



The City of Portland

MUNICIPAL CLIMATE ACTION PLAN

Prepared by the Portland Municipal Climate Change
Working Group

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ACKNOWLEDGEMENTS

The Municipal Climate Action Plan was prepared by
The City of Portland Municipal Climate Change Working Group

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Introduction

"Climate change may be the greatest challenge to our City since the rebuilding after the Great Fire of 1866 and it will require of us an honest, committed and sustained commitment to change."

The Mayor's Sustainable Portland Taskforce final report, Nov. 2007

Global warming is a serious problem with major implications for both the global and local environment. Unless communities, such as the City of Portland, take immediate action to reduce greenhouse gas (GHG) emissions our region may see its average mean temperature increase by as much as 10 degrees Fahrenheit during the next century. This would result in several negative impacts including disruptions in the supply of food and energy, damage to public infrastructure from more frequent and more extreme weather events, a higher rate of infectious diseases and a higher susceptibility to flooding. In fact, several parts of the City already experience flooding during astronomical high tides. As a coastal community, the city of Portland is vulnerable to the effects of climate change and the municipal government should lead community efforts to prevent and mitigate these impacts. To do this, the City will need to model appropriate conservation practices by adopting energy efficient modes of operation and decision making.

In the summer of 2001 the City of Portland's elected officials signed a resolution pledging to participate in the Cities for Climate Protection (CCP) Campaign sponsored by ICLEI. By doing so they joined officials from hundreds of other cities around the world who believe that action at the local level serves as the foundation of the international effort to fight global climate change.

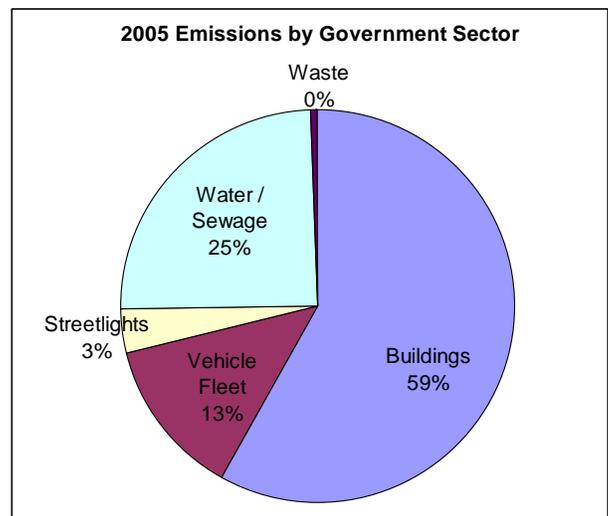
As a participant in the CCP Campaign, the City committed to complete a 'Five Milestone' Process:

1. **Complete a Greenhouse Gas Emissions Inventory and Report**
2. **Set an Emissions Reduction Target**
3. **Complete a Local Climate Action Plan to Reduce Greenhouse Gas Emissions**
4. **Implement the Local Climate Action Plan**
5. **Monitor the Impact of Emissions Reductions Measures**

Milestone 1: The first emissions inventory was completed in 2001 and updated in 2005 with assistance from interns funded by Clean Air Cool Planet. These interns gathered energy consumption data from a variety of sources including Northern Utilities, Central Maine Power, Union Oil and City personnel and entered it into specialized modeling software provided by ICLEI. The software totaled the energy usage from the various departments and created reports detailing the amount of carbon dioxide emitted. This information was used to create a 2005 baseline measurement of equivalent carbon dioxide emissions (eCO₂) for the city of Portland.

Milestone 2: In 2005 then Mayor Jill Duson signed the Governor's Carbon Challenge. By doing so she committed the City to reduce its CO₂ emissions to 10% below 1990 levels by 2020. This addressed the second milestone of the CCP campaign.

Milestone 3: In the summer of 2007 City Manager Joseph Gray established a diverse working group



consisting of representatives from a variety of departments. The group's goal was to develop a series of steps the City could take to reduce energy costs and GHG emissions. This group, dubbed the Municipal Working Group, met throughout the summer and fall.

