

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF SEPTEMBER 26, 2017

Item 1, Report No. 29, of the Committee of the Whole (Working Session), which was adopted without amendment by the Council of the City of Vaughan on September 26, 2017.

1 UPDATE ON THE CITY OF VAUGHAN CORPORATE ENERGY MANAGEMENT STRATEGY AND ENERGY MANAGER AGREEMENT

The Committee of the Whole (Working Session) recommends approval of the recommendation contained in the following report of the Deputy City Manager of Planning and Growth Management, the Deputy City Manager of Community Services and the Director of Policy Planning and Environmental Sustainability, dated September 18, 2017:

Recommendation

The Deputy City Manager of Planning and Growth Management, the Deputy City Manager of Community Services and the Director of Policy Planning and Environmental Sustainability, in consultation with the Director of Financial Planning and Development Finance, recommend:

1. THAT the staff report and presentation outlining progress on energy consumption savings, greenhouse gas (GHG) emissions and impact on utility costs from conservation retrofits in City facilities as part of the City's Corporate Energy Management Strategy BE RECEIVED;
2. THAT staff be directed to evaluate alternative financing procurement options to (i) assist in funding ongoing energy efficiency upgrades in City facilities and (ii) consider investments in renewable energy systems and alternative energy systems and to facilitate energy systems on City assets to make Vaughan a contributing part of a distributed energy system;
3. THAT staff be directed to evaluate setting best-in-class energy use intensity targets for City facilities in anticipation of the Ministry of Energy setting such targets under Ontario Regulation 397/11 for the broader public sector; and
4. THAT the City enter into the Mayors' Megawatt Challenge to facilitate information exchange and sharing.

Contribution to Sustainability

This initiative is consistent with the priorities previously set out by Council in Green Directions Vaughan regarding the Community Sustainability and Environmental Master Plan, under Goal 1: To reduce greenhouse gas emissions and move towards carbon neutrality for the City of Vaughan's facilities and infrastructure:

- Action 1.1.1: Seek creative funding for energy saving projects for municipal facilities;
- Action 1.1.2: Evaluate the city's greenhouse gas emissions by completing an energy audit on all City facilities by building upon the ongoing work of other municipalities;
- Action 1.1.3: Prepare an annual energy conservation plan pursuant to the Energy Conservation Leadership Act, 2006, S.O. 2006, C3; and
- Action 1.1.5: Develop an emissions reduction plan for City facilities.

The City is required to report on energy consumption and GHG emissions of facilities in accordance with O.Reg. 397/11. The Environmental Commissioner of Ontario recently reported on the results of several years of mandatory energy reporting in the public sector and notes that "it creates awareness of energy use, drives interest in conservation activities, which in turn helps develop Ontario expertise in energy management companies".

EXTRACT FROM COUNCIL MEETING MINUTES OF SEPTEMBER 26, 2017

Item 1, CW(W/S) Report No. 29 – Page 2

Economic Impact

Facility Maintenance Services has spent \$740,913 on energy efficiency upgrades with a focus on LED lighting retrofits, heating, ventilation and air conditioning upgrades, and improvements in efficiency at arenas. To date, the City has received \$40,687.30 in incentive payments from Alectra Utilities under the Energy Manager (EM) Agreement. Energy efficiency upgrades made to date are saving the City an estimated 2,023 MWh of electricity, 101 tonnes of greenhouse gas (GHG) emissions and avoiding \$245,900 in annual energy costs.

Communications Plan

Broader public sector buildings are ideal candidates to demonstrate energy efficiency and support a culture of conservation. (from Conservation: Let's Get Serious, Environmental Commissioner of Ontario, 2016)

Energy efficiency upgrades throughout the community and especially at local community centres have created an excellent platform to engage with Vaughan citizens about the many benefits of energy conservation. In coordination with Corporate Communications, 3 ft. by 5 ft. "Energy Dashboard" posters are being created for community centres. The dashboards use infographic-style images to educate residents on energy savings and greenhouse gas emission reductions that are occurring at city facilities.

The information is available to the public on the Broader Public Sector (BPS) portal (www.ontario.ca/data/energy-use-and-greenhouse-gas-emissions-broader-public-sector) and is required to be made available on the City web site. The energy consumption data verified by the Ministry of Energy and returned to the City, once available, will be posted to the appropriate web pages under Environmental Sustainability.

