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ANNUAL ENERGY REPORT 2006

The Finance and Administration Committee recommends:

- 1. receipt of the presentation from Barry Crowe, Director, Property Services and Subhash Bhatia, Program Manager, Corporate Energy Services; and**
- 2. the adoption of the recommendations contained in the following report, November 20, 2007, from the Commissioner of Corporate Services:**

1. RECOMMENDATIONS

It is recommended that:

1. This report be received for information by Committee and Council.
2. The Regional Clerk circulate a copy of this report to Ministry of Energy for information.

2. PURPOSE

This annual report outlines the progress and outlook on York Region's Energy Management Program.

3. BACKGROUND

The Energy Management Program, led by Property Services started in early 2003. The Energy Management Program's primary focus is to incorporate sustainable measures and identify cost-cutting initiatives across Regional buildings and operations. This specialized program is expanding and comprises the following areas of energy management:

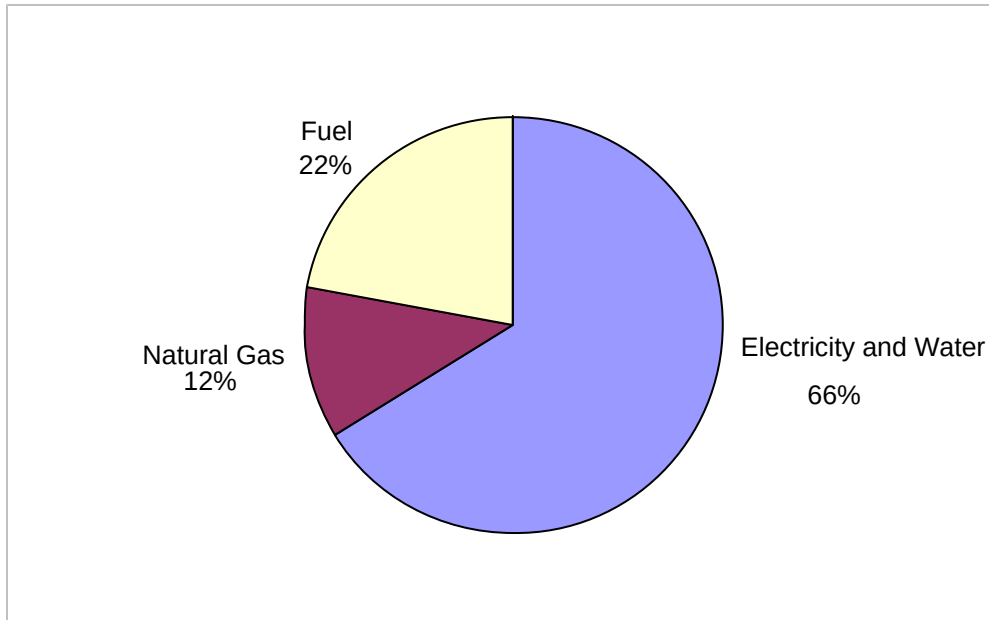
- Sustainable Buildings (High Performance Retrofits/Design, LEED® Certification, Renewable Energy)
- Energy Data Management (Energy monitoring, metering, software, load profiles)
- Energy Supply Management (Procurement Strategy, Supply /Demand Optimization)
- Energy Use (Benchmarking, Audits, Demand Response)
- Reporting (Bill 21 reporting, Emissions Accounting, Energy Awareness)
- Organizational Integration (Strategic Energy Plan)

3.1 Region's Utility Profile

The Region's energy use continues to grow in concert with increased demand for Regional services. On a corporate scale the Region's utility expenditures in 2006

exceeded \$16.35 million. There was a reduction of 2,564,258KWh in electricity consumption in 2006 while natural gas consumption grew by 50,909m³ as compared to 2005 consumption.

