SUBJECT: Corporate Energy Policy (City Wide) - (PW07127)  
(Outstanding Business List: Public Works Committee and Audit & Administration Committee)

RECOMMENDATION:

(a) That the City of Hamilton adopt the Corporate Energy Policy and its recommendations attached as Appendix A to Report PW07127 and that all Department Heads be directed to implement the policy recommendations;

(b) That an Energy Conservation Initiative Reserve be created to fund initiatives related to energy conservation and demand management as well as the Office of Energy Initiatives (OEI);

(c) That the sources of funds for the Energy Conservation Initiative Reserve include billing recoveries, project incentives as well as current and future savings identified through projects managed by the Energy Office;

(d) That all City Boards and agencies be encouraged to adopt policy and actively participate on the Corporate Energy Steering Committee;

(e) That the Office of Energy Initiatives report on the progress and results of the Corporate Energy Policy initiatives and Energy Conservation Initiative Reserve, annually;

(f) That the issue related to Peak Oil Report be removed from the Public Works Committee Outstanding Business List and the issue related to Energy Initiatives Update be removed from the Audit & Administration Committee Outstanding Business List.
EXECUTIVE SUMMARY:

Further to the Council meeting of May 11, 2006, at which time the Peak Oil report was received, the Office of Energy Initiatives (OEI) through the General Manager of Public Works, was charged with developing a Corporate Energy Policy (Energy Policy) for City owned Facilities and Operations. Council directed that the Energy Policy address the following recommendations:

(a) That the “Peak Oil” report be referred to the General Manager of Public Works in order for Staff to further investigate and report back to the Public Works, Infrastructure and Environment Standing Committee on the following:

1) That the General Manager of Public Works be directed to develop an Energy Management Policy, and forward to Council for approval;

2) That the Energy Management Policy:

   aa) Recommends targets for reduced energy use in City Facilities and timelines for achieving same;

   bb) Recommends strategies to achieve those targets;

   cc) Recommends a framework for the use of renewable technologies in supplying energy to new City Facilities; and

   dd) Provides recommendations to Council on the feasibility of designing new City Facilities to LEED standards, or equivalency, including a policy to encourage LEED certification for new buildings to be constructed in Hamilton and that new buildings constructed by the City of Hamilton continue to include requirements for pricing and analysis of LEED certified consultant services within the request for proposal specifications until such time as the design standards are approved by Council;

   ee) Provides recommendations to Council on the feasibility of producing energy to operate City Facilities and/or partner facilities (e.g. co-generation facilities, district energy facilities).

A further motion was received by Council which requested that:

The Manager of Energy Initiatives report on the feasibility of recommendations on reducing energy use by two-thirds by 2018, and well as ideas on producing energy.

Council provided further direction to other departments within the City, such as Economic Development, Planning and Transit, which are responsible for making recommendations on the items directed to their departments/ divisions.

This report and the accompanying Energy Policy (Appendix “A”) outline a number of recommendations and strategies in response to Council’s request. This report also proposes that an Energy Reserve be established to permanently fund the OEI, along with other initiatives related to energy conservation and demand management.

The City of Hamilton’s Corporate Energy Policy is specifically designed to:

- Facilitate the achievement of City-wide energy reduction targets
- Address legislated reporting requirements
- Provide for ongoing Energy Monitoring and Targeting of utility usage
Define policies re capital investment related to energy
Define policies related to energy procurement.

The Energy Policy incorporates the following key components:
- Strategy for Achieving Energy Reduction Targets
- Monitoring and Targeting of Existing/New/Retrofitted Buildings
- Conservation and Demand Management Investment: Existing Buildings:
- Conservation and Demand Management Investment: Major Renovations / New Construction
- Implementation of Eco-Responsive Energy Management Policies

Specific Policies re Capital Investment Related to Energy
- Energy Management Standard - Central Building Automation System control
- Incandescent lighting
- Roof Capital Replacement Evaluation
- Energy Efficient Equipment Purchasing
- Electricity Generation, Cogeneration, District Energy
- Back-up / Emergency Power Systems

Specific Policies re: Energy Procurement
- “Traditional” Energy Procurement
- Green Power
- Emissions Trading
- Renewable Energy

Please refer to the Energy Policy in Appendix “A” for further detail.

Environment Hamilton recommended that the City pursue an After Hours Lights Out program in their recent Short Term City Response to Climate Change Report. Staff agrees that this would be a positive initiative in terms of reducing energy use and sending a message to the public that the City is not wasteful in its energy use by keeping the lights on after hours. The Energy Policy outlines the recommendations on developing an After Hours Lights Out Program.

Targets and Timelines for Reducing Energy Use in City Facilities and Operations
The Energy Policy calls for targeted energy reductions in energy intensity of City owned facilities and operations of:

<table>
<thead>
<tr>
<th>Year</th>
<th>Targeted Energy Reduction</th>
<th>GHG (eCO₂) Reduction in tonnes</th>
<th>Cumulative Energy Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>3.0%</td>
<td>7,975</td>
<td>$2,042,318</td>
</tr>
<tr>
<td>2012</td>
<td>7.5%</td>
<td>18,369</td>
<td>$8,713,473</td>
</tr>
<tr>
<td>2020</td>
<td>20%</td>
<td>46,086</td>
<td>$49,133,085</td>
</tr>
</tbody>
</table>

Note:
(1) Savings from Energy reductions are due to energy Conservative and Demand Management (CDM) activities only.
(2) All energy savings through to 2020 are based on 2007 utility rates with no increases

These targets equate to about a 1.5 % reduction in energy per year. The report recommends that 2005 be used as the base year for measuring results.
The Energy Policy recommendations create a road map to initiate energy CDM plans and processes within individual departments and divisions. City Council and Senior City Staff’s commitment to the Energy Policy and its foregoing recommendations are critical to encouraging staff involvement and buy-in to the program. The City’s success will come from changing the way we think about energy CDM in our daily working activities. It brings CDM to the forefront of all facilities and operational retrofits, for greater budget control, reduced costs, reduced emissions and an overall better quality of life for staff and the community. The Energy Policy also provides a methodology for capturing and recording our results and reporting on our successes, through the City’s new Energy Management Software System.

This report also proposes that an Energy Reserve be established to permanently fund the OEI as well as other initiatives related to energy conservation and demand management. By establishing this energy reserve it will enable the City to fund various energy initiatives and activities that will continue to provide the City with an ongoing return on its investment. It is proposed that Energy Reserve be created to fund the following activities:

- Fund the Public Works, Office of Energy Initiatives
- Payback capital reserves
- Energy cost increases or budgetary shortfalls during the current budget cycle.
- Energy audits and feasibility studies
- Pilot projects for new energy technologies and renewable energy projects
- Fund incremental retrofit project costs of higher efficiency options.
- OEI website, educational and energy awareness programs

The risk to the City of not approving a steady source of funding to the OEI is that the City loses the ability to stabilize energy costs and to implement projects to reduce energy use and lower greenhouse gas (GHG) emissions. This report outlines how the OEI can be funded through the creation of an Energy Reserve. The Energy Reserve would be funded through various savings initiatives. Table 1, below outlines the anticipated savings/avoided costs for 2007 related to energy on a corporate basis, including City Housing Hamilton and Water and Waste Water.

**Table 1 - 2007 Projected Savings/ Avoided Costs**

<table>
<thead>
<tr>
<th>2007 Estimated Savings From</th>
<th>Saving/ Avoided Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy CDM Activities</td>
<td>$245,466</td>
</tr>
<tr>
<td>Commodity Procurement/ Strategies</td>
<td>$531,336</td>
</tr>
<tr>
<td>Rate Structure Savings</td>
<td>$1,803,382</td>
</tr>
<tr>
<td>Incentives/ Funding</td>
<td>$169,734</td>
</tr>
<tr>
<td>Billing Verification &amp; Validation</td>
<td>$307,848</td>
</tr>
<tr>
<td>Total:</td>
<td>$3,057,765</td>
</tr>
</tbody>
</table>

**Note:** savings and avoided costs are based on direct savings to the Levy or Rates or through avoided costs (costs that the City did not have to incur due to actions taken).
Corporate Energy Steering Committee

The report and Energy Policy also recommend the formation of a Corporate Energy Steering Committee (CESC). The CESC is necessary to the success of the Energy Policy. The CESC will provide a vehicle for key staff to work together in developing energy plans and strategies for their departments/divisions. It is important the CESC to be able to respond quickly and to have the ability to make key decisions. To do this it will be important to ensure that the right staff are at the table. The CESC will have lead responsibility and accountability for achieving energy reduction targets. The intent is that the CESC will have a similar committee structure to the Central Fleet Advisory Committee.

