consider, it is the existing building stock that is and will be responsible for most GHG emissions in our city. The City has responded by launching the Cambridge Energy Alliance through a collaboration with private foundations. CEA is the City's major initiative to attack the building energy problem and needs to succeed in its goals to improve the energy efficiency of half of all Cambridge buildings in the next 5 to 7 years and install significant amounts of renewable energy.
- **A lack of awareness by businesses, professionals, and residents hampers progress on energy efficiency and renewable energy.** Owners and occupants of buildings are often unaware of how much energy – electricity, natural gas, and fuel oil – they consume or of how their buildings perform in terms of energy use compared to other similar buildings. Measuring and understanding energy use is the necessary foundation for effective management of energy use. Awareness and understanding of the current technology, products, and services that are available to improve building energy performance is also low. The Cambridge Energy Alliance and the City's Green Building/Zoning Task Force are working on this problem, but additional measures appear to be needed. Greater awareness is critical because about 80% of greenhouse gas emissions in Cambridge are related to building energy use.
- **A lack of financial and other incentives hampers energy efficiency and renewable energy in buildings.** Energy efficiency measures generally make financial sense, but

owners often do not install them because of a range of factors including competing priorities, the scale of the savings relative to time and effort, lack of confidence that improvements will result in savings, the owner/renter split incentive problem, and the need to make an upfront investment. Renewable energy systems tend to take longer to pay off and face similar obstacles. Property owners need incentives and support to overcome these obstacles.

- **Local and state regulations affect energy decisions.** Regulations such as the state building code and the local zoning ordinance affect the energy efficiency of a building. On one hand, the regulations serve as minimum standards. On the other hand, they may make certain measures difficult to install. If the standards of these regulations are raised, then buildings can become more efficient over time.

#### *Transportation*

- **Reducing single-occupancy vehicle travel requires strong, coordinated action.** Shifting trips to non-SOV modes, such as public transit, high-occupancy vehicles, bicycling, and walking reduces greenhouse gas emissions. Measures that increase access to transit and modifications of parking management strategies can encourage this shift. In addition, adoption of low-carbon alternative fuel vehicles and reduction of private car ownership can avoid and reduce emissions. These actions need to be coordinated in their implementation to have a synergistic effect.
- **The most important reductions in GHG emissions are cumulative reductions.** Immediately implementable actions with modest GHG reductions have the potential for greater cumulative effects than actions with larger impacts that cannot be implemented immediately. This is important since it is the accumulation of greenhouse gases in the atmosphere that is the primary cause of climate change.

## **RECOMMENDATIONS**

The Climate Protection Action Committee established four subcommittees in August 2008 on building energy, transportation, communications and engagement, and measurement and goals. Other topics were also considered for subcommittees to focus on, but were not initially included due to the constraints of time and resources. Those topics were adaptation, zero waste, technology, and land use/vegetative strategies. The Committee plans to take up those topics at a future date.

The subcommittees developed recommendations that were then reviewed by the entire Committee. The recommendations below represent the Committee's consensus as to appropriate actions that can be implemented in the near future, and another set that require further deliberation and analysis. The following recommendations will not be sufficient to achieve major reductions in greenhouse gas emissions, but they do represent an important first step.

## **PRIORITIES FOR ACTION IN THE SHORT TERM**

### **MEASUREMENT & GOALS PRIORITIES**

#### **Identify and Collect Important Data the City Doesn't Currently Have**

There are types of data related to greenhouse gas emissions that are not currently collected, which would be useful to have to develop management strategies. Information on automobile miles actually travelled or transportation fuel consumed within Cambridge, and the number of participants in the NSTAR Green program are examples.