The Municipal Working Group (MWG) reviewed the inventory which indicated that emissions from municipal operations in 2005 amounted to nearly 41,000 tons of equivalent CO₂. We learned that 59% of these emissions came from energy consumption in the City's buildings and facilities, water and sewage systems accounted for 25% of the emissions and the vehicle fleet contributed 13% of the emissions. Streetlights and traffic signals accounted for a smaller portion and emissions from waste incineration were negligible.

Several Departments have already begun to take action independent of a central plan basing their efforts on best practices in their areas of responsibility. Examples of such efforts include the installation of LED lights in most traffic signals, the installation of energy efficient T8 fluorescent tubes in most buildings and the adoption of biodiesel to fuel the municipal vehicle fleet. The School Department has recently enacted an energy policy to guide conservation efforts by its building users.

The City of Portland paid nearly \$8 million for its energy use in 2005. This represents a 30% increase from 2000. Energy costs have soared higher since then and the price of oil recently peaked at over \$110 a barrel. Costs continue to rise.

With these factors in mind, the MWG drafted a series of recommendations. This report and its acceptance by the City Manager bring the City to the third milestone of the CCP campaign.

Milestones 4 & 5: If the City of Portland's local government hopes to achieve the emission reduction goals it has set for itself the City Council and the City Manager will need to maintain and extend their commitment to energy efficiency and sustainability. Their guidance will serve as the framework of staff efforts. To become sustainable, though, the initiative will require every City employee to participate. It is the individual employee who will decide whether to turn out a light when s/he leaves a room, who will decide whether or not s/he really needs to drive a vehicle to a meeting a few blocks away or who will throw some paper in the trash instead of the recycling bin. *Unless we foster an organizational culture that values conservation of resources we will not succeed.*

The members of the MWG are pleased to present the results and recommendations to the City Manager and the City Council. The MWG looks forward to implementing these measures and by doing so leading the way into a more sustainable future for the community we serve.

GENERAL RECOMMENDATIONS

1. Create a “Green Team”

The City Manager should create a “Green Team” made up of representatives from all departments to assist with the implementation and adoption of Action Plan items. This team should take primary responsibility for several recommended action items including peer education and behavior modification efforts and coordination with environmental groups outside the City. Examples may include: Portland Green Streets and Commute Another Way Day, among others. The Green Team should also assume primary responsibility for monitoring the City’s progress towards its emissions reduction goals and updating the action plan on a regular basis.

The City has had positive experiences recruiting groups of employee volunteers to work on important issues facing the City family. Examples include the Diversity Team and the Health Improvement Team. These programs have particular value because they disperse responsibility beyond the formal management hierarchy and empower interested employees to have significant impact on an initiative they feel strongly about. Members of these teams serve as ambassadors for their particular initiative and work to create interest in it amongst their coworkers. This social networking represents an effective tool for creating more widespread awareness. Hallway chats and informal discussions amongst peers about “green issues” will help create a more receptive environment for the message.

Moreover, a City Green Team will be able to coordinate and cooperate with school, institutional and regional environmental efforts to share best practices and join in regional efforts across bureaucratic and municipal boundaries.

2. Develop a Behavior Change Program for Employees

City employees should make conscious efforts to reduce the amount of energy they consume during the course of their work. This can be accomplished through basic energy conservation measures such as turning off lights when leaving rooms, limiting the use of space heaters and air conditioners, limit unnecessary copying and printing, eliminating unnecessary trips in City vehicles, walking to meetings and turning off computers and computer equipment when not in use. Unfortunately, these basic procedures are not common employee behavior. Creating a culture of conservation will require specific efforts to modify employee behavior. These should include a variety of steps including education and the implementation of specific policies. In addition, individual departments should develop specific energy reduction measures related to their specific operations. These plans should be submitted to and endorsed by the City Manager. Special recognition can be used to encourage compliance.