BACKGROUND:

In 2005 City Council approved the concept of an energy office (now the Public Works, Office of Energy Initiatives) to be created to formalize and centralize responsibility for energy management in the City by focusing on how and where the City of Hamilton is spending money on energy and to look for ways to save and reduce energy consumption.

It was anticipated that the energy office would, amongst other functions:

- Develop and implement billing verification strategies;
- Develop purchasing strategies and practices for commodities (natural gas, electricity and eventually fuel (diesel, unleaded, and biodiesel));
- Establish consumption reduction targets and guidelines for the use of renewable energy sources in City Projects (subject to Council approval as part of an Energy Management Strategy or plan to be produced);
- Develop and project manage energy retrofit projects;
- Generally raise awareness in the corporation with respect to energy use.

In May 2006, the Office of Energy Initiatives was established with the hiring of the manager. In January and March of 2007, two senior project managers joined the OEI team. To date the City’s new energy program has been a tremendous success. The role of the Office of Energy Initiatives (OEI’s) is to manage energy supply and work with all City departments with their CDM initiatives on a corporate basis. OEI responsibilities include:

1. Corporate Energy Policy
2. Commodity Procurement
3. Utility Rate Management
4. Utility Bill Errors and Adjustments
5. Energy Monitoring, Verification, Benchmarking and Analysis
6. Metering, Sub-metering and Customer Utility Billing
7. Energy Conservation and Demand Management
8. Regulatory Compliance and Reporting
9. Environmental Emission Reductions
10. Stewardship and Education

Given the increasing significance of energy initiatives, staff feels it would be prudent to rename the Fleet and Facilities Division to Energy, Fleet & Facilities to more aptly
describe the portfolio of services offered and to recognize the importance of Energy Management within the Corporate Structure

**ANALYSIS/RATIONALE:**

**WHY THE NEED FOR AN ENERGY POLICY?**

The City of Hamilton, like most Ontario municipalities, is challenged with significant budgetary pressures due to reduced levels of funding and increasing costs. Hamilton also has the added pressure of an aging infrastructure which will require significant investment over the next several years. It makes good business sense to ensure that these infrastructure upgrades consider energy CDM at the forefront of the project. The incremental cost of Energy efficient upgrades will not only pay for themselves over time, they will also deliver the majority, if not all of emission savings targeted under this policy.

In terms of energy supply and pricing, reports like the “Peak Oil” report raise awareness that energy costs will continue to increase and the impact of these rising prices can be severe to the City and our local economy. What is unknown is how quickly energy prices will rise over the next several years and to what degree. Given the way energy markets tend to perform, the bigger challenge now is managing for volatility of pricing. The reality is that energy prices are now globally-driven rather than locally-driven. Ontario alone will need to invest billions of dollars, over the next decade, in utility infrastructure and new electricity generation to replace the aging supply base that exists today. With the increasing focus on global warming and the environment, we have a situation which demands a new technological leap for producing clean and green energy at a reasonable cost. If this situation is not addressed, maintaining energy costs at today’s rates over the longer term will be a significant challenge. The best way to mitigate the City’s exposure to energy market volatility and rising prices is to use less energy, through CDM initiatives as outlined in the Energy Policy. There are (3) key drivers that emphasis the need to for Corporate Energy Policy now and a change in the way the City approaches all energy related retrofit and new construction projects. The key drivers behind the Energy Policy are:

1) Energy costs
2) Energy and the Environment
3) New regulatory requirements

**1) ENERGY COSTS**

The City of Hamilton currently spends about $40 million annually on nearly 4,000 electricity, natural gas and water utilities accounts. Small increases in energy costs can quickly impact the bottom line. A 2.5% increase in energy cost means another million dollars the City has to spend on energy. The graph below illustrates how the City’s energy costs are distributed to the top 3 utilities.
While a 2.5% increase and a million additional dollars seem significant enough, the reality is that utilities in the past 5-years have increased 9.5% on average, as outlined in the table below. The OEI has implemented several strategies to level off and stabilize energy costs through new procurement and rate strategies designed to mitigate risk and market exposure.

<table>
<thead>
<tr>
<th>Year</th>
<th>Hydro</th>
<th>Union Gas</th>
<th>Water</th>
<th>Weighted Avg.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Average</td>
<td>9%</td>
<td>11%</td>
<td>8%</td>
<td>9.5%</td>
</tr>
</tbody>
</table>

**Strategies include:**

- Executing new master energy supply agreements with larger suppliers, with better buying power and better credit ratings. This initiative alone with save the City $350 - $400 thousand dollars annually through improved rates for natural gas.
- Hedging forward – means securing about 85% of the City’s natural gas supply in longer term deals, during favourable market conditions.
- Removing all of the City’s interval meters from the Regulated Price Plan (RPP) to a Spot Market pass through rate.
- Installing additional interval meters and removing these locations/ accounts from the RPP rate.
- Implementing CDM projects, such as the Energy Pilot Retrofit Program for 20 City buildings, the Green Light program in Housing and the installation of LED traffic lights by the Operations and Maintenance Division.

As part of an previous motion Council requested that “The Manager of Energy Initiatives for a report on the feasibility of recommendations on reducing energy use by two-thirds by 2018, and well as ideas on producing energy.

Staff believes that the targets recommended as part of the Energy Policy are realistically obtainable based on the economics of today and the technologies available. There is little doubt that as energy prices rise, economics will change and energy efficient technologies will continue to improve over time. What the current target in the Energy Policy does is establish a starting point and a direction for moving forward. As
market realities evolve, the Energy Policy and its targets can be changed or adapted to reflect the new market conditions. Therefore, staff recommends that setting targets for reductions of 2/3 is not affordable at this time, but should continue to be evaluated over time with changing market realities.

There are a variety of ways to improving energy efficiency and reduce GHG emissions. The following graph is not intended to suggest that renewable energy projects such as wind or solar are too expensive and as a result should not be considered. The intent of the graph is to identify that from a dollars and cents standpoint energy efficiency improvement from lighting and HVAC retrofits are proven and offer a much better return on investment then some of the newer emerging renewable technologies.

**Average Cost to Achieve a Reduction of One Metric Ton of CO₂**

![Average Cost Graph]

**Renewable Energy Projects**

The City of Hamilton is actually one of Ontario’s leading municipalities when it comes to its commitment to developing new clean and green (renewable) energy generation and supply. Examples include:

- Hamilton Community Energy - Clean energy from natural gas and EcoLogo certified.
- Woodward Cogeneration Plant - 1.6 MW’s (megawatts) in renewable/green generation, using methane produced from the Waste Treatment Plant.
- Cleanfield VAWT (vertical axis wind turbine) - a 3.5 kW (kilowatt) test unit is installed at the Hamilton Incubator of Technology (HIT).
- Solar Hot Water - Currently conducting a feasibility study at 2 City Housing Hamilton locations

**2) ENERGY AND THE ENVIRONMENT**

Ontario is faced with a supply crunch that is resulting in steadily rising energy prices. Ontario’s municipal leaders have struggled to manage energy cost and many are beginning to understand that energy costs are controllable.

Investing in energy efficiency has many direct and indirect benefits to the community and province – Whatever we save, we reduce in demand for fossil fuels and nuclear power and we assist with overall system reliability. Saving on energy costs is also direct
benefit to the taxpayers and ratepayers of Hamilton, both in terms of dollars and reduced GHG emissions.

Meeting our energy needs efficiently is a net gain for the environment and sustainable energy practices can also generate economic benefits through new jobs and businesses. The City’s Energy Policy is also an excellent case of leading by example.

Energy usage can be curbed and influenced through the promotion of energy conservation, energy efficiency and energy demand management. Curbing the use or efficiency of energy usage can reduce greenhouse gases and air pollutants while maintaining energy supply.

**GHG Emission Reductions**

Reducing energy consumption means more than just saving money. Using energy more efficiently reduces the demand for fossils fuels, which equates to lower greenhouse gas (GHG) emissions that contribute to climate change. When the demand for energy decreases so does the need to build more generation capacity.

**VISION 2020**

In conjunction with our related policies, such as Vision 2020, the City’s Energy Policy can make a significant contribution to the targeting a 20% reduction in greenhouse gas emissions by the year 2020.

**Estimated Total Metric Tons of CO₂ Reduced From CDM Initiatives**

The CO₂ reductions in the graph above are annual amounts of CO₂ reductions achieved through the Energy Policy and its CDM initiatives. The graph does not include CO₂ reductions that can come from renewable energy. Conservation activities derived from energy awareness of the City’s employees, green power or the City’s Green Fleet initiatives are not include in the reductions.
CDM Retrofits and Capital Renewal/Life Cycle Replacements

CDM Retrofits tend to be initiatives or project specific, where a new energy efficient technology or group of technologies are added or retrofit within a facility or group of facilities (e.g. Energy Retrofit Pilot Program for 20 City buildings).