Recommended Actions:

1. ***Conduct an Inventory of Data Needs and Sources.*** A number of organizations exist that could assist the City in developing a richer set of data sources and provide insight on how best to track greenhouse gas emission trends. They include ICLEI, Harvard, MIT, The Climate Registry, Executive Office of Energy and Environmental Affairs, and others. Interested members of the Committee and City staff will work together to engage the assistance of these organizations to inventory data needs and sources. The committee estimates this task can be completed within two months of commencement.
2. ***Disaggregate Data to Make It Useful for Planning and Policy-making.*** Measurement data needs to be in sufficient detail such that it is possible to track progress, or the lack of progress, of strategies and measures. For example, it would be useful to have residential energy use data by fuel and type of structure. Interested members of the Committee and City staff will work with NSTAR, and other sources to assess data needs and how these needs could be met. The committee estimates this task can be completed within two months of commencement.
3. ***Take Steps to Measure and Report Results for Actual Program Implementation.*** The City's inventory currently consists primarily of emission sources and does not comprehensively track emission reduction measures. As a result, the inventory probably overstates the level of emissions to some degree. For example, the replacement of conventional vehicles with hybrid or higher fuel efficiency vehicles is not tracked. And the inventory is not currently set up to account for the expected reductions generated by the Cambridge Energy Alliance. Interested members of the Committee and City staff will work with project proponents to develop a process to collect such information and incorporate it into the inventory. The committee estimates this task can be completed within three months of commencement.

#### **Improve Data Quality**

The context and quality of some of the data used in the City's greenhouse gas emissions inventory is not clear. For example, exactly which types of accounts are counted in residential and commercial electricity and gas use provided by NSTAR has not been requested by the City. Similarly, the MIT and Mirant Kendall Station power plants burn fuel oil periodically when it is less costly than natural gas. These quantities are not captured in the inventory and may therefore represent an undercounting of energy use and greenhouse gas emissions.

Action:

1. ***Assess the quality of data used in the GHG inventory.*** Evaluate the data that underlies the greenhouse gas emissions inventory in greater depth to determine if adjustments need to be made in the inventory methodology. City staff will work with interested members of the Committee to assess the quality of major data sources and

develop procedures to improve the quality where needed. The Committee estimates that this task can be completed within one month of commencement.

### **Develop New Climate Protection Goals to Drive Action and Communicate Progress**

The City has two climate protection goals: reduce greenhouse gas emissions by 20 percent below 1990 levels by 2010 and reduce emissions by 80 percent below current levels by 2050. Given that 2010 is nearing, the Committee recommends that the City re-establish a shorter term goal which means choosing a target reduction amount and target year. Additional sub-goals and qualitative goals may also be useful.

Action:

1. ***Develop a Process to Establish a New Suite of Goals.*** A process is needed for goal setting and to create a measurement system that permits the City to set goals and update them periodically, and assess and communicate progress toward overarching goals and the results of our actions. The process should be ongoing or periodic and respond to progress, new information, new technologies, and opportunities. The selected goals should reflect a balance of achievable, stretch, and aspirational ones. Selected goals should include high-level, overarching goals motivated by a sense of what's needed globally, as well as focused, shorter-term program- or segment-specific targets for action or outcome. City staff will work with the Committee and stakeholders to develop a new suite of goals going forward from 2010. This task can be started following the completion of the actions described above on data quality and comprehensiveness.

### **COMMUNICATIONS AND ENGAGEMENT PRIORITIES**

#### **Understand the Breadth of Climate Change Activities across the Community**

A great deal of climate protection activity is taking place in Cambridge, but there is a lack of understanding as to what will be required to create a successful movement around climate issues in Cambridge.

Recommended Action:

1. ***Conduct an inventory and gap analysis of local climate protection activities.*** The major locally-based grassroots groups have overlapping membership and regular communication (Green Decade, Greenport, and HEET). However, there is less communication with members of local chapters of national environmental groups, or with groups with more specific agendas (church groups, groups such as Livable Streets, CitySprouts) or with neighborhood groups that do not have obviously climate-related issues on their agenda. Interested members of the Committee, aided by staff, will continue its efforts to develop a list of organizations and continue to develop a survey of these groups; carrying out the survey can both begin the work of outreach and engagement and serve as the basis for a comprehensive outreach plan.
  - Develop survey process and hoped-for outcomes and figure out how to tabulate and store the results. Finalize outreach list. Work with Cambridge Energy Alliance to coordinate with its planned community outreach effort. The committee estimates this task can be completed within two months of commencement.

- Conduct surveys with key groups and tabulate results. Re-examine process and decide on next steps. The committee estimates this task can be completed within three months of commencement.

### **Understand the Elements Needed to Create a Successful Climate Movement**

There are existing models for successful political organizing, psychological behavior change, and climate-specific programs as well as knowledgeable individuals in the area who could inform who Cambridge could create a broad, effective movement on climate change.