Purpose

The purpose of this report is to provide an update to Council on the progress regarding energy consumption savings, greenhouse gas emissions reductions, and impact on utility costs from energy conservation retrofits in City facilities as part of the City's corporate energy management strategy. The report serves as a progress update of the Energy Conservation and Demand Management Plan (ECDMP) and implementation of the Energy Manager Agreement with Alectra.

The City is required to report its energy consumption to the Ontario Ministry of Energy through the BPS portal in accordance with O. Reg. 397/11. The City is required to report on 55 facilities.

Background - Analysis and Options

1. Policy Direction

The City of Vaughan's corporate energy management strategy aligns with several provincial and regional policies.

1.1 Ontario's Energy Regulation for Public Agencies

Ontario Provincial Regulation O. Reg. 397/11: Energy Conservation and Demand Management Plan came into force January 1, 2012. It requires public agencies, including municipalities, starting on July 1, 2013, to report annually to the Ministry of Energy on corporate energy use and greenhouse gas (GHG) emissions. Municipalities are required to publish the energy consumption reports on their websites. Additionally, starting July 1, 2014,

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF SEPTEMBER 26, 2017

Item 1, CW(WS) Report No. 29 – Page 3

public agencies were required to develop five-year conservation plans and publish their plans on their websites. Plans require updating every five years. The City approved the Conservation Demand Management Plan in 2014 and will be updating the ECDMP in 2019.

Energy conservation opportunities in public buildings are addressed in a chapter of the latest Annual Energy Conservation Progress Report – 2015/16 (Conservation: Let's Get Serious) from the Environmental Commissioner of Ontario (ECO). In this chapter, the first three years of energy use data for the province's broader public sector buildings are analyzed and the ECO assesses the potential for benchmarking this data. The ECO provides one main recommendation from the assessment directed to the Minister of Finance to remove barriers that prevent public bodies from borrowing to upgrade the energy efficiency of their buildings, and from using the resulting energy bill savings to repay the loan. In addition to the detailed analysis of energy intensity of public buildings, the following observation is also provided by the ECO: "Overall, mandatory energy reporting in the BPS is supporting a culture of conservation and creating a virtuous circle: it creates awareness of energy use, drives interest in conservation activities, which in turn helps develop Ontario expertise in energy management companies. This can lead to technological improvements and more opportunities for local green jobs."

The Environmental Commissioner of Ontario notes that if all Ontario BPS buildings reach at least median energy efficiency for their category, energy consumption could decrease by 21 per cent, providing 0.6 megatonnes of GHG savings and approximately \$250 million in avoided utility costs.

1.2 Government of Ontario Climate Change Action Plan

Ontario has set GHG reduction targets of 15 per cent in 2020, 37 per cent in 2030 and 80 per cent in 2050 below 1990 emissions levels. Based on greenhouse gas reporting data, Ontario has met its 2014 target of six per cent below 1990 levels. The government of Ontario has announced it intends to establish a greenhouse gas pollution reduction challenge fund to support emissions reduction projects proposed by municipalities that already have municipal/community energy plans or climate change policies with greenhouse gas pollution inventories in place. Green projects will be eligible to receive matching provincial funding, with a focus on demonstrating the best cost-per-tonne reduction. The City of Vaughan's corporate energy management strategy (the ECDMP), as well as the community-wide Municipal Energy Plan approved in June 2016, will situate the City in a good position to be ready to apply for funding when the program is announced.

1.3 Growth Plan for the Greater Golden Horseshoe

The *Growth Plan* not only continues the emphasis on complete communities and compact urban form, but also deepens an alignment with the Province's climate change strategy as articulated in the Climate Change Action Plan. A guiding principle of the Growth Plan explicitly notes this connection to "Integrate climate change considerations into planning and managing growth such as planning for more resilient communities and *infrastructure* – that are adaptive to the impacts of a changing climate – and moving towards low-carbon communities, with the long-term goal of net-zero communities, by incorporating approaches to reduce greenhouse gas emissions". The reference to resilient infrastructure reflects the acknowledgment of climate change adaptation as well as ongoing energy conservation and GHG emissions reduction.