Capital Renewal/ Life Cycle Replacements are generally managed by the division who carries responsibility for operating and maintaining the existing or original equipment e.g. Public Works, Corporate Buildings & Technical Services. Typical projects include major capital replacements of chillers, boilers, roofs, windows, fans, pumps, piping etc. Typically equipment to be considered for this process includes:

- HVAC equipment (e.g. boilers, chillers, pumps, motors etc.),
- Lighting and controls
- Building envelope (e.g. roofs, insulation, windows and doors etc.),
- Water use (e.g. pools, toilets, water reclaim etc.)
- BAS (building automation system) controls,
- Process improvements
- Back-up generators
- Any other energy consuming device

These types of projects generally follow four steps:

- Project Identification & Feasibility - Energy Audits or Feasibility Analysis
- Planning & Budgeting - Project Financing, Incentives, Business Case & Approvals
- Implementation - Tender, Project Management, Commissioning
- Monitoring & Verification - Measure and Verify Results, Reporting Achievements

The intent is to make CDM part of the City’s normal course of business for all facility and operational retrofits, including capital renewal and life cycle replacements projects. Success means incorporating CDM options at the initial stages of a project design. This ensures that options for improving energy efficiency are considered, evaluated and quantified in terms of life cycle costing analysis, including cost, maintenance and emission reductions.

Evaluation of LEED and Green Building Design Options –

Major Renovations and New Construction of City Owned Buildings

LEED (Leadership in Energy and Environmental Design) is a green building certification tool administered by CaBGC (Canada Green Building Council), which provides a framework for constructing green/ energy efficient buildings. LEED® Canada NC 1.0 for New Construction and Major Renovations (launched in 2004) rating system addresses the performance of commercial and institutional buildings.

Many municipalities are starting to explore LEED certification for their own buildings. Some municipalities have even adapted standards such as minimum LEED Silver rating for all new municipally owned new construction projects. Considering LEED for new construction and major renovations makes good business sense, in that a high performance green building vs. conventional inefficient buildings can reduce energy consumption by 25% to 75%, water use reduction by 20% to 50% and reduced environmental greenhouse gas (GHG) emissions by as much as 60%.

The Prerequisites and Credits are organized in the five principal LEED® categories:
An additional category, Innovation & Design Process, addresses sustainable building expertise as well as design measures not covered under these five environmental categories. Project ratings are certified by the CaGBC based on the total point score, following an independent review and audits of selected Credits of documentation submitted by a design and construction team. With four possible levels of certification (certified, silver, gold and platinum), LEED® can accommodate a wide range of green building strategies that best fit the constraints and goals of particular projects.

The Energy Policy recommends that the City conduct a three year pilot program to evaluate the financial, energy and environmental impacts of various levels of LEED certification. The primary reason for a LEED pilot program is so that the City can be eligible for a higher incentive level. If the City establishes a new LEED standard, then this becomes the base from which efficiency improvements are measured.

The LEED Pilot Program would allow the City to gather valuable information on several key projects such as the upcoming major renovations project at City Hall and the Library and Market. Based on the three year LEED Pilot Program, the City will have the opportunity to further develop their expertise, and demonstrate leadership in design evaluations for maximizing the environmental and energy components on a life cycle basis of new buildings and major renovations.

3) NEW REGULATORY REQUIREMENTS

Bill 21 - Energy Conservation Responsibility Act

Bill 21, the Energy Conservation Responsibility Act 2006 is expected to be initiated in 2008. Bill 21 will set guidelines for the monitoring, tracking and reporting of energy use within Municipalities. This policy meets and exceeds the main components of the legislation.

The Energy Conservation Task Force of the Association of Municipalities of Ontario (AMO) developed a document called the Municipal Energy Conservation Template which was adopted by the AMO Board of Directors for use by member municipalities. The City’s Manager of Energy Initiatives is a member of AMO’s Energy Conservation Task Force and has played an active role in the templates development and design.

The template employs a flexible approach that could be used by municipalities in meeting the requirements of the Bill 21, the Energy Conservation and Leadership Act, 2006 (ECLA). The ECLA requires the creation of Energy Plans in provincial ministries and wider public sector organizations. While regulations requiring the creation of energy conservation plans by municipalities have not yet been filed, section four of the ECLA provides:

i) The Lieutenant Governor in Council may, by regulation, require public agencies to prepare annual energy conservation plan or, if the regulations so provide, an energy conservation plan respecting such other period as may be prescribed.

ii) The Lieutenant Governor in Council may, by regulation, require a public agency to which subsection (1) applies to achieve prescribed energy conservation targets.
iii) The plan must be prepared in accordance with such requirements as may be prescribed and must include the following information:

- An itemized description of the public agency’s significant energy-consuming technologies and operations.
- A summary of annual energy usage for each of the public agency’s technologies and operations.
- A description of current and proposed activities and measures to conserve the energy used by the public agency’s technologies and in the public agency’s operations and to otherwise reduce the amount of energy used by the public agency.
- A summary of the progress and achievements in energy conservation and other reductions described in paragraph 3 since the previous plan.
- Such additional information as may be prescribed. AMO has developed the Template as an aid to municipalities to start measuring and managing their energy consumption requirements. It is intended as a starting point in municipal energy management and member municipalities are encouraged to go beyond these requirements if they so choose. It is also recognized that several municipalities may already have sophisticated energy management systems in place that go beyond the scope of what is provided here and that these organizations provide working examples of what is possible in this area to other members.

**AMO’s Advice to Municipalities**

*AMO recognizes that the provincial government has not yet filed regulations requiring the wider public sector, including municipalities, to create energy conservation and management plans. However, energy is a significant cost driver for municipalities and energy management activities provide important tools to manage energy expenditures. By instituting energy conservation measures, municipalities can also demonstrate their commitment to action to reduce greenhouse gases and the effects of climate change. Members are encouraged to use this template as a starting point for energy conservation and management within their organizations and as the basis for reporting to councils on the results of energy management and conservation activities.*

The Template incorporates a phased approach to energy management and reporting. The first year requires reporting of total energy consumption, past and current energy conservation/management activities and goals and objectives for each municipality in managing their energy needs.

In the second year, it is intended that the municipality would include these reports and begin to break down energy consumption further, either by facility or major operation. Major strategies that might be employed by the municipality in managing energy and implementing conservation programs are also detailed.

Finally, in the third year, updated information from the previous reports is combined with opportunity assessments and action plans to reduce, conserve or use energy more efficiently in municipal operations. These initiatives are intended to be measured against energy usage so that by year three municipalities are reporting on:

- past initiatives;
- conservation objectives;
- global and detailed consumption;
strategies for management;
individual savings opportunities;
detailed cases for individual initiatives or projects; and
Energy procurement.

In the subsequent years, energy conservation projects should be measured against consumption to show efficiencies and project results.

Energy consumption and savings often go hand in hand with greenhouse gas (GHG) or carbon reduction initiatives and air quality improvement strategies. To capture this, the Template includes a final stage of reporting that can be used in any of the three phases in which members might wish to report on initiatives that have an impact on GHG’s or other relevant initiatives so that these can be integrated into energy conservation and management programs.

The Triple Bottom Line & Air Quality and Climate Change

The reduction of air pollutants and greenhouse gas emissions affect all three “bottom lines” of sustainability - economy, environment and social. Reductions that help retard climate change and improve air quality have other social/health, economic and environmental benefits to the community.

Efforts to reduce air pollutants and greenhouse gas emissions from municipal operations could produce economic benefits for the Corporation and improve the quality of life in the City. They could produce energy and operating costs savings, encourage renewal of physical assets, and improve the delivery of municipal services.

**ALTERNATIVES FOR CONSIDERATION:**

N/A

**FINANCIAL/STAFFING/LEGAL IMPLICATIONS:**

**Financial Implications**

**Energy Reserve**

As savings in energy expenditures are identified, whether through reduced rates or energy CDM initiatives, it is proposed that the total amount of savings be base-transferred from the corresponding energy line (e.g. Hydro, Natural Gas) to the Energy Office. At this time, a 5% reduction to the 2007 Natural Gas Budget and a 1% reduction to the 2007 Hydro budget is proposed for the 2008 base budget for a total of approximately $400,000. In regards to Street lighting Energy (i.e. exit the RPP rate), a conservative $200,000 will be base transferred at this time. The total of approximately $600,000 will establish the base amount for the reserve and will allow for a continuous funding of the OEI.