Part of the behavior change program would include promoting the in-house recycling program. The City has adopted single sort recycling in all City and School buildings. This has been well received by staff and participation has been good in most buildings. (In City Hall, for instance, the custodial staff has been proactive in providing recycling receptacles in convenient locations and collection has increased from once each week to twice each week.) Increased promotion and awareness could lead to further success in this area.

Clean Air Cool Planet has offered to assist with the implementation of a City wide behavior modification program. The City should partner with them for this effort. Coordination can also be combined with active and effective Health Improvement Team which sends daily “healthy

living” tips to employees. The Green Team should assume primary responsibility for promoting and managing this effort.

3. Foster and Encourage Student Support

Educational efforts around reducing energy consumption and changing employee behavior cannot be effective without continuous effort. While many employees have a genuine interest in supporting such efforts, their job responsibilities limit the time they have available. The City should supplement staff capacity by partnering with local schools – high schools, colleges and universities to recruit motivated students who could fill internships, work study jobs, work for academic credit opportunities and volunteer positions. Assignments could include researching energy reduction efforts in other communities, creating and implementing educational programs for staff and assisting the Green Team with their efforts. Students would provide valuable work for the City while getting an opportunity to learn first hand about the workings of municipal government. They could bring creativity and energy to the City's efforts at a very low cost.

The City has worked with student groups on a limited basis with great success. Last year the Portland High School Environmental Club created an educational video about curbside recycling for the City web page and for cable access TV. This year, Muskie Institute students are working with the Energy and Environmental Sustainability Committee to research sustainability efforts in other communities and document BMPs gleaned for these communities. These experiences suggest that partnerships with schools can be very useful.

Cool Air Cool Planet maintains regular contact with its educational and school partners. We should take advantage of this resource to develop and maintain relationships with schools. In addition to continual updates of the Greenhouse Gas Emissions Inventory and Report, college or graduate level interns should be employed to create metrics for the recommendations of this plan for continual measurement and tracking.

4. Develop an Environmental Preferable Procurement Policy

The choices the City makes regarding the goods and services it purchases can have a major impact on the environment and offer an important opportunity to visibly demonstrate a commitment to sustainability. Ensuring that City purchasing policies include green standards such as a mandate for recycled content, a local vendor/provider preference, reduced toxicity and a full life cycle analysis of major purchases such as heavy equipment and vehicles would model sustainable spending to Portland residents and businesses.

Many communities around the country have already instituted green procurement policies and can provide the City with valuable case studies. ICLEI is currently developing an implementation guide for green procurement. The Green Team should work closely with their staff to implement this measure.

5. Participate in Educational and Informational Partnerships and Events

The City has chosen to participate in a number of climate change initiatives including the Governor's Carbon Challenge, Cities for Climate Protection and have partnered with Clean Air Cool Planet and ICLEI. These relationships have proved valuable and should continue.

The City should also participate in other relevant initiatives such as the EPA's Cool Cities program, managed locally by GPCOG which will allow us to access additional informational and, potentially, financial resources.

The City should actively participate in Earth Day events, Maine Recycles Week and support the efforts of local groups such as Portland Green Streets. Doing so would bring greater public attention to these events and organizations while helping us inform the greater community about our efforts.

6. Update our Emissions Inventory

In order to monitor the City's progress the city will need to commit to updating the emissions inventory every five years at a minimum.

7. Conduct Public Outreach

The City should regularly inform the public about its energy reduction and climate change efforts. It is important to engage community members in a dialogue about climate change and energy conservation efforts to ensure that they understand that they are partners in a community wide effort. To facilitate this effort, City staff should discuss conservation efforts with members of the community whenever possible and perhaps include this as topic of discussion in the HCD meeting held each year by the District City Councilors. As energy costs continue to rise, the public will be very interested to learn what measures have been taken to reduce consumption and reduce costs.