Recommended Action:

1. ***Conduct research and develop a list of best practices and recommendations.*** Social change models exist, including some directed at climate change, that could provide useful insights. Local experts in community organizing and communications could provide advice. And the literature in this area is rich. Interested members of the Committee, together with staff, will conduct research and develop a list of best practices and recommendations for the City and climate-related organizations to consider. The Committee will also work with staff to develop plans to disseminate this information and organize a meeting to understand strategies and challenges and begin developing relationships and nurturing the efforts of the many organizations and individuals contributing to Cambridge's goals.
  - Develop a research plan. The committee estimates this step can be completed within one month of commencement.
  - Become familiar with the work of Marshall Ganz, Van Jones, the Apollo Alliance, Futerra, Doug McKenzie-Mohr, et al. Develop a plan to draw on local experts and disseminate their insights to local groups. The committee estimates this task can be completed within three months of commencement.

### **Coordinate Communication on Climate Protection Efforts in Cambridge**

Interested members of the Committee can help the City develop the information exchange tools that can bring together climate protection activities in the community and will serve as a resource to CPAC on engaging the community.

Recommended Action:

1. ***Appoint committee liaisons.*** The Committee will designate members to liaise with community stakeholders and City staff on a regular basis. Various means of exchanging information will be developed and implemented.
  - The liaison process can begin right away, to ensure strong communication. Develop a list of three key ways to communicate with CPAC, City, and community. The committee estimates this task can be completed within two months of commencement.

## *BUILDING ENERGY PRIORITIES*

### **Reduce Lack of Energy Awareness Among Businesses, Residents, and Organizations**

Owners and occupants of buildings are often unaware of how much energy they use and its contribution to climate change. They are also often unaware of their buildings' potential for improved energy efficiency and on-site clean energy generation.

Recommended Actions:

1. ***Develop a Building Energy Labeling Requirement.*** California, Washington, DC, and other jurisdictions are mandating building owners to benchmark and report their building's energy performance using the Energy Star Portfolio Manager Tool. Benchmarking enables building owners to compare the energy performance of their building to similar structures. Reporting of the results would help the City understand energy use in Cambridge and plan appropriate programs to improve efficiency and install on-site generation. The Committee with support from City staff will develop a recommendation for consideration.
2. ***Evaluate the Commonwealth's Proposed "Stretch" Energy Code for Local Adoption.*** The Massachusetts Executive Office of Energy and Environmental Affairs and the Board of Building Regulations and Standards has approved a "stretch" energy code that would be about 30% more efficient than the existing code for new construction/major rehabilitation. The stretch code could be voluntarily adopted by the City. The Commonwealth's forthcoming Green Communities program has proposed making adoption of the stretch energy code a prerequisite to be eligible for grants. The City has been following the state's process on the stretch energy code. City staff will evaluate the appropriateness of the stretch code and develop a recommendation in consultation with the Committee.
3. ***Mandatory Building Energy Audits.*** Some jurisdictions, such as Berkeley, CA, Montgomery County, MD, and Austin, TX require an energy audit at the time of a property sale. The Governor of Oregon has proposed a similar requirement. City staff will investigate the authority of the City to adopt such a measure and develop a recommendation as appropriate in consultation with the Committee.

### **Create New Energy Incentives and Support More Use of Existing Incentives**

Improving the energy efficiency of a building usually makes financial sense. And while renewable energy and other on-site generation technology can be expensive, they are an important element of converting to a low-carbon economy. However there are many practical and perceived barriers that prevent energy upgrade projects. Creating more financial incentives and motivating building owners to use the ones that exist will generate more clean energy activity.

Recommended Actions:

1. ***Identify and Promote Energy Efficiency and Renewable Energy Incentives.*** There are various grant and tax incentive programs for residents, businesses, and organizations. The City will work with the Cambridge Energy Alliance to compile a list of these programs and develop ways to disseminate the information and make it easier to access.
2. ***Develop Green Leases.*** The "split incentive" problem stymies many energy improvements. Renters tend to pay energy bills and have no incentive to make capital improvements, while owners do not realize the financial benefits of reduced energy bills.