The OEI is also very involved in reviewing historical billings from all energy suppliers. Under the microscope and with the group’s specific knowledge and experience, the OEI has identified and will continue to identify, errors that have been made by these suppliers. The results of these efforts will result in recoveries of past overpayments for energy. It is proposed that recoveries of this nature also flow to the Energy Reserve to be used as a source of funding for future conservation projects.
The OEI continues to identify sources of incentive funding for retrofit and other energy conservation initiatives. These incentives provided by energy suppliers and various levels of Government will help to mitigate the cost of improvements that will reduce the use of energy. These monies will be applied to the specific project approved for funding. However, if a specific project is not identified, these monies will be transferred to the reserve to be used for conservation projects in general.

Once the budget base for the Energy Reserve is established, all future savings in current energy expenditures (i.e. for the 2009 budget year and beyond) could result in levy savings or could be used to fund further energy initiatives or both. Historic billing errors would continue to be directed to the Energy Reserve to fund future projects and Incentive payments would continue to be used to reduce the cost of conservation projects.

In regards to City Boards and Agencies, the OEI will provide services on a contract and/or consultant basis. Any savings generated and proposed to be transferred to the Energy office, will be negotiated between the Office of Energy Initiatives and the Board or Agency.

The Energy Reserve would be established to permanently fund the OEI as well as other initiatives related to energy conservation and demand management (CDM). It is proposed that the Energy Reserve be created to fund the following activities:

- Fund the Public Works, Office of Energy Initiatives
- Payback capital outlay
- Energy cost increases or budgetary shortfalls during the current budget cycle.
- Energy audits and feasibility studies
- Pilot projects for new energy technologies and renewable energy projects
- Fund incremental retrofit project costs of higher efficiency options.
- OEI website, educational and energy awareness programs

The risk to the City of not approving a steady source of funding to the OEI is that the City loses the ability to stabilize energy costs and to implement projects to reduce energy use and lower greenhouse gas (GHG) emissions.

**Staffing Implications**
Staffing is addressed in a separate in camera report.

**Legal Implications**
N/A

**POLICIES AFFECTING PROPOSAL:**

**The Public Works Strategic Plan, Innovate Now**

The recommendations of the Energy Policy are well in step with the Public Works key goal, *to be recognized as the centre of environmental and innovative excellence in Canada. The Energy Policy also is in line with the strategies Vision Drivers.*

Vision Drivers:

1. Communities (Services our communities connect with and trust) - Energy CDM reduces energy waste and improves the overall efficiency or energy intensity of the City’s facilities and operations. Doing less also helps the community be
improving our local environment and quality of life through reduced emissions and improved quality of service.

2. People (Skilled teams ready for any situation) - The Energy Policy challenges the City and staff to change the way we do business. It makes conservation part of all projects from the start.

3. Processes (Smart processes to match our needs) - The Energy Policy provides a path for how to effectively improve the efficiency of the City’s aging infrastructure.

4. Finances (Sound financial management for the long haul) - The incremental cost of installing energy efficient options for capital pays for itself over the life of the project. Overall using less energy, means less cost and less exposure to market price increases and volatility.

The Public Works Strategic Plan’s Top Priority is to be a leader in ‘greening’ and stewardship in the City. The Energy Policy is the best way to meet this priority for City owned facilities and operations.

**RELEVANT CONSULTATION:**
Corporate Services - Budgets & Finance, Purchasing
Public Works, Fleet & Facilities

**CITY STRATEGIC COMMITMENT:**
By evaluating the “Triple Bottom Line”, (community, environment, economic implications) we can make choices that create value across all three bottom lines, moving us closer to our vision for a sustainable community, and Provincial interests.

- **Community Well-Being is enhanced.** ☑ Yes ☐ No
- **Environmental Well-Being is enhanced.** ☑ Yes ☐ No
- **Economic Well-Being is enhanced.** ☑ Yes ☐ No
- **Does the option you are recommending create value across all three bottom lines?** ☑ Yes ☐ No
- **Do the options you are recommending make Hamilton a City of choice for high performance public servants?** ☑ Yes ☐ No
APPENDIX “A”
PW07127

CITY OF HAMILTON
CORPORATE
ENERGY POLICY

For
City Facilities and Operations
October 2007

Prepared By:
The Office of Energy Initiatives
Fleet and Facilities
PUBLIC WORKS
TABLE OF CONTENTS

EXECUTIVE SUMMARY ........................................................................................................................................ 3

1.0 INTRODUCTION ............................................................................................................................................... 4
  1.1 Background................................................................................................................................................ 4
  1.2 Bill 21 – Energy Conservation Responsibility Act .................................................................................. 5
  1.3 Energy Reduction Targets ....................................................................................................................... 6
  1.4 Corporate Energy Steering Committee .................................................................................................. 7

2.0 STRATEGY FOR ACHIEVING ENERGY REDUCTION TARGETS ............................................................... 9
  2.1 Monitoring and Targeting Program .......................................................................................................... 9
  2.2 CDM Investment: Existing Buildings ...................................................................................................... 11
  2.3 CDM Investment: Major Renovations / New Construction .................................................................. 14
  2.4 Implementation of Eco-Responsive Energy Management Policies .................................................... 16

3.0 SPECIFIC POLICIES RE CAPITAL INVESTMENT ................................................................................... 18
  3.1 Energy Management Standard – Central BAS Control .......................................................................... 18
  3.2 Incandescent Lighting ............................................................................................................................... 18
  3.3 Roof Capital Replacement Evaluation .................................................................................................. 18
  3.4 Energy Efficient Equipment Purchasing ................................................................................................ 18
  3.5 Electricity Generation, Cogeneration, and District Energy ...................................................................... 19
  3.6 Back-up / Emergency Power Systems .................................................................................................... 19

4.0 SPECIFIC POLICIES RE ENERGY PROCUREMENT ............................................................................... 21
  4.1 ‘Traditional’ Energy Procurement .......................................................................................................... 21
  4.2 Renewable Energy .................................................................................................................................. 21
  4.3 Green Power ............................................................................................................................................ 22
  4.4 Emissions Trading .................................................................................................................................. 22

APPENDIX A - DEFINITIONS ............................................................................................................................. 23
EXECUTIVE SUMMARY

The City of Hamilton’s Energy Policy is designed to:

- Facilitate the achievement of City-wide energy reduction targets
- Address legislated reporting requirements
- Provide for ongoing Energy Monitoring and Targeting of utility usage
- Define policies re capital investment related to energy
- Define policies related to energy procurement.

The Energy Policy incorporates the following key components:

1) **Strategy for Achieving Energy Reduction Targets**
   a) Monitoring and Targeting of Existing/New/Retrofitted Buildings
   b) Conservation and Demand Management Investment: Existing Buildings:
   c) Conservation and Demand Management Investment: Major Renovations / New Construction
   d) Implementation of Eco-Responsive Energy Management Policies

2) **Specific Policies re: Capital Investment Related to Energy**
   a) Energy Management Standard - Central Building Automation System control
   b) Incandescent lighting
   c) Roof Capital Replacement Evaluation
   d) Energy Efficient Equipment Purchasing
   e) Electricity Generation, Cogeneration, District Energy
   f) Back-up / Emergency Power Systems

3) **Specific Policies re: Energy Procurement**
   a) Energy Procurement
   b) Green power
   c) Emissions trading
   d) Renewable Energy
1.0 INTRODUCTION

1.1 Background

The City of Hamilton, like most Ontario municipalities, is challenged with significant budgetary pressures due to reduced levels of funding and increasing costs. Hamilton also has the added pressure of an aging infrastructure which will require significant investment over the next several years.

In terms of energy supply and pricing, reports like the “Peak Oil” report raise awareness that energy costs will continue to increase and the impact of these rising prices can be severe to the City and our local economy. What is unknown is how quickly energy prices will rise over the next several years and to what degree. Given the way energy markets tend to perform, the bigger challenge now is managing for volatility of pricing. The reality is that energy prices are now globally-driven rather than locally-driven. Ontario alone will need to invest billions of dollars, over the next decade, in utility infrastructure and new electricity generation to replace the aging supply base that exists today. In total, about 80% of Ontario’s existing electricity generation capacity must be replaced over the next 20-years.

With the increasing focus on global warming and the environment, we have a situation which demands a new technological leap for producing clean and green energy at a reasonable cost. If this situation is not addressed, the news on maintaining energy costs at today’s rates over the longer term is not good.