A comprehensive Sustainable Portland website should be created that can document the City's climate change efforts and provide community members with resources to assist with their own climate change reduction efforts. Energy conservation efforts should be transparent to the public. Information and data documenting fleet fuel consumption, electrical consumption, natural gas consumption and oil consumption from year to year should be available to the public.

ENERGY USE AND FACILITY MEASURES

1. Commission Comprehensive Energy Audits For All City and School Department Buildings

The first and most important step to the City should take to reduce energy consumption and GHG emissions is to commission comprehensive energy audits in all City and School Department buildings. The data collected during green house gas inventory indicates that heating and maintaining buildings represents the greatest area of energy consumption in City operations. While inventory data shows which buildings are the highest users of energy, it does not determine what factors contribute to this usage. Energy audits conducted by knowledgeable energy professionals will help us to determine the appropriate steps to reduce energy consumption. *Until this information is documented the city will be unable to significantly progress toward energy reduction goals.*

Explore Performance Contracting to Act On Recommendations From Energy Audits

Many cities have used performance based contracting with Energy Service Companies (ESCOs) to fund building upgrades. These companies take the result of an audit (or complete their own) and recommend projects to improve energy efficiency. They then negotiate a contract with their client that bundles the recommended efficiency measures into a single project and allows the client to pay for the capital improvements from the savings recouped from the installed conservation measures. The Boston Housing Authority, for instance, has used this arrangement to fund over \$50 million in capital improvements. Some of these improvements include installation of more efficient boilers, low flow toilets, "cool roof" retrofits, solar arrays and combined heat and power systems. Other Maine communities have begun to recognize the value of performance contracts. The City of Biddeford and the City of Bangor have each recently embarked on large capital improvement projects using this method of financing.

Contracting with an ESCO appears to offer the quickest and most economical way to achieve significant reduction in energy consumption and green house gas emissions from City buildings. It offers the opportunity to lump a number of building improvements into a single package with a target date for completion without requiring an upfront expenditure of City funds. It also offers a comprehensive approach to efficiency improvements that would not rely on identifying and attempting to fund improvements to individual buildings each fiscal year. Exploring this option should be the highest priority for the City.

The Maine Public Utilities Commission is able to offer the City assistance and expert advice regarding ESCOs and performance contracting. The City Manager's Office has already had an initial meeting with them to explore performance contracting and further exploration will help to determine the merits of this approach. Additional outside consultation may be needed to ensure that any potential contract fully meet the City's needs.

2. Upgrade Lighting, HVAC and Water Systems in Existing Buildings

In the absence of a comprehensive energy performance contract to upgrade systems in City buildings, or in buildings that are not included in such a program, a comprehensive strategy should be created to maximize the energy efficiency. This would include adopting a range of measures *as indicated by an energy audit* such as additional insulation, replacing fixtures, adding motion sensors to light switches and replacement of heating and cooling systems. The City should also upgrade plumbing fixtures in an effort to efficiently use water because, according to data in our emissions inventory, electricity use by the Portland Water District to treat and pump water is a significant contributor to green house gas emissions.

Facilities Management is mindful of energy conservation and has already begun important changes. For instance, they are using T-8 bulbs in most lighting and have worked to ensure that buildings are properly weather proofed. However, MWG recommends creating a strategy and timeline for completing any necessary upgrades identified through an energy audit.

3. Adopt a Comprehensive Energy Policy for City

In August, 2007 the Portland Public Schools adopted a comprehensive energy policy which describes the responsibility all school employees, students, volunteers and building users have to conserve energy. The policy provides specific procedures that govern the use of heating, cooling and lighting systems in school buildings in order to minimize waste. It also designates

specific individuals to be responsible for ensuring that building users understand and follow the policy.

The City should adopt the School Department's energy policy as a model with the understanding that it will need to be modified to accommodate the wide range functions City operations encompass.

Many of the policies that should be adopted include "common sense" measures (such as turning out lights in empty rooms) that will need to be reinforced through an employee/building user behavior modification program.