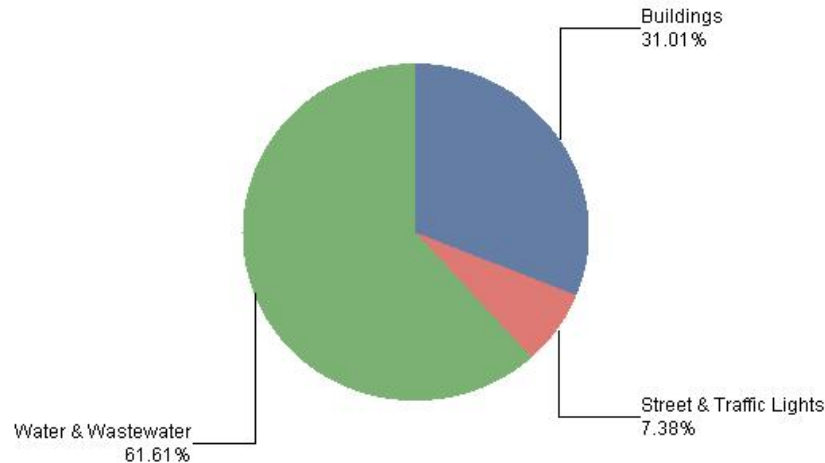
Figure 1 - Distribution of Energy Costs by Utility Type, York Region, 2006
(Source: Energy and Environmental Management System)
Energy Consumption Distribution



Electricity costs are the largest component of the Region's energy bill, with over 60% of those costs derived from water and wastewater pumping and treatment (Figure 2).

Figure 2 - Distribution of Electricity Costs by Facility Type, York Region, 2006
(Source: Energy and Environmental Management System)

Distribution of Electricity Consumption by Facility Type (York Region, 2006)



3.2 Market and Regulatory Update

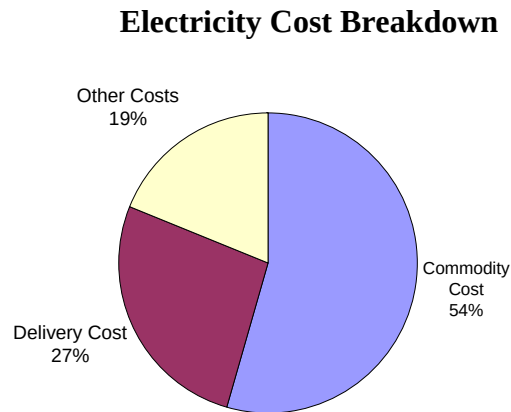
3.2.1 Electricity

In 2006, York Region paid a two tiered Regulated Price Plan (RPP) for its electricity consumption. Effective May 1, 2007, the Region pays 5.3 cents per kilowatt hour (KWh) up to a certain threshold each month and 6.2 cents per KWh for electricity used per month over this amount.

Effective April 2008, municipalities with facilities using more than 250,000 KWh per year (approximately \$2,000 a month) will begin paying an hourly price for electricity. The hourly price is set by Ontario's wholesale electricity market, which is operated by the Independent Electricity System Operator (IESO). This price is determined by balancing all the offers to supply energy against the demand for it. Prices fluctuate according to the weather, generator availability and time of day. The hourly price is mitigated financially by a number of adjustments including the Provincial Benefit and the Ontario Power Generation (OPG) Rebate.

The breakdown between commodity and distribution costs for electricity depends on the rate classification (e.g. >50kW demand) and size of the load. For a typical water and wastewater facility the breakdown is presented below (Figure 3).

Figure 3 - Electricity Distribution and Commodity Costs of a Typical Water and Wastewater Facility, York Region, 2006
(Source: Energy and Environmental Management System)



The electricity distribution rates increased in 2006. Hydro One distribution rates increased approximately 5% and PowerStream distribution rates increased by approximately 1%. There was no distribution rate increase for Newmarket Hydro.

3.2.2 Energy Conservation Responsibility Act (Bill 21), 2006

The Energy Conservation Leadership Act (ECLA), a component of Bill 21 received Royal Assent on March 28, 2006. Under this legislation, the Region is required to prepare and publish periodic energy conservation plans. The plans must be prepared in accordance with the requirements and must include the following information:

- A summary of annual energy usage
- Itemized description of significant energy consuming technologies and operations
- Description of current and proposed activities and measures to conserve energy
- Summary of progress and achievements in energy consumption and other reductions since the previous plan

A key requirement of Bill 21 is the need to track the energy usage for each Regional facility in order to identify poor performers, track energy savings, and report on the improvement of York Region's environmental footprint. York Region's proprietary energy software "EEMS" positions us meeting the reporting requirements of Bill 21.