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF SEPTEMBER 26, 2017

Item 1, CW(W/S) Report No. 29 – Page 4

1.4 Independent Electricity System Operator Conservation First Framework

The 2015-2020 Conservation First Framework (CFF) maps out Ontario's energy conservation goals over the next six years, emphasizing a coordinated effort within all stages of energy planning, as well as more effective teamwork among sector partners, particularly with local distribution companies (LDCs). The goal of the CFF is a total reduction of 8.7 TWh of electricity consumption in Ontario by December 31, 2020 — 1.7 TWh to be achieved through conservation projects with transmission-connected customers, and 7 TWh from conservation programs delivered by LDCs to residential and business customers across the province.

As part of the Conservation First Framework, the Independent Electricity System Operator (IESO) provides incentive funding for hiring an Embedded Energy Manager (EEM). The EEM is responsible for:

- Electrical Energy Saving Project Implementation;
- Energy Tracking & Monitoring;
- Energy Savings Opportunities & Action Plan;
- Measurement & Verification Strategy;
- Energy Management Behaviour and Business Process Improvements;
- Employee Awareness Programs;
- Assistance to LDC Projects; and
- Reporting.

2. Energy Conservation and Demand Management Plan (ECDMP) and Energy Manager (EM) Agreement Funding

Under O. Reg. 397/11, the ECDMP was required to be in place by 2014 and is required to be updated every 5 years. The ECDMP functions as the City's corporate energy conservation strategy and is intended to be a road map for best practice energy management to deliver energy savings associated with City facilities and infrastructure in an effective and flexible manner. An update of the ECDMP is required by regulation by 2019 and a draft will be completed in 2018 by staff for finalization in 2019.

The City of Vaughan currently receives \$80,000 yearly in funding through the IESO EM Agreement to support an Energy Manager position. The funding is contingent on meeting a 2,000 MWh energy savings target and requires the submission of quarterly progress reports to track energy conservation projects, expected and verified energy savings, and incentive payments back to the City. With the anticipated electricity savings expected from the Vaughan LED Streetlight project, staff will evaluate amending the EM Agreement to the performance-based model. This would fund an up-front payment of \$40,000 per year, with an additional \$40 per megawatt hour saved above the 2,000 MWh target to an annual total funding cap of \$150,000.

3. Utility Costs and Summary of Energy Conservation Retrofits in City Facilities

3.1 Utility Costs

Energy consumption retrofits have helped curb increases in the City's utility costs.

In 2016, the City of Vaughan spent approximately \$10.6 million on utility costs, which includes electricity for facilities and streetlights, natural gas at facilities and water use. Overall, utility costs rose approximately 10% over the previous year, primarily due to increased electricity costs. The City spent \$5.2M on electricity at the 55 buildings that the City owns and operates.

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF SEPTEMBER 26, 2017

Item 1, CW(WS) Report No. 29 – Page 5

The cost of electricity consumed at Vaughan facilities has steadily risen from \$4.2M in 2012, to \$4.6M in 2014 to \$5.2M in 2016. During this time, the amount of electricity consumed by the corporate facilities has decreased while the cost per kWh has increased. Based on an analysis of electricity consumption and charges, the average price per kWh that the City of Vaughan pays has risen from \$0.13/kWh in 2012 to \$0.18/kWh in 2016. Electricity price increases can be managed by the City mainly in two ways: reduce energy consumption through energy efficiency upgrades and changes in operations and maintenance; and reduce peak demand charges through investment in technologies and targeted facility energy management.

In 2017, natural gas costs are expected to increase by \$0.033518 per cubic metre (CUM) as a result of the Province's Climate Change Action Plan (Cap and Trade) legislation. For the City of Vaughan, this will increase natural gas bills by an estimated \$160,000. The City paid approximately \$988,000 for natural gas in 2016.

3.2 Energy Conservation Retrofits

As noted above, Facility Maintenance Services has spent \$740,913 on energy efficiency upgrades which has resulted in an estimated \$245,900 of avoided annual energy costs.

In 2016, Internat Energy Solutions Canada (IESC) was hired by the City of Vaughan to act as the interim Energy Manager for the City of Vaughan from August 2016 to February 2017 while the existing Energy Manager was on leave. IESC provided detailed recommendations for energy efficiency upgrades at the City's community centres and large administration buildings based on site visits and incorporating the results of the earlier audits of 15 facilities. The proposed energy conservation measures form a facility energy management plan required under the EM Agreement.