The City of Hamilton currently spends about $40 million annually on its energy and water utilities. Small increases in energy costs can quickly impact the bottom line. A 2.5% increase in energy cost adds another million dollars to the City’s budget. The graph below demonstrates what an annual increase in energy costs between 3% and 12% could do to the City’s current budget.
The issues described above clearly show that the City needs to take action and a long term view of energy costs, in conjunction with our related policies, such as Vision 2020, which is targeting a 20% reduction in greenhouse gas emissions by the year 2020.

Addressing both these challenges require the establishment of a Corporate Energy Policy (Energy Policy). The City has already undertaken action for managing its energy commodity costs, but the best way to mitigate its exposure to rising energy prices is to use less energy. By setting targets and strategies for energy reduction the City can better control energy costs while decreasing environmental emissions over the long term. With Council and staff support of the Energy Policy and its recommendations, Energy Conservation and Demand Management (CDM) is brought to the forefront of the City’s decision making process with all City facilities and operations. The added benefit of the Energy Policy is that as the City reduces its energy consumption, it also reduces environmental emissions.

Within this Energy Policy it is recommended that the City adopt energy reduction targets identified below, along with the following recommendations/guidelines within the Energy Policy to achieve these results. This Energy Policy has been drafted for implementation within all City Departments. The Energy Policy also recommends that all City Boards and Agencies be encouraged to acknowledge and adapt the City’s Energy Policy as part of their board resolutions.

This policy document is written with the next 3 to 5 years in mind. It is expected that additions or changes will be made to the energy policy as legislation, codes and market conditions change and evolve over time.

Typically, larger energy CDM initiatives take from 3 to 5 years to identify, evaluate, plan, budget, implement, monitor and verify results. The strategies identified can create a road map to initiate energy CDM plans and processes within individual departments and divisions.

City Council and Senior City Staff’s commitment to the Energy Policy and the foregoing energy plans is critical to encouraging staff involvement and buy-in to the program. The City’s success will come from change to the way we think about energy CDM in our daily working activities. It brings CDM to the forefront of all facilities and operational retrofits, for greater budget control, reduced costs, reduced emissions and an overall better quality of life for staff and the community. The Energy Policy also provides a methodology for capturing and recording our results and reporting on our successes.

1.2 Bill 21 – Energy Conservation Responsibility Act

The introduction of Bill 21 - the Energy Conservation Responsibility Act will put mandatory requirements for monitoring and reporting of energy use for all Ontario municipalities, including the City of Hamilton. This puts stringent requirements on the City to have a thorough understanding and organization of all of our energy and utility costs, along with our consumption profiles.

An Energy Management Software System (Utility Manager) has been purchased that will store a database of all historical energy costs and consumptions, and meets all the reporting, monitoring and verification standards that are required under Bill 21.
Utility Manager has the capabilities to standardize energy use reporting and analysis by correcting consumption for weather, using energy intensity factors to compare facilities, and to accurately identify and monitor energy reductions and savings from CDM activities.

Utility Manager will also be used for utility bill verification to identify any billing errors from the Utilities, create load profiles of our energy consumption, and monitor and verify rate structures.

The OEI will play an instrumental role in providing data to help with forecasting and creating energy budgets as required, by delivering the most up to date consumption and cost patterns for all facilities from the Utility Manager database. The OEI will work with Finance groups to supply any information required.

It is important that all City departments comply with utility information requests from the OEI so that all project and energy information is recording for future verification and reporting to Council and as part of Bill 21 requirements.

1.3 Energy Reduction Targets

The key to a successful long term energy conservation and demand management (CDM) vision is a strong Energy Policy, with measurable and achievable targets.

The Energy Policy calls for targeted energy reductions in energy intensity of City owned facilities and operations of:

<table>
<thead>
<tr>
<th>Target</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0%</td>
<td>by 2009</td>
</tr>
<tr>
<td>7.5%</td>
<td>by 2012</td>
</tr>
<tr>
<td>20%</td>
<td>by 2020</td>
</tr>
</tbody>
</table>

These targets equate to about a 1.5 % reduction in energy per year. The report recommends that 2005 be used as the base year for measuring results.

2005 has been established as the City’s base year that energy reduction results will be measured against, as accurate energy data is available for 2005 while pre-amalgamation energy Information prior to 2005 is less reliable.

The Energy Reduction Target will be applied to each City Department or Division’s overall energy usage on a proportional basis. This means larger energy users in the City must achieve the same reduction on a percentage basis in relation to their 2005 base year consumption, but their overall contribution to energy, cost and emission reductions will be much larger overall.

1.3.1 Comparison with Other Municipalities

The following table compares the energy reduction targets of different municipalities:
<table>
<thead>
<tr>
<th>Municipality</th>
<th>CDM Reduction Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamilton</td>
<td>Recommending 20% below 2005 level by 2020</td>
</tr>
<tr>
<td>Toronto</td>
<td>20% below 2005 level by 2020</td>
</tr>
<tr>
<td>London</td>
<td>no targets defined</td>
</tr>
<tr>
<td>Ottawa</td>
<td>20% below 1990 levels by 2012</td>
</tr>
<tr>
<td>Peel Region</td>
<td>no targets defined</td>
</tr>
<tr>
<td>Oakville</td>
<td>10% by (no date given)</td>
</tr>
<tr>
<td>Vancouver</td>
<td>6% reduction by 2012</td>
</tr>
<tr>
<td>Calgary</td>
<td>20% below 2005 level by 2020</td>
</tr>
<tr>
<td>Edmonton</td>
<td>16% below 1990 levels by 2010</td>
</tr>
<tr>
<td>Waterloo</td>
<td>no targets defined</td>
</tr>
<tr>
<td>Kitchener</td>
<td>no targets defined</td>
</tr>
<tr>
<td>Mississauga</td>
<td>no targets defined</td>
</tr>
<tr>
<td>Halton Region</td>
<td>no targets defined</td>
</tr>
</tbody>
</table>

1.4 Corporate Energy Steering Committee

The formation of a Corporate Energy Steering Committee (CESC) is necessary to success of the Energy Policy. The CESC will provide a vehicle for key staff to work together in developing energy plans and strategies for their divisions. The CESC will have lead responsibility and accountability for achieving energy reduction targets. The intent is that the CESC will have a similar committee structure to the Central Fleet Advisory Committee.

The recommendations for the CESC committee are as follows.

1. A Corporate Energy Steering Committee (CESC) shall consist of key representatives from within the City’s major energy user groups (e.g. Facilities, Housing, Culture & Rec., Water & Waste Water or project managers/ advisors e.g. Office of Energy initiatives (OEI), Capital Planning and Implementation (CPI). The Corporate Energy Steering Committee will oversee the development of respective divisional Energy Conservation and Demand Management Plans and budgets for achieving targeted results. The following chart provides an example of how the CESC could be structured. The CESC would meet on a minimum quarterly basis (monthly initially).
2. The Public Works, Office of Energy Initiatives be responsible for reporting on all City of Hamilton corporate energy consumption reductions, cost savings initiatives and associated environmental emission reductions associated with energy conservation and demand management on an annual basis at a minimum and as required by legislation under Bill 21 - Energy Conservation Responsibility Act, 2006.

3. All City Departments and participating Boards and Agencies will be responsible for reporting on all energy incentive funding, project cost, energy consumption reductions, cost savings initiatives etc., and all other activities associated with energy conservation and demand management as requested by the OEI.

4. **All City Boards and Agencies** are encouraged to acknowledge and adapt the City’s Energy Policy and its changes from time to time as part of their board resolutions including the City’s recent Statement of Policies and Goals Relating to the Use of Commodity Price Hedging Agreements.
2.0 STRATEGY FOR ACHIEVING ENERGY REDUCTION TARGETS

To ensure that the City moves energy CDM activities to the forefront of normal business practices the City will need to achieve its energy reduction results through a combination of:

1) Monitoring and Targeting of Existing/New/Retrofitted Buildings
2) Investment in Energy Efficiency - Existing Buildings
3) Implementation of Energy Efficient Design - Major Renovations / New Construction
4) Implementation of Eco-Responsive Energy Management Policies

These are outlined in the following sections.

2.1 Monitoring and Targeting Program

Energy accounting is a cornerstone of an effective energy management program. Monthly utility usage and costs should be monitored to identify trends, highlight anomalies, and benchmark facility usage against that of similar buildings in the portfolio.

Monitoring and Targeting is the next level in utility cost management, as it allows for more timely identification of energy usage anomalies. This is to be implemented at all existing / new buildings.

The vision is for energy to be managed through a management-by-exception process at the building level. Here daily target utility load profiles would be generated for each building based on day type and hourly weather data for comparison against real-time metering data. Using these tools it will be possible to identify variances or exceptions that can be investigated to resolve any problems.