The concept of a “green lease” is to encourage owners and renters to work together and share the benefits. The Cambridge Energy Alliance, with support from an MIT graduate student, has been working to develop a residential green lease. BOMA Seattle has developed a commercial green lease. City staff will work to engage CEA and other stakeholders such as BOMA Boston to develop green leases for residential and commercial property.

3. **Develop Green Financing.** Some financial institutions offer their customers energy efficient mortgages and green loans. Energy efficient mortgages factor in lower energy costs associated if a residence meets Energy Star Homes standards or other criteria. Green loans are sometimes offered by socially motivated banks and provide lower interest rates for projects such as installing solar energy systems. City staff will work with the Cambridge Energy Alliance to engage local financial institutions and experts to assess options for green financing and work to increase the availability of these tools in Cambridge.

### **Develop Programs and Information for Energy Education and Outreach**

Property owners and renters need reliable, easy-to-access information to understand their options for energy efficiency and renewable energy.

Recommended Actions:

1. **Develop a Web-based Energy Clearinghouse.** Tool kits can be created for different groups of stakeholders (i.e., businesses, residents, community organizations). The information should cover what is involved in energy retrofits of all scales, provide links to the Cambridge Energy Alliance, tax incentives, NSTAR programs including rebates and NSTAR Green, and explain how to organize an “energy barnraising” event such as the HEET initiative. City staff will support the Cambridge Energy Alliance’s efforts to collect information and assess options for hosting and maintaining a local energy information website.
2. **Develop Checklists for Real Estate & Building Professionals.** Checklists could be created for building and real estate professionals about the basic building energy information that they should provide to buyers, sellers, tenants, and other clients. City staff and interested members of the Committee will work with local realtors, contractors, and other professionals to develop checklists and encourage their use.

## ***TRANSPORTATION PRIORITIES***

### **Facilitate the Adoption of Plug-in Electric Vehicles**

A number of automobile manufacturers have announced their intent to produce plug-in electric vehicles for the consumer market in the near future. A number of cities and regions, such as the San Francisco Bay area and Boulder, Colorado, have begun to prepare for the creation of the infrastructure to support these vehicles. There are a number issues that need to be evaluated and coordinated to make the infrastructure workable, including how to prevent exacerbating peak electric demand, efficacy of the vehicles, the choice of infrastructure technology and products, and how to distribute and site charging facilities. Nevertheless, electric vehicles offer great potential for reducing greenhouse gas emissions from the transportation sector.

Recommended Actions:

1. **Consult experts on technology status.** City staff and interested members of the Committee will consult with automobile industry and EV experts in the area, such as the Sloan Automotive Laboratory at MIT and A123 Systems in Watertown, to assess the status of EV technology and deployment and advise the City on optimal timing for the installation of EV infrastructure. NSTAR will also be consulted to understand the impact on the electric distribution system.
2. **Assess strategies to deploy EV-charging infrastructure.** City staff and interested members of the Committee will contact third-party vendors of recharging and battery replacement technology and services to assess the logistics and merits of entering into a public/private partnership to create the infrastructure. The feasibility of a pilot program will be considered as well as other infrastructure creation strategies.
3. **Assess plug-in EVs for City fleet.** City staff in consultation with the committee will assess the feasibility of incorporating EVs into the municipal vehicle fleet and develop a recommendation on the pace and extent of the adoption of this technology by the City.
4. **Investigate funding opportunities for implementation of EV-charging infrastructure.** City staff will monitor grant opportunities and explore possibilities of partnering with private sector entrepreneurs, and make recommendations on which, if any, to pursue.

**Revise Zoning Requirements for Residential, Commercial and Retail Parking**

Current parking planning practices tend to favor generous parking supply and no or low user fees which have unintended and undesirable consequences: they increase automobile travel which exacerbates various problems including traffic congestion, roadway costs, crashes and GHG emissions. Requiring too much parking also increases green development costs, reduces housing affordability, and causes dispersed land use patterns. The special permit review process for large developments has worked to keep employee parking ratios low, but current code requires a minimum number of 1 parking space for each new housing unit in Cambridge. This parking requirement takes a one-size-fits-all approach, even though vehicle ownership varies dramatically for different types of households. Renters, low-income households, seniors, and those living in dense neighborhoods near transit tend to own fewer cars. In fact, 27% of all Cambridge households own no cars at all according to the 2000 Census. In addition, parking is expensive to create -- represented in the cost of land, the cost to build the parking, the loss of leasable space, and the fact that most developers will never be able to recoup the operating expenses over the life of the parking spaces. Work on this recommendation could commence by the end of 2009.