3.2.3 Renewable Energy - Standard Offer Program Update

The Ministry of Energy has established a Standard Offer Program to help Ontario meet its renewable energy supply targets. Municipalities are eligible for this program, which provides a premium price for small renewable energy projects (<10 MW) for a fixed term (20 years). The forms of renewable energy include wind, solar, renewable biomass, bio-

gas, bio-fuel, landfill gas and water. The base price for all qualifying projects other than solar photovoltaic will be 11 cents/KWh. For solar photovoltaic, it will be 42 cents/KWh.

The Standard Offer Program provides an opportunity for the Region to increase its energy self-sufficiency through development of renewable power sources. Ontario's net metering regulation allows sending electricity generated from renewable sources to the electrical grid for a credit towards energy costs. It will specifically enhance the business case of the "behind the meter" wind energy project at the Sutton Water Pollution Control Plant in Georgina.

4. ANALYSIS AND OPTIONS

The following sections highlight major achievements to-date and initiatives in progress for 2007, within the Energy Management Program.

4.1 Sustainable Initiatives

An integral and important component of the Energy Management Program is "Sustainable Buildings". It is a part of the Region's Sustainability Strategy which promotes corporate culture of sustainability and implementation.

4.1.1 New Buildings

- On April 27, 2006, Regional Council approved the Sustainable Design and Construction Standard of LEED® Silver for new Regional facilities over 500 m² (5382 ft²) gross floor area. Housing and Water and Wastewater Process Facilities were excluded from the minimum sustainable standard at that time. Staff is reviewing application of LEED® standards for Housing and Process Facilities and determine a minimum sustainable standard applicable for them.
- The Region embarked upon its first LEED® project, a joint Fire / EMS station in partnership with the City of Vaughan. The facility has been awarded LEED® Gold certification by Canada Green Building Council. It has exceeded the minimum target of LEED® Silver and is a positive example of two levels of government working cohesively to promote energy conservation and reduce environmental impact of the new development.
- The project has also been awarded the Canadian Project Excellence Award 2007 under the Vision category. This prestigious award recognizes the outstanding performance and vision for better workplace, society and environment. Some of the key features of the project include 35% better energy performance, 58.6 tonnes of CO₂/year emissions reduction, 55% reduction in potable water use and superior indoor environment quality.

- Staff has continued to develop an implementation plan for integrated design process. The energy program continues to develop expertise in the area and has three LEED® accredited professionals on their team. Staff will develop a minimum standard for sustainable sites, water efficiency, energy and atmosphere, indoor environment and material and resources.
- Staff organized *Green Building: Policy to Practice* workshop in partnership with Canada Green Building Council on September 7, 2007. The workshop was geared towards developing working knowledge of green buildings and the project delivery process. It was well attended by representatives from area municipalities, York Region District School Board and Regional departments.
- Staff is working closely with Housing York Inc. in review and implementation of LEED® standards in the Tom Taylor Place, Newmarket. The project is in construction stage and targets to be Region's first LEED® certified multi-unit residential facility.
- The review of LEED® measures for the proposed Community Environmental Centre, Vaughan is in progress. Staff is actively involved in the assessment of sustainable and energy efficient design strategies at the critical concept design phase. Staff will be involved in the design and construction stage to provide due diligence to ensure delivery of LEED® certified project.
- An initial assessment and feasibility of LEED® measures is being examined for Stouffville Zone 2 Reservoir and Pumping Station. A sustainable design review and energy model on the current building design will be used to assess the design to LEED® measures. The assessment will include approaches and strategies for dealing with site development, water conservation, material selection, indoor environmental quality, energy efficiency measures as well as a provision for installing photovoltaic solar panels.

4.1.2 Existing Buildings

The Administrative Building in Newmarket has been the focus of considerable audit and upgrade work over the last few years, due to its size, potential and visibility. Efficiency measures include:

- Replaced magnetic fluorescent lighting ballasts with electronic
- Daylighting control in private offices
- Occupancy sensors for controlling lights in private offices, meeting rooms and washrooms
- Automatic sensor-operated faucets
- Variable-speed drives and return air ducting on air handlers
- Variable-speed drives on heating and cooling pumps
- New heating boilers

- Booster heat pumps for police call centre

The 2006 utility data review with respect to the baseline shows, 14% reduction in electricity use and 41% reduction in natural gas consumption for an overall savings of \$186,288.