To get to this point, the following key components of this strategy must be in place:

1) Ongoing Real-Time Monitoring of All Utilities
2) Standards of Performance

These are explored in the following sections.

2.1.1 Verification and Validation of Utility Bills

The OEI will monitor utility bills (verify and validate) for the correct application of energy rates, demand and energy consumption charges.

2.1.2 Ongoing Real-Time Monitoring of All Utilities

Each utility (e.g. electricity, gas, water, district cooling, district heating) should be tracked for each building on an hourly basis. The addition of real-time metering enables real-time feedback...
confirmation to operational changes, and allows targeted measures to be monitored and their positive financial effects confirmed.

City of Hamilton buildings greater than 5,000 square metres should move towards having interval meters on their electrical services and pulse outputs on their gas and water meters as a basic first step.

2.1.3 Standards of Performance

Efficient building operation must be defined in order to be managed. Once standards for efficient operation are quantified, operation and maintenance effectiveness can be measured. Early identification of operational problems also mitigates the risk of having significant operation failures.

The following temperature settings apply to all City Facilities unless a deviation from the standard is required as determined by Corporate Buildings & Technical Services due to mechanical or system limitations:

- Indoor temperature settings in all spaces during occupied periods will be 22 degrees Celsius (72°F) during the winter and 24 degrees Celsius (75°F) during the summer. Where available, occupants will be given the temporary capability of varying temperature +/- 1 degree Celsius (2°F), resulting in 21-23°C (70-73°F) for heating and 23-25°C (74-77°F) for cooling.

- Indoor temperature settings in all spaces during unoccupied periods will be 18°C (64°F) during the winter and 27°C (81°F) during the summer. The exception is for pre-heating or pre-cooling periods necessary to maintain building system performance during occupied periods, especially during adverse weather conditions.

Spaces, such as research facilities, requiring critical temperature settings will be more tightly controlled and will be addressed as exceptions to the Energy Policy where necessary.

Occupants who control their own thermostats are required to adhere to these temperature standards also.

A performance standard must be measurable and quantifiable. The following are examples of potential standards of performance for City of Hamilton buildings:

- Desirable domestic hot water tank temperature (e.g. 50°C).
- Minimum light levels in offices, hallways, storage areas, etc (e.g. 400 LUX).
- Maximum CO₂ level in offices, resident spaces, etc (e.g. 700 ppm above ambient)
- Fan operation: when outdoor air temperature > 12C.

When it comes time to consider / evaluate energy efficiency measures (e.g. lighting retrofits, control of fresh air volume using CO₂, etc.), these provide useful guidelines/checks.

Definitions of the standards are not arbitrary. The standards must reflect building code requirements, good O&M practices, and occupant needs.
2.2 CDM Investment: Existing Buildings

CDM Activities can benefit the City through:

✓ Reduced Energy Demand & Consumption
✓ Reduced Energy Costs
✓ Reduced Environmental Emissions
✓ Reduced Maintenance Costs
✓ Reduced Exposure to Energy Market Volatility (Risk Mitigation)
✓ Improved Working Environments
✓ Improved Productivity

2.2.1 Strategy: CDM Retrofits and Capital Renewal/Life Cycle Replacements

CDM Retrofits tend to be initiatives or project specific, where a new energy efficient technology or group of technologies are added or retrofit within a facility or group of facilities (e.g. Energy Retrofit Pilot Program for 20 City buildings).

Capital Renewal/ Life Cycle Replacements are generally managed by the division who carries responsibility for operating and maintaining the existing or original equipment e.g. Public Works, Corporate Buildings & Technical Services. Typical projects include major capital replacements of chillers, boilers, roofs, windows, fans, pumps, piping etc.

Typically equipment to be considered for this process includes:

- HVAC equipment (e.g. boilers, chillers, pumps, motors etc.),
- Lighting and controls
- Building envelope (e.g. roofs, insulation, windows and doors etc.),
- Water use (e.g. pools, toilets, water reclaim etc.)
- BAS (building automation system) controls,
- Process improvements
- Back-up generators
- Any other energy consuming device

These types of projects generally follow 4 steps:

✓ Project Identification & Feasibility - Energy Audits, Feasibility Analysis or through detailed Condition Assessments.
✓ Planning & Budgeting - Project Financing, Incentives, Business Case & Approvals
✓ Implementation – Tender, Project Execution, Project Management, Commissioning
✓ Monitoring & Verification – Measure and Verify Results, Reporting Achievements

The intent is to make CDM part of the City’s normal course of business for all facility and operational retrofits, including capital renewal and life cycle replacements projects. Success means incorporating CDM options at the initial stages of a project design. This ensures that options for improving energy efficiency are considered, evaluated and quantified in terms of life cycle costing analysis, including cost, maintenance and emission reductions.
Projects will continue to be managed by the division who carries responsibility for operating and maintaining existing or original equipment. The OEI will be a resource section for implementation and the follow-up to the recommend (5) step process (below). In the following recommendations all facility and operational CDM retrofits and capital renewal/ life cycle replacement projects, would be required to adapt the following procedures:

1) **Identify government and utility funding programs (incentives):**

Incentives funding opportunities for CDM projects and feasibility studies are on the rise. Funding opportunities exist today that were not available in previous years. It is anticipated that, unless there is a major shift politically at the Provincial and Federal levels of government, incentive funding for CDM activities is expected to be available to encourage greater efficiency levels for at least the next 3 to 5 years.

Most government and utility funding programs are designed to encourage greater levels of energy efficiency or CDM activities which would not have been normally achieved without these funds. As new energy efficient product costs decline or become more cost effective due to increases in utility rates, and as design techniques become main stream, through code changes or reduction targets achieved, funding for these activities will likely be reduced or eliminated altogether. It should be noted that all funding programs are established with a defined or limited budget. Typically it is the early adopters that reap the largest subsidies.

To be an early adopter, the City needs to change the way we approach our day to day business in terms of facility retrofits, capital renewal, new construction and major renovations of the City’s building stock. Energy conservation and demand management must be viewed as the cornerstone to these activities moving forward if we are to achieve targeted results with the greatest return on investment for the City and its taxpayers.

In many cases these funds can be used to cover a portion of both the feasibility/ engineering study costs and part of the incremental costs of the energy efficient upgrade.

For each project, the following must be identified:

- Potential utility or government funding (incentives) for CDM feasibility studies
- Potential utility or government funding (incentives) for CDM retrofit/ renewal projects
- Application process
- Eligibility criteria
- Steps to securing funding.

Some funding programs are prescriptive (product specific) while others consider custom measures, often requiring detailed engineering analysis. In some cases a feasibility study may be necessary.

It should be noted that most government and utility incentive /funding programs will NOT provide incentives for project feasibility studies or CDM retrofit / renewal projects that have been initiated prior to application approval.

2) **Determine the project base case(s) vs. the alternative CDM option(s).**
For CDM retrofit projects the “base case” is usually the existing equipment. For Capital Renewal/ Life Cycle Replacement Projects the “base case” is typically the standard efficiency replacement option.

Note: Check incentive/ funding criteria before proceeding. In some cases the funding can be for prescriptive measures. Nevertheless, the existing, base case and energy efficiency options must all be considered for tracking and reporting purposes.

3) **Identify the following for each option on an annual and life cycle cost basis:**
   
   - Associated project / equipment costs
   - Energy consumption and energy demand (e.g. kWh, kW, GJ, M3, L etc.,)
   - Energy/ utility costs and savings
   - Maintenance and operational savings
   - Impact with and without financial incentives or funding.

Energy rate escalators should be factored in savings (3% annually).

Determining the equipment cost, energy consumption, and cost savings associated with all options is necessary for qualifying for incentive funding and for internal tracking purposes.

4) **Provide Project information to the OEI**

Project information will be used by the OEI for tracking, monitoring and verification for reporting to City Council and Senior City Management.

The OEI will also ensure that legislative requirements for reporting under Bill 21 – the Energy Conservation Act are met.

The OEI will identify related **environmental emission reductions** for each option vs. existing or the base case.

5) **Identify project recommendations for proceeding with the base case or the more energy efficient option and reasons/ rationale why.**

These steps are important to ensure that energy efficiency is considered in all projects and for incentives application which will in most cases compare an energy efficient option to a base case. It also provides the City with the ability to track all energy saving initiatives and their environmental and cost savings.
2.3 CDM Investment: Major Renovations / New Construction

Major Renovations are similar to new construction in that they involve major capital and planning involvement e.g. Public Works, Capital Planning & Implementation. City Housing Hamilton also has a similar capital project group for managing these types of projects. The renovation of Hamilton’s City Hall is an example of a major renovation project that falls under this category.