Recommended Actions:

1. **Assess parking policy best practices of other cities.** The committee recommends that the city examine the best practices in other cities and consider appropriate ones for Cambridge.
2. **Analyze and recommend possible modifications to existing parking rules.** The Committee recommends that the city examine the following proposals, vetted through appropriate public processes:
  - a. Converting minimum parking requirements to maximums where non-automobile transportation mode choices are readily available.
  - b. Allowing developers to pay fees in-lieu of building parking, creating a revenue stream that can be used to benefit non-automobile transportation in the neighborhood.
  - c. Updating the Zoning Ordinance with appropriate ratios.

- d. Encouraging shared parking across different uses and discourage single-use reserved parking.
- e. Encouraging the use of existing underutilized parking before building new parking.

### **Revamp the Residential Parking Permit System to Better Manage On-street Parking on Residential Streets**

Changes can be made to the existing residential parking permit program that would prevent spillover parking from non-residential development into residential streets, create a disincentive to owning cars in Cambridge, alleviate the on-street parking crunch to reduce cruising for parking, and allow developers to unbundle the cost of parking from housing (which reveals the true cost of parking and allows people who don't own cars to pay less for housing). A lot of possible strategies exist that will need further analysis to determine impacts. An essential element of the analysis of proposed changes to the regulation of parking is to ascertain that the proposed changes will lead to a reduction in transportation emissions resulting from either avoided trips or a reduction in cruising for parking. Work on this recommendation could begin by the end of 2009.

#### Recommended Actions:

1. ***Analyze and recommend possible modifications to parking permit fees.*** The Committee recommends that the City assess the current fee for a resident parking permit and develop a proposal to revise it. Possible changes could include increasing the permit fee; establishing a sliding fee with the first vehicle having a lower fee than additional vehicles garaged at the same address; charging a different fee for those with and without availability of off-street parking; and assessing the fee based on the efficiency of vehicles. Revenues from increased fees could be used for programs that shift transportation modes from driving to less carbon-intensive modes. Other concepts to explore include:
  - Charge more to people with off-street parking available;
  - A sliding scale that reflects the level of vehicle emissions (as measured through most recent inspection);
  - Redistribution of fee revenues to subsidize low-income household use of non-SOV modes.
2. ***Assess parking benefit districts.*** The Committee recommends that the city study the feasibility and desirability of residential parking benefit districts. Under the current system, only residents can receive parking permits but permits are made available for visitors as well as and, in some cases, some non-resident commercial vehicles. Rather than simply prohibiting non-residents from parking, non-residents could be allowed to pay to park in the resident permit district during times when on-street parking is largely unused (such as during business hours). The City could limit the number of non-resident permits issued based on the number of spaces that are typically available during the day. Gaining support of residents might require that permits be only issued, and their use enforced, for a period when parking supply exceeds resident demand. The additional fees could be used for improvements in the affected district and could have a neutral impact on the City budget.
3. ***Assess zoned resident parking permits.*** The Committee recommends that the city study the feasibility of zoned resident parking permits. This would be similar to the Boston practice where a resident only can park in his or her neighborhood, which prevents commuters from driving across the City to park near work. This could reduce driving within the City and prevent residents from one neighborhood parking in another

- neighborhood. However, it could also lead to an increase in non-commute, retail trips out of the City.
4. **Assess constraining the parking permit supply.** The Committee recommends that the city study the feasibility of constraining the supply of permits by limiting the number of permits available to the actual number of curbside spaces or some percent above the actual number of spaces. This could either be done by neighborhood or citywide. This technique is used in Toronto.
  5. **Assess visitor parking permit program.** The Committee recommends that the city assess the feasibility of changes to the visitor parking permit program to reduce trips. Possible changes should accommodate both visitors and non-car-owning residents who borrow a car occasionally (e.g., Zipcar), while reducing misuse of visitor permits will be considered.
  6. **Assess ways to improve parking rule enforcement.** The Committee recommends that the city identify means of improving enforcement of existing parking rules.