Energy efficiency retrofit projects resulting from Building Energy Feasibility Studies II are currently underway. These include:

- Lighting upgrades and automatic lighting controls
- Building automation and mechanical upgrades
- A pilot solar water heating project

These measures upon implementation are estimated to save \$90,000 annually with a less than ten year payback period on investment.

Corporate Energy is also involved in the HYI portfolio and has assisted on the completion of two major energy retrofit projects at Founders Place (540 Timothy Street, Town of Newmarket) and Elmwood Gardens (325 Elm Road, Town of Whitchurch-Stouffville). The expected annual savings are \$46,000 with a simple payback period of 5.2 years. HYI is working on a plan to retrofit five buildings each year.

4.1.3 Wind Energy Feasibility Study at Sutton Water Pollution Control Plant

The Wind Energy Pre-Feasibility Study in the Town of Georgina identified Sutton Water Pollution Control Plant (WPCP) as a promising site for wind energy development. A report on the wind monitoring and Region's role in wind energy were approved by Council in 2006.

The Region is demonstrating environmental stewardship by conducting the Wind Energy Feasibility study at Sutton WPCP. The installation of a meteorological tower for wind resource monitoring was completed in September 2007. The study will assess the 12 months of data collected for the wind resource and the business case assessment results will be presented to Council in Fall 2008. The study will investigate the possibility of installing a single wind turbine at the Sutton WPCP based on the wind resource assessment, energy yield analysis, financial, technical and environmental constraints assessment for the site.

4.1.4 Green Power

The Region will be purchasing green power for two Regional facilities - the Administrative Building and the Household Hazardous Recycling Depot at an estimated cost of \$73,000.

4.1.5 Energy from Waste

Corporate Energy will work with Solid Waste Management Branch to explore possible technologies related to energy conservation in the Durham / York waste management initiative.

4.2 Energy Data Management

Energy data management includes energy monitoring, metering, software and facility load profiles. The comprehensive database of facilities, usage and utility cost information is useful in monitoring excessive variations, identifying and recovering billing errors and targeting facilities for follow up evaluations.

4.2.1 Energy and Environmental Management System (EEMS)

York Region created EEMS – an energy software tool that measures the energy and environmental performance of municipal operations. Energy information is tracked and made available for reporting for all buildings, street and traffic lights, water and wastewater facilities, power generation, and fleet operations.

- York Region has made EEMS available to other municipalities. The Region has licensed the system to the Region of Waterloo, Town of Markham, Halton Region and the Town of Oakville. Several other municipalities have expressed interest in obtaining an EEMS license.
- Staff has successfully completed an electronic utility invoice data initiative with two local distribution companies (PowerStream, Hydro One). This initiative involved the engineering of system interfaces resulting in the seamless electronic data transfer into the EEMS software of monthly utility bills. Fully seamless electronic invoice data transfer is a first for a municipality in Ontario.
- Staff is investigating solutions and soliciting feedback to incorporate real time energy data into EEMS.

4.3 Energy Supply Management

The energy supply market continues to evolve and Corporate Energy worked on the following initiatives related to energy supply management.

4.3.1 Natural Gas Procurement

In 2006, York Region continued to achieve price risk management and significant cost savings through the strategic procurement of natural gas. In 2006, the Region saved over \$135,000 by participating in a bulk natural gas purchasing program that is operated by the Association of Municipalities of Ontario (GASAMO).

4.3.2 Electricity Procurement

An Interim Electricity Procurement Strategy was approved by Council on May 24, 2007. The report recommended that York Region purchase electricity in a combination of the Regulated Price Plan, the Spot Market, and a Fixed Price Contract(s). Corporate Energy is implementing the interim electricity procurement strategy in a phased manner.

Phase I will include the removal of 15 interval metered sites from the RPP to the Hourly Spot Market. We anticipate significant annual savings in converting these accounts to the hourly spot market.