4. Adopt green building standards for municipal buildings

The City should adopt proven, verifiable performance standards to ensure that our buildings are designed and built to use resources efficiently. The U.S. Green Building Council's LEED (Leadership in Energy, Environment and Design) standards are the most well known rating system and offer the benefit of broad public acceptance and recognition. Buildings designed to meet LEED standards use energy and water resources efficiently and are healthy for those living and working in them. The certification process adds additional cost to building projects and the City should weigh the cost of certification versus its benefits on a case by case basis.

5. Purchase Renewable Energy

In accordance with green purchasing initiatives, the City should include a certain percentage of green power in its energy portfolio. Green power currently costs significantly more than energy from the standard offer so this measure may be a longer term goal. As energy prices continue to rise, green power may become more cost competitive. Purchasing even a small portion of green power will demonstrate interest and commitment while working to increase demand.

6. Explore Small-Scale Energy Generation Project

The City should explore cost effective small-scale energy generation demonstration projects on City facilities. Such projects, including wind and solar power, offer credible opportunities to show how the City of Portland can play a part in reducing dependence on carbon emitting energy sources. Community support for locally produced energy is growing and the City should be open to using City land in private/public partnerships that reduce overall carbon emissions and potentially benefit the Portland taxpayer.

TRANSPORTATION RECOMMENDATIONS:

1. Update Policies Guiding Use of City Owned Vehicles –Target Reduction

The City should review policies regarding the use of City owned vehicles and amend them to minimize the use of fuel. Examples of such measures could include:

- using the smallest practical piece of equipment for a job
- organizing work assignments to reduce vehicle miles driven
- requiring route drivers to complete routes as assigned
- minimizing the use of City vehicles for personal use

The City Manager should set a reduction target for gasoline and diesel fuel consumption by vehicles in the City fleet and task the Fleet Users Committee with working to implement the reductions.

2. Purchase and use route optimization software

All City operations that regularly use vehicles should develop plans and policies for shared trips, car pooling and trip avoidance. Technology such as Global Positioning and Geographic Information Systems should be used to analyze routed service for maximum efficiency and reduced vehicle miles.

The City should purchase route optimization software to create the most efficient possible routes for operations such as trash and recycling collection, snow plowing, street sweeping and any other operation that requires route driving. This software would integrate with our current MIS program to provide program managers with detailed maps and routes that they can provide to their drivers. Many communities have found that they are able to reduce the number of vehicles used to provide a service if they optimize their vehicle routes. Inefficient routing wastes significant amounts of fuel and also leads to inconsistent service to residents.

3. Enforce Anti-Idling Regulations:

The City implemented an anti-idling policy for its fleet in January, 2006. Anecdotal evidence suggests, however, that City employees have not fully embraced or implemented it. In the short term, the City Manager should send a communication to City employees reminding them of the anti-idling policy and Department Heads should follow up to ensure that vehicle users receive specific information and training about the policy.

The overall success of the policy will rely on individual employees understanding and buying into the rationale behind the policy. The Fleet Users Committee, which has representatives from all of the City departments that operate vehicles, should assume the task of conducting an ongoing peer educating and compliance campaign in conjunction with other fuel conservation efforts.

4. Transportation Demand Management for Employee Commuting

The City should assist employees in their efforts to conserve fuel during their daily commute to work. This includes promoting carpooling by maintaining a bulletin board where interested employees can make arrangements, offering the opportunity for telecommuting where applicable, encouraging the use of public transportation and promoting bicycling or walking to work. City employees should be given equal or greater incentives to choose non-automotive commuting options over employer-paid parking.

Many employees report that the lack of showering facilities in City Hall discourages them from walking or bicycling. Installing such facilities would promote more active lifestyles and reduce emissions created by vehicular commuting.

Most City buildings currently do not have adequate (or any) bike racks for employee or public use. Bike racks should be a priority and installed in convenient and secure areas to promote the use of bicycles by employees and the public.