IESC recommended 56 energy efficiency upgrades that have paybacks of less than three years. These short-term, energy efficiency upgrades would cost a total of approximately \$850,000 and would save 2,393 MWh of electricity, 27,330 CUM of natural gas, reduce the City's GHG footprint by 171 tonnes and avoid an estimated \$385,000 in utility costs annually.

IESC also recommended an additional 27 energy efficiency upgrades that have paybacks of greater than three years and less than eight years. These medium-term, energy efficiency upgrades would cost a total of about \$730,000 and would save 742 MWh of electricity, 53,530 CUM of natural gas, reduce the City's GHG footprint by 138 tonnes and avoid approximately \$140,000 in utility costs annually.

The remaining building energy retrofits are critical in continuing to curb increases in operating costs, decrease the corporate carbon footprint and be cost effective in the operations of facilities.

4. LED Streetlight Retrofit Project

Electricity consumption savings from the LED streetlight retrofit, estimated at over 9,000 MWh annually once completed, can be used to exceed savings targets under the EM Agreement

The business case study completed for the LED street light replacement project estimated the City would save approximately 9,000 MWh annually and avoid an estimated \$1.5 million in electricity costs each year once implementation is completed in 2020. The electricity consumption

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF SEPTEMBER 26, 2017

Item 1, CW(W.S) Report No. 29 – Page 6

savings from the LED street light replacement are eligible to count towards the EM Agreement savings target of 2,000 MWh. Hence, there is the potential to exceed the energy savings target in the EM Agreement.

5. Roof Repair and Solar Photovoltaic Installation at Six Community Centres

At the February 21, 2017 meeting, Council awarded tender T16-464, Roof upgrade for installation of solar panels at six (6) community centres, Chancellor CC, Father Ermanno Bulfon CC, Maple CC, Dufferin Clark CC, Garnet A. Williams CC, and North Thornhill CC. The roof upgrade for installation of rooftop solar panels at the six (6) community centres was awarded in the amount of \$2,104,000. The City is working in partnership with Alectra Utilities to support installation of solar arrays on the rooftops of the community centres under the Feed-in-Tariff (FIT) program.

The work to repair and/or replace roofs at these locations is required as a result of the roof assessments conducted in 2016 and to meet the requirements of the solar installations overall. The project will strengthen the City's commitment to environmental stewardship as once installed, arrays are projected to generate an estimated 850 kW of energy per year to the Alectra grid and approximately \$47,750 in annual lease payments to the City.

6. Challenges and Next Steps

6.1 Utility Cost Escalation

Since 2012, the average price per kWh has risen from \$0.13 per kWh to \$0.18 per kWh in 2016. The total consumption for Vaughan facilities has decreased from 32,916,066 kWh in 2012 to 26,544,704 in 2016.

Action: Continue collaboration with City staff in Facility Maintenance Services, Corporate Asset Management and Financial Planning & Development Finance to work holistically on energy management with a focus on peak reduction or load shifting as a way to mitigate increases in electricity charges in addition to implementing energy retrofits. This has the potential to reduce the additional charges that the City pays during peak hours (e.g. Global Adjustment Charge).

6.2. Financing Ongoing Energy Conservation Retrofits

Retrofits are working to reduce energy consumption as shown for those community centres where most retrofits have occurred. However, due to electricity rate escalation, energy consumption savings have only helped mitigate costs increases. To continue mitigating future utility cost increases, ongoing energy retrofits will be evaluated and any capital budget requests will be brought forward as part of the 2018 budget process.

Action: Evaluate alternative financing options to assist in funding the energy retrofits identified in the 2017 audits by Internat Energy Solutions Canada. The retrofit program funded by The Atmospheric Fund (TAF) should be included in such an evaluation.

6.3. Energy Savings Through Operations and Maintenance

Retrofits requiring a capital budget allocation are one key mechanism to reduce energy consumption. However, changes in operations and maintenance can provide significant energy consumption savings. For example, as noted in the report of the ECO, Conservation: Let's Get Serious, the Grand River Hospital in Kitchener-Waterloo was able to reduce electricity and natural gas consumption by 20% and 30% respectively and save over \$270,000 in utility bills in 2015 while spending less than \$100,000 on external projects.

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF SEPTEMBER 26, 2017

Item 1, CW(WS) Report No. 29 – Page 7

Action: Consider joining Mayors Megawatt Challenge to provide peer-to-peer learning opportunities to extract energy savings from operations. Joining the Mayors Megawatt Challenge also provides for the comparison of the City building stock against other like-use facilities.