Phase II will place all street lighting accounts onto the spot market. The adoption of the Commodity Price Hedging Policy approved by Regional Council at its meeting October 19, 2007 will allow all street lighting accounts to be placed on spot market and is expected to provide significant annual utility savings.

Phase III will incorporate fixed price electricity contracts to purchase electricity for specific Regional facilities. Phase III will also include the purchase of Green Power.

4.4 Energy Use

It is important to analyze the energy use in facilities, perform energy audits and target facilities for retrofit implementation.

4.4.1 Building Energy Feasibility Study Phase III

The third phase of our Building Energy Feasibility Study (BEFS) will be completed in 2007. The BEFS will identify and quantify capital, operating and maintenance efficiency improvements in all the various energy-using building systems such as lighting, heating and cooling, as well as advanced energy and “green” building measures. BEFS provides the necessary background for developing a cost-saving retrofit program.

Thirteen buildings representing 446,000 ft² of floor area are included in BEFS III.

4.4.2 Water and Wastewater Energy Feasibility Study

Since Water and Wastewater represents the single largest user of energy within the services operated by the Region, it is important to ensure that this energy is being used in the most efficient manner possible. The Water and Wastewater Energy Feasibility Study reviewed various processes and general building services opportunities for the reduction of energy within Water and Wastewater facilities and identified general and site specific energy management opportunities at the following facilities:

- One water treatment plant (Keswick Water Treatment Plant)
- One water pumping station (Newmarket Wells 13&16)
- One wastewater pumping station (Aurora Sewage Pumping Station)

The potential for savings at the three sites ranged from 4% to 19%. Water and Wastewater is investigating the implementation of identified initiatives which have been added into the Water and Wastewater Infrastructure Improvement Program. If all the high priority initiatives are implemented the first year savings potential is estimated to be \$147,768.

4.4.3 Housing York Inc. (HYI) Energy Audits

Energy audits were completed on most of the HYI buildings. Seven remaining buildings are scheduled for audits in 2007.

4.4.4 Demand Response (DR)

Given the serious electrical grid reliability issues in York Region expressed by the Ontario Power Authority, Corporate Energy continues to investigate various demand response concepts. The Region signed a demand response contract with Rodan Energy and Metering Solutions Inc. for the Administrative Building. The program requires drop in demand (>50KW) for 6 hours duration within 1.5 hours of receiving operation directive. The Region has curtailed over 2,600 KWh in the program at critical times when the supply infrastructure was heavily constrained.

The pilot project at the Aurora Sewage Pumping Station (SPS) will utilize existing generator during peak electricity demand periods. PowerStream's Conservation and Demand Management program is fully funding the capital cost for necessary upgrades to make the emergency generator ready for peak demand management. There are three existing emergency generators at Aurora Sewage Pumping Station but only one generator capable of 1.5 MW of electricity per hour can participate in peak demand management at this stage. This generator provides an opportunity to supply much needed peaking power to the region.

4.5 Reporting

Corporate Energy will submit the necessary documents on behalf of the Region to comply with ECLA once regulations are finalized. The Energy Management Program performs emission calculations and submits reports on behalf of the Region to meet its requirements under National Pollution Release Inventory and Ministry of Environment Reg. 127.

4.5.1 Clean Air

There is an unequivocal link between energy use and environmental impact. In 2006, the Energy program managed a new environmental contract position to conduct technical, economic and environmental due diligence activities on the proposed clean air action plan developed by the Corporate Clean Air Task Force. The staff worked on 2004 emissions inventory calculations and provided technical input to the draft Regional Air Quality Strategy.

4.6 Organizational Integration – Strategic Energy Plan (SEP)

The development of the Regional SEP will provide a strategic vision incorporating all Regional departments. The plan will provide a framework for advancing the Region from its current state of energy management to the preferred state of energy sustainability. The plan will also provide a long term strategic vision for energy management that is consistent with and builds upon the Region's Vision 2026, Sustainability Strategy and Strategic Air Quality Strategy.

4.7 Relationship to Vision 2026

The Energy Management Program supports Goal 1 “Quality Communities for a Diverse Population” and Goal 2 “Enhanced Environment, Heritage and Culture” of Vision 2026. As a key player in community development, the Region has the opportunity to show environmental stewardship and leadership through its Energy Management Program by ensuring that its own facilities and operations are built and managed in a responsible and sustainable manner.