STREET LIGHTING RECOMMENDATIONS

1. Retrofit Mercury Streetlamps to More Efficient Model

The City has had great success with transitioning traffic signals to energy efficient LED technology. Unfortunately, our nearly 40,000 street lights still use high pressure sodium bulbs - on old, energy inefficient technology which cost over \$1 million annually to operate. Newer technologies offer the potential to significantly reduce electrical consumption and save money. Some cities have begun installing LED light fixtures, which offer amazing potential to reduce electrical consumption. The City should work to upgrade our street lights as soon as possible with such energy efficient fixtures. While this promises to be a large expense, the pay-off in cost savings and GHG emission reductions would be significant. A performance contract with an ESCO or another type of financing arrangement may make this fiscally realistic. We should partner with the Maine PUC and Central Maine Power (who owns many of the lights) and work to implement this measure in the near term.

WATER AND SEWER RECOMMENDATIONS

1. Upgrade the Pumps and Pump Station Buildings

The City's wastewater system relies on a network of large pumps to move large quantities of storm water and sewer effluent through underground pipes to the East End Water Treatment Facility. These pumps and the buildings housing them use tremendous amounts of energy. This system is a vital part of the community's infrastructure and it is important that it be maintained and operated at the highest level of efficiency. To that end, the MWG recommends that the City make several improvements in this area.

The City should replace existing pumps with energy efficient variable flow drive technology. This would significantly reduce electrical consumption by regulating pump speed according to the flow of water in the system.

The buildings housing the pumps must be temperature controlled to ensure proper operation of the equipment they house. Consequently, all of these structures should be inspected to ensure that they are properly weather proofed. The City should also consider the following recommendations:

- Eliminate windows or replace them with energy efficient applications
- Improve the performance and location of all thermostatically controlled heating devices in the pump stations
- Establish a defined minimum temperature for each pump station based on electrical control manufacturer's recommendations
- Connect temperature sensors to a fully working SCADA system so that heating system failures can be quickly detected and repaired
- Convert oil based heating systems to industrial electrical space heater applications

The pump station buildings must also be ventilated to ensure safe interior air quality. Current practice relies on continual venting. The City should upgrade the HVAC systems in the pump stations and maximize the use of timers to facilitate adequate ventilation within the structures.

CONCLUSION

The City's updated green house gas emissions inventory indicates that the City's carbon footprint rose significantly between 2000 and 2005. Despite measures taken by individual departments there is little reason to believe that this growth stopped. It is now clear that the City of Portland must rethink its standard operating procedures. We need to develop an awareness that using energy has consequences on the environmental level – carbon emissions – and on an economic level – cost. Each City employee will need to apply this principle to daily work activities. Changing long established but energy inefficient work practices will be difficult for many. However, doing so will make us better, more responsible stewards of our community's physical and social infrastructure.

The wide ranging work individual departments have done over the last several years to reduce energy consumption will serve as a solid foundation for further, more coordinated efforts. Many employees have already begun to understand the importance of bringing efficiency to municipal operations and will continue to support these efforts. Many employees will undoubtedly offer new and innovative suggestions that have not been explored. We are anxious to hear such ideas and to harness the energy and creativity of the City workforce as we work to achieve our emissions reduction goals. It will take a concerted effort on the part of City staff at all levels of responsibility and in all departments to reduce eCO₂ emissions to 10% below 1990 levels by 2020

Luckily, there is access to support and technical assistance from governmental agencies at the state and federal level as well as support from non-governmental organizations such as ICLEI, Clean Air Cool Planet and the U.S. Conference of Mayors. These groups have been instrumental in helping complete the emissions inventory and they stand ready to continue their support. We will need to maintain close relationships with these groups as we move forward in order to benefit full from the assistance they can provide.

Increased energy use is not a given. Many large and small companies, institutions, and municipalities in Maine have made significant progress in not only slowing growth in carbon emissions, but in achieving actual reductions. The City of Portland must show leadership and commitment to succeed in this effort.