New Construction projects involve the complete design, development and construction of a new facility. These projects are also managed by Public Works, Capital Planning & Implementation, or by similar groups e.g. Housing.

The following strategy recommendations outline steps to ensure that CDM options are properly evaluated in the early stages of a project development.

2.3.1 Strategy: Evaluation of LEED and Green Building Design Options – Major Renovations and New Construction of City Owned Buildings

LEED (Leadership in Energy and Environmental Design) is a green building certification tool administered by CaBGC (Canada Green Building Council), which provides a framework for constructing green/energy efficient buildings. LEED® Canada NC 1.0 for New Construction and Major Renovations (launched in 2004) rating system addresses the performance of commercial and institutional buildings.

Many municipalities are starting to explore LEED certification for their own buildings. Some municipalities have even adapted standards such as minimum LEED Silver rating for all new municipally owned new construction projects. Considering LEED for new construction and major renovations makes good business sense, in that a high performance green building vs. conventional inefficient buildings can reduce energy consumption by 25% to 75%, water use reduction by 20% to 50% and reduced environmental greenhouse gas (GHG) emissions by as much as 60%.

The Prerequisites and Credits are organized in the five principal LEED® categories:
An additional category, Innovation & Design Process, addresses sustainable building expertise as well as design measures not covered under these five environmental categories. Project ratings are certified by the CaGBC based on the total point score, following an independent review and audits of selected Credits of documentation submitted by a design and construction team. With four possible levels of certification (certified, silver, gold and platinum), LEED® can accommodate a wide range of green building strategies that best fit the constraints and goals of particular projects.

The following information outlines what other municipalities are doing with LEED standards for their municipal buildings.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>LEED® Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamilton</td>
<td>3 -year LEED Pilot Program</td>
</tr>
<tr>
<td>Toronto</td>
<td>None – Toronto has their own standard</td>
</tr>
<tr>
<td>Waterloo</td>
<td>Silver LEED standards for new facilities over 500 m2</td>
</tr>
<tr>
<td>York</td>
<td>Silver LEED standards for new facilities over 500 m2</td>
</tr>
<tr>
<td>London</td>
<td>none</td>
</tr>
<tr>
<td>East Gwillimbury</td>
<td>Silver LEED standards for new facilities</td>
</tr>
<tr>
<td>Ottawa</td>
<td>Silver LEED standards for new facilities over 500 m2</td>
</tr>
<tr>
<td>Richmond</td>
<td>Gold LEED standards for new facilities over 2,000 m2</td>
</tr>
<tr>
<td></td>
<td>Silver LEED standards for new facilities under 2,000 m2</td>
</tr>
<tr>
<td>Oakville</td>
<td>promote LEED only</td>
</tr>
<tr>
<td>Vancouver</td>
<td>Gold LEED standards for new facilities over 1,000 m2</td>
</tr>
<tr>
<td>Calgary</td>
<td>Silver LEED standards for new facilities</td>
</tr>
<tr>
<td>Edmonton</td>
<td>considering LEED Silver as mandatory</td>
</tr>
</tbody>
</table>

(Source: CaGBC Municipal Green Building Toolkit)

The Energy Policy recommends that the City conduct a 3-year pilot program to evaluate the financial, energy and environmental impacts of various levels of LEED certification.

The LEED Pilot Program would allow the City to gather valuable information on several key projects such as the upcoming major renovations project at City Hall and the Library and Market. Based on the 3-year LEED Pilot Program, the City will have the opportunity to further develop their expertise, and demonstrate leadership in design evaluations for maximizing the environmental and energy components on a life cycle basis of new buildings and major renovations.

The LEED Pilot Program is outlined as follows:

1) **Major Renovations** - For a 3-year period all major renovations of City owned facilities will require a life cycle cost assessment of the energy, financial and environmental benefits associated with:

   a. Base case design
b. LEED Certified design
c. LEED Silver design

2) New Construction - For a 3-year period all new City facilities to be constructed will require a life cycle cost assessment of the energy, financial and environmental benefits associated with having the building constructed according to:

a. Base case design
b. LEED Certified design
c. LEED Silver design
d. LEED Gold design
e. LEED Platinum design

3) Evaluation of Energy Performance Upgrades - As part of the LEED Pilot Program, all major renovations and new construction projects will require evaluation of energy efficiency upgrades compared to the base case design standard. The base case design standard is the minimum level of energy efficiency that must be achieved as defined under LEED® Canada NC 1.0 for New Construction and Major Renovations and its subsequent addendums.

4) Evaluation of Renewable Energy Options - As part of the LEED Pilot Program, options for renewable energy are to be evaluated. This will provide the City detailed information on the viability of renewable energy projects in the context of the overall project. The project evaluation shall investigate supplying using at least 5%, 10% and 20% renewable energy vs. the buildings total energy use, as per LEED® Canada NC 1.0 for New Construction and Major Renovations.

5) Evaluation of Green & White Roofs - As part of the LEED Pilot Program, options with respect to green and white roofs (or cool roofs which reflect heat) are to be evaluated as a potential LEED credit and provide information in terms of energy, water / sewage infrastructure or system benefits, financial, environmental benefits and overall viability in relation to the overall project.

These standards will apply to City owned buildings in excess of 500 square metres (5,400 ft²).

Buildings below 500 square metres are to follow the recommendation outlined in Section 2.2 of this report for CDM Retrofits/ Initiatives & Capital Renewal/ Life Cycle Replacement Projects.

Following the 3-year LEED Pilot Program, OEI staff will report to Council on the energy, environmental and financial life cycle benefits and results of various LEED and energy efficiency evaluations and provide recommendations for implementing future standards.

2.4 Implementation of Eco-Responsive Energy Management Policies

The following supplemental policies will apply for all buildings.
2.4.1 Temperature Setback: Smog / Constrained Electricity Supply Days

During smog days or electricity supply constrained periods, cooling season temperatures will be increased an additional 2 degrees Celsius in an effort to reduce energy consumption.

2.4.2 After Hours ‘Lights Out’ Program

Environment Hamilton recommended that the City pursue an After Hours Lights Out program in their recent Short Term City Response to Climate Change Report. City staff agrees that this would be a positive initiative in terms of reducing energy use and sending a message to the public that the City is not wasteful in its energy use by keeping the lights on after hours. There are two challenges to overcome with a lights out program. The first is technological, the second is cleaning schedules. Given this:

1) Public Works, Fleet and Facilities, OEI and Corporate Buildings & Technical Services work together to phase in automated lighting control upgrades on City facilities as budgets allow, so that the City can lead by example by automatically turning off unnecessary lighting in City owned facilities after hours when the buildings are unoccupied.

2) Where manual lighting controls exist in facilities, Corporate Buildings & Technical Services will continue to educate security guards, cleaning staff and maintenance staff on the importance of lighting only areas that are necessary during unoccupied periods.

2.4.2.1 Leased Office Spaces – Terms for Leases

In City leased office spaces, temperature conditions for occupied and unoccupied period within the Energy Policy should be established as part of building lease agreements.
3.0 SPECIFIC POLICIES RE CAPITAL INVESTMENT

3.1 Energy Management Standard – Central BAS Control

As BAS controls (building automated system) are modernized they will be centrally controlled by Corporate Buildings & Technical Services at the CUP so that they can be monitored and adjusted from a single location to maintain building temperatures or flag problem areas quickly. This will ensure temperature control is maintained reliably and monitored from a single location. This will also build on the existing system the City already has in place for several facilities.

3.2 Incandescent Lighting

The City is committed to replacing or eliminating incandescent lighting by 2012 (as per recent provincial legislation).

3.3 Roof Capital Replacement Evaluation

As part of ongoing roof capital replacement evaluations that in addition to standard roof replacement that the feasibility of a “Green” or “White” roof be explored for City owned facilities.

3.4 Energy Efficient Equipment Purchasing

ENERGY STAR® is trusted and a simple source that the City can use to identify products that are among the most energy-efficient on the market. Only manufacturers and retailers whose products meet the ENERGY STAR criteria can label their products with this symbol. ENERGY STAR in Canada is a voluntary program between Natural Resources Canada's Office of Energy Efficiency and organizations that manufacture sell or promote products that meet the ENERGY STAR levels of energy performance. ENERGY STAR in Canada is administered by Natural Resources Canada's (NRCan's) Office of Energy Efficiency (OEE). Visit online at oee.nrcan.gc.ca/energystar for more information.

Why we are recommending ENERGY STAR?