5. FINANCIAL IMPLICATIONS

5.1 2006 Savings

The Energy Management Program has focused on self-financing the groundwork stages of its program through operation efficiencies, grants and EEMS license sales. The design of more energy efficient buildings and implementation of retrofits will effectively result as a hedge against rising energy costs.

A previous report was tabled before Regional Council summarizing the performance of the program and projected savings on June 22, 2006. This report indicated that the program had already generated \$227,000 in savings and projected savings of \$390,629 in 2006/2007. The total program saving in 2006 was \$401,688, which exceed the projected savings.

Table 1 summarizes the financial performance of the program for 2006.

Table 1
Energy Management Program Savings (2006)

	Savings (\$)
Admin Centre Energy Retrofits	186,288*
Natural Gas Procurement	135,000
EEMS Licenses	20,000
Blue Willow Housing Energy Efficient Design	35,400**
Bales Drive Transportation & Works Operation Centre	25,000
Total	\$401,688

* Reduction in 1,023,517 KWh in electricity and 211,098m³ natural gas

** Savings accrued to Housing York Inc.

5.2 Projected Savings (2007 – 2008)

The retrofit at the Administrative Building was completed at a gross cost of \$1.6 million and is eligible for incentives over \$134,000. The total utility savings in 2006 with respect to the baseline was \$186,288, resulting in a simple payback of approximately eight years. In 2007, the energy retrofits at the Administrative Building are expected to achieve over \$190,000 in annual energy savings. Beyond 2007, future planned energy retrofits are eventually expected to save \$280,000 in annual utility savings.

Table 2
Annual Energy Management Program and Utility Savings (2007 - 2008)

	Savings (\$)
Administrative Building Energy Retrofits	190,000
Phase II Energy Retrofits*	45,000
W&WW Energy Retrofits*	73,000
EEMS Licenses	20,000
LEED Gold Fire / EMS	12,629
Blue Willow Housing	35,400**
Tom Taylor Place*	26,000**
Bales Drive Transportation & Works	25,000
Natural Gas Procurement	TBD
Electricity Procurement*	291,000
Green Power Procurement	(73,000)
Demand Response	20,000
Total	\$665,029

* Indicate partial year savings

** Savings accrued to Housing York Inc.

5.3 Grants

The Region was successful in securing grants for energy studies, design and retrofits. The program has accessed \$470,925 in grant funding to date, an addition of \$111,721 since the previous update. The Region was also successful in securing \$403,000 in capital funding from PowerStream's Conservation and Demand Management Program. This funding will be used for necessary upgrades to make the emergency generator ready for peak demand management at the Aurora Sewage Pumping Station.

The total grant funding dispersed in instalments through 2004 to 2007 is shown below.

Table 3
Energy Efficiency Grants (2004 - 2007)

	Savings (\$)
Natural Resources Canada	155,000
Federation of Canadian Municipalities and Green Fund	262,700
Enbridge Gas Distribution	41,225
Environmental Careers Organization (wage subsidy)	12,000
Total	\$470,925

6. LOCAL MUNICIPAL IMPACT

The Region's Energy Management Program benefits residents and local municipalities by contributing to lower demand for utilities and large-scale infrastructure, enhanced Regional air quality and reduction in greenhouse gas emissions.

7. CONCLUSION

The Energy Management Program savings in 2006 are \$401,688 and have exceeded the projection. The projected savings (2007-2008) are \$665,029, over 58% increase to previous year projection. The program has accessed over \$470,925 in grants to date. The program has successfully implemented a fully seamless electronic invoice transfer into the Region's EEMS software for two local distribution companies, a first for a municipality in Ontario.

The program has developed and implemented initiatives to promote and implement sustainable and energy efficient building design and construction. The program has made notable contributions in achieving York Region's first LEED® Gold certified facility. There is significant opportunity for further cost savings in implementing sustainable, energy efficient building design and retrofits. The program fulfils the Region's need for effective energy management while positioning the Region as a leader in sustainable buildings, energy efficiency and environmental performance.

The Senior Management Group has reviewed this report.