



STAFF REPORT ACTION REQUIRED

Energy Retrofits – City Buildings

Date:	September 2, 2015
To:	Parks and Environment Committee
From:	Chief Corporate Officer
Wards:	All
Reference Number:	P:\2015\Internal Services\E&E\Pe15007e&e – (AFS # 21511)

SUMMARY

The Parks and Environment Committee, at its meeting on June 22 2015, requested the Chief Corporate Officer to report to the September meeting:

- a. with an outline of what service standard would be needed to start a program for examining all City Buildings for energy retrofits;
- b. on the cost of increasing the corporate waste diversion rate beyond the rate currently being achieved;
- c. on the target and cost to achieve the target for normalized energy consumption for corporate buildings that exceeds the global standard for municipal buildings; and
- d. on the cost of accelerating plans to achieve greater energy efficiency of municipal buildings using recoverable debt.

The Energy Conservation and Demand Management Plan (ECDM) has identified 528 City facilities as having potential for energy conservation initiatives. There are a total of 4,809 City properties identified in the City of Toronto data base (SAP), which consist of a variety of types of properties for example: water treatment plants, TTC facilities, parks, outdoor arenas. Some of the properties have a very low energy consumption or no energy consumption for example: property with no buildings or seasonal use (outdoor arena, ball parks). These projects will be prioritized for future inclusion in the ECDM plan.

The ECDM plan includes all of the major energy-consuming buildings in the City's portfolio that are not managed by other divisions, and will be the focus for energy conservation planning in the near term. Smaller, seasonal and distributed lighting opportunities will be evaluated in turn.

Recoverable debt will be used to finance all aspects of project identification, scoping, engineering, implementation and monitoring & verification. The risk associated with using recoverable debt to finance project identification and scoping phases can be addressed using several strategies including strategic prioritization of high potential projects, grouping of projects into portfolios and the use of non-recoverable funds.

ECDM has established an energy efficiency performance target of having all buildings attain top quartile performance. Although there are no global standards for energy performance, this approach has been used by the Building Owners and