6.4 Measurement and Verification

Energy tracking information to verify savings from energy conservation measures is critical. Not only is measurement and verification a requirement of the EM Agreement, up-to-date energy tracking is essential to ensure that energy savings potential is being realized from retrofits and where operations and/or maintenance improvements may require further refinement. This accountability is also important to demonstrate actions taken by the City in support of Ontario's Climate Change Action Plan.

Action: Evaluate the costs of options for up-to-date energy consumption tracking, also standardizing by weather conditions (e.g. heating and cooling degree days) and facility utilization rate, along with utility costs to more accurately measure simple payback. Energy measurement and verification undertaken in this manner allows City staff to more accurately demonstrate energy and cost savings. The energy tracking data can be used to create an energy conservation reserve that would be used for re-investing energy savings in on-going energy conservation measures. Allocating a portion of the cost savings from energy reduction, and also including rebate payments from the EM Agreement and Enbridge's "Run it Right" programs, to an "energy conservation fund" can be used for further retrofit projects, to leverage Gas Tax, as potential matching funds for future Green Municipal Fund applications, and/or for ongoing operator training. Staff are currently exploring the creation of such a reserve and will be bringing forward an update as part of the 2018 budget process.

6.5 Carbon Pricing

Fossil fuel costs are increasing under the Province's Climate Change Action Plan. While energy conservation retrofits will continue to focus on electricity savings in the short term to mitigate cost increases, attention in the near future will need to focus also on natural gas consumption in City facilities and fuel use by the City's fleet.

Action: Plan for reducing fossil fuel use by the City and incorporate such measures into the update of the ECDMP for 2019 in accordance with O. Reg. 397/11. Immediate actions include registering appropriate City facilities in Enbridge's "Run it Right" program, a customized natural gas reduction program.

6.6 New Facility Construction

Given the provincial policy direction towards low carbon communities as well as industry consideration of "net zero ready" and "net zero energy" buildings, City staff should look beyond the City's LEED Gold certification requirement to evaluate the business case for sustainable elements such as the following for new facilities:

- A best-in-class energy efficiency target (such as expressed in terms of energy intensity or better than Ontario Building Code);
- Leveraging Savings by Design, High Performance New Construction or other incentive programs to achieve high energy efficiency and low GHG emissions;
- Integrating renewable energy and/or distributed energy (e.g. electricity storage, cogeneration, etc.) to achieve energy targets and lower operating costs; and
- Building resilience through passive design features and whole-system design.

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF SEPTEMBER 26, 2017

Item 1, CW(WS) Report No. 29 – Page 8

Relationship to Term of Council Service Excellence Strategy Map (2014-2018)

The Energy Conservation Demand Management Plan is related to Service Excellence Strategy Term of Council Priority 12. “To continue to cultivate an environmentally sustainable City”, in which facility retrofits for energy conservation and LED street light retrofits are tracked.

Regional Implications

Corporate energy management for GHG emissions reductions and energy savings are consistent with Regional policy direction in York Region Vision 2051 and the Region Official Plan 2010.

Conclusion

The City is able to demonstrate energy consumption savings for those facilities that have been the focus of energy conservation retrofits. Cost savings and energy savings have been achieved but offset by increases in energy costs. Ongoing energy conservation retrofits are necessary to mitigate future energy cost increases.

The energy consumption savings have resulted in modest GHG emissions reductions given the relatively low-carbon electricity grid in Ontario. While energy conservation retrofits should continue to focus on electricity savings to mitigate energy cost increases, an increasing focus on natural gas consumption savings is required given the price increases for fossil fuel under Ontario’s Climate Change Action Plan.

Corporate energy management is an ongoing function under the provincially mandated Energy Conservation and Demand Management Plan. Maximizing the EM Agreement is the current focus of ECDMP implementation, although several actions are identified in this report to make further progress.

Attachments

1. Corporate Energy Management Strategy PowerPoint Presentation

Report prepared by:

Elizabeth Linley, Sustainability Coordinator-Energy Manager, ext. 8426
Tony Iacobelli, Manager of Environmental Sustainability, ext. 8630

(A copy of the attachments referred to in the foregoing have been forwarded to each Member of Council and a copy thereof is also on file in the office of the City Clerk.)