## **PRIORITIES WITH ACTION IN PROGRESS**

### **BUILDING ENERGY PRIORITIES THE COMMITTEE WILL SUPPORT**

#### **Increase the Energy Efficiency of New Construction**

***Green Building Requirements for New Construction*** – The City's Green Building/Zoning Task Force has been charged with developing recommendations for green building requirements on private development in Cambridge. Such an approach should improve the energy efficiency and clean energy capacity of new buildings. The Committee will follow the deliberations of the task force and contribute comments and information as appropriate.

### **TRANSPORTATION PRIORITIES THE COMMITTEE WILL SUPPORT**

#### **Develop a bicycle network to facilitate bicycle travel along key routes within the City, promote intermodal transfer from bicycle to mass transit, and provide comprehensive citywide bike parking infrastructure**

***Bicycle Advisory Committee Analysis*** - Cambridge currently enjoys one of the, if not the, highest rate of bicycling in the region. Compared to the rates of bicycling in many European cities, however, the potential exists to shift many more trips to bicycling. More bicycling increases the visibility of bicycling in the city, which in turn promotes more bicycling. More on-road and parking facilities for bicycles will help the city move closer to a "tipping point" of people seeing and being aware of bicycling, encouraging even more bicycling. More covered parking will also enable more bicycling in less ideal bicycling weather.

The Bicycle Advisory Committee advises City departments and the City Manager on planning for bicycle improvements on streets throughout the community, including on-road bicycle lanes and other facilities as well as bicycle parking. The committee is in the process of analyzing bicycle travel throughout the city and is working to identify gaps in the infrastructure, both in terms of on-road and parking facilities, as well as ways to facilitate inter-modal trips involving bicycles and develop a strategy to address these gaps in a comprehensive and strategic manner. CPAC will follow the work of the Bicycle Advisory Committee and City departments and work to identify linkages to other transportation initiatives where CPAC could be involved and help to coordinate initiatives.

## **Implement On-street Meter Technology to Better Manage Short-term Customer Parking Supply**

On-street parking management in retail/commercial districts can be improved to support short-term customer parking and discourage long-term commuter parking. Better managed short-term customer parking supply can prevent drivers from circling in search of a parking space.

1. The Committee recommends that the City undertake a feasibility/policy analysis for on-street customer parking management in Harvard Square, Central Square, Inman Square, Porter Square, and East Cambridge. The analysis should consider the following components:
  - a) Demand-responsive pricing—Charge the lowest price possible that results in one or two vacant spaces per block, to prevent drivers from circling the block hunting for a space. Goal: 85% occupancy and 15% vacancy.
  - b) Location-specific pricing—Charge more for parking in desirable areas, such as Harvard and Central squares, slightly less in Inman Square, and where there is plenty of available curb parking, potentially make it free.
  - c) Parking improvement districts—Commit the revenue (above what is currently diverted to the general fund) to be reinvested on the blocks where the money is paid. Reinvestment examples include cleaning and/or rebuilding sidewalks, installing lighting, installing bicycle racks, installing street furniture, putting wires underground, so the vast majority of people benefit.

## **IDEAS NEEDING FURTHER DELIBERATION AND DEVELOPMENT**

### **TRANSPORTATION**

**Improve traffic patterns and lane layout on Massachusetts Avenue and other key transit routes to facilitate bus, high occupancy vehicle and bicycle travel.** The goal of this idea would be to facilitate rapid buses, high occupancy vehicles, and bicycle travel while reducing congestion and improving safety for motorists, cyclists, and pedestrians. Implementation might involve dedicated lanes for buses and HOVs either all day in both directions or alternately inbound and outbound during rush hours; dedicated bicycle lane separate from the bus lane; consideration of a central “switch lane” that would be inbound in the morning rush hour and outbound in the afternoon rush hour; conservation of parking along major streets; and prevention of traffic displacement onto neighborhood streets. There are many complicated issues that need to be understood before this idea could be developed into a feasible proposal.

### **NEXT STEPS**

The Climate Protection Action Committee will submit this report and its recommendations to the City Manager. The committee will continue to work with staff to help set priorities and appropriate timetables for various action items.