- to reduce energy costs
- to reduce electricity demand
- to reduce impact on the environment
- Energy-efficient products on the market today can reduce energy costs by 25 to 50 percent, or even more, without compromising quality or performance.
- Investments in energy-efficient products can quickly pay for themselves and provide a significant return, making funds available for investment in your community.
- Energy-efficient products have an extended life and offer decreased maintenance.
- Incentives may be available for some equipment.

ENERGY STAR is easy to use and provides comprehensive tools and information with an online purchasing guide for specifying products that meet energy efficiency criteria.
1) City Purchasing Policies adapt as a minimum standard ENERGY STAR® rated equipment or equivalent for energy consuming devices such as: appliances, photo copiers, computers, computer monitors etc.

2) All new and retrofit motor replacements (e.g. fans, pumps, etc..) specify high efficiency motors as minimum standards. Where required the OEI will provide recommendations on minimum efficiency standards.

The OEI will develop an energy roster for purchasing energy CDM related consulting, engineering and contracting services.

3.5 Energy Education and Awareness

Education and awareness programs on energy conservation play an integral role in achieving and sustaining reductions in energy use. By employing a range of educational tools to teach staff and the community about energy efficiency and the benefits of conservation, awareness programs will reinforce the link between individual behaviour, energy use and the potential for savings.

3.6 Electricity Generation, Cogeneration, and District Energy

Generation or cogeneration of electricity or developing district energy projects can be an attractive way of improving efficiency, providing security of supply and reducing environmental emissions. These projects can also be very costly and carry a significant amount of risk and as such need to be thoroughly evaluated both technically and financially vs. a variety of potential market conditions. As such the Energy Policy recommends that:

1) All electricity generation, cogeneration and district energy projects are evaluated on a case by case basis, with the aid of independent third party technical, legal and financial expertise, through the OEI.

2) The City will only construct clean or green generation or cogeneration projects.

3) These projects consider the economic impact to the City, including overall efficiency gains, security of supply, environmental impact, life cycle analysis and the local economic benefits for City.

4) The OEI be included in all generation, cogeneration and district energy project reviews prior to commitment to ensure all legal, technical and energy related issues have been considered. This is to make certain that the impacts of the new project can be clearly understood beyond the context of the specific project to measure any impact it has with other City energy strategies e.g., commodity supply and hedge strategies.

3.7 Back-up / Emergency Power Systems

1) All new and retrofit back-up/ emergency generation units and equipment will be reviewed for the economic (life cycle analysis), energy efficiency and environmental benefits of converting to newer cleaner fuel options such as natural gas or dual fuel generation units vs. existing diesel powered units.
2) All new and retrofit back-up/ emergency generation units are to also evaluate the costs and feasibility of “synchronization” of this equipment with the facility so that these units can used for “Peak Shaving” or “Peak Clipping” when favourable market conditions exist. This would also enable the City to participate in potentially lucrative Demand Response (DR) programs sponsored by the OPA. Synchronization allows the back-up/ emergency generators to run in parallel (at the same time) as the power is supplied to the facility from the grid and prevents power interruptions for critical and sensitive equipment such as elevators and computer systems.

3) That the OEI be included in the review of all new or retrofit back-up/ emergency generation power system projects prior to commitment to ensure all legal, technical and energy related issues have been considered.
4.0 SPECIFIC POLICIES RE: ENERGY PROCUREMENT

4.1 ‘Traditional’ Energy Procurement

The OEI will evaluate energy procurement options for the City on an ongoing basis, taking into account evolving energy requirements, energy market regulations and conditions, and the City’s risk profile. The Manager of Energy Initiatives may enter into hedging strategies where it is deemed appropriate and subject to the previously Council approved Commodity Price Hedging Policy (FCS07024).

4.1.1 Utility Supply and Rate Management

The OEI will evaluate utility rates (electricity, natural gas, water and waste water) for the City on an ongoing basis taking into account evolving energy requirements, energy market regulations and supply conditions/contacts and the City’s commodity supply arrangements. The OEI may initiate all utility rate changes as required to manage utility supply and utility rates. This is to ensure continued supply and allow for optimization of utility metering and rates favourable to the City.

4.1.2 Energy Contract Management

The OEI will be manage all energy commodity, energy supply, utility rates etc., as required to maintain energy supply to the City and the City’s end-use customers where the City directly supplies district heating, cooling or electricity from the CUP. All contracts will be managed within established City guidelines.

4.1.3 Utility Billing, Metering and Sub-Metering

The OEI will manage all customer billing, metering/sub-metering, monitoring, verification, validation and energy use data for the City’s district heating, cooling and electricity end-use customers.

4.2 Renewable Energy

The City of Hamilton is one of the Provinces leading municipal producers of Clean and Green Power. Currently a portion of the Central Utility Plant’s electricity which is supplied by Hamilton Community Energy is EcoLogo Certified as Clean Energy. The power produced by burning methane at the City’s Woodward Co-Generation Plant is considered green. Glenbrook’s Landfill Gas generation project when it comes online in 2008 will also produce green power.

4.2.1 Renewable Energy Metering

All renewable energy projects include appropriate metering to accurately determine actual net energy production and the subsequent life cycle costs analysis and corresponding environmental benefits.
4.2.2 Inclusion of OEI in Renewable Energy Project Evaluations

That the OEI be included in all corporate renewable energy project evaluations prior to commitment to ensure all legal, technical and energy related issues have been considered.

**Note:** If a renewable energy project receives funding from the OPA (Ontario Power Authority), their contracts stipulate that all green tags or credits produced, become the property of the OPA. The OPA in turn would have the right to sell these credits to a third party.

4.3 Green Power

With the current production of clean and green power and the premium cost of buying green power the OEI recommends that the City delay purchasing any new Green Power at this time. The cost premium for Green Power is approximately 3 cents per kilowatt-hour greater. This is a 50% increase in the current commodity rate the City is paying for electricity. It is recommended that Green Power be considered as part of the LEED evaluation for major retrofits or new construction (50% Green Power for a facilities provides one LEED credit). Green Power can be considered at a later date if necessary to supplement target shortfalls in CDM initiatives.

4.4 Emissions Trading

Emission trading, carbon trading, green tags etc., are still emerging options. The primary issues that the City will need to consider is whether the City sells or retires future credits for the benefits of the environment. It is recommended that the OEI, Corporate Finance and Planning & Economic Development, Long Range Planning & Design (Air Quality & Climate Change) continue to work together to establish a framework for selling or retiring future emission credits, carbon trading, green tags etc. along with the required certification and cost of ongoing monitoring and verification of measures. The results of this analysis is to be reported back to Council in June 2008.
APPENDIX A - DEFINITIONS

“CUP” (Central Utility Plant) which is owned by the City and is located within the downtown core of Hamilton, was constructed and became operational in 1977, in order to generate and distribute district energy (heating, cooling and electricity) to facilities in the downtown area. Hamilton Community Energy (HCE) provides electricity and thermal heating (hot water) to the CUP which in turn redistributes these services to its end use customers such as Copps Coliseum, the Central Library, and Farmer’s Market, Hamilton Place, Convention Centre, Parking Garage, Ellen Fairclough Building, Art Gallery and Hamilton City Hall.

“CDM or Energy CDM” means Energy Conservation and Demand Management

“Energy Intensity” for purposes of the Energy Policy, is the process of reducing overall energy usage or consumption of a facility or facility operations using a common measure over a specific timeframe. By measuring energy intensity vs. straight energy consumption reductions we are able to account for additions or deletions in the City’s building stock. We can also account for building expansions, changes in the City’s portfolio and correct for seasonal weather variations. Example: Comparing kilowatt-hours (kWh) per square foot of a building between 2005 vs. 2007.

“Facility” shall include all City owned buildings and grounds e.g. parks and recreation facilities.

“HECFI” means The Hamilton Entertainment and Convention Facilities, Inc.

“HVAC” means heating, ventilation, and air-conditioning.

“IESO” means Independent Electricity System Operator.

“Life Cycle Cost Analysis” is a method of economic analysis that sums all relevant project costs over a given study period in present-value terms. It is most relevant when selecting among mutually exclusive project alternatives that provide the same functional performance but have different initial costs, OM&R costs, and/or expected lives:

- Investment-related:
- Acquisition costs
- Replacement costs
- Residual value (resale or disposal cost)
- Operating-related:
- Operation, maintenance, and repair costs
- Energy and water costs
- Contract-related costs (for financed projects)


“OPA” means Ontario Power Authority

“Operations” Operations is what the City "does" and how it delivers its "product" to customers or constituents. It is the core of a company’s business. Example: Public Works, Water & Waste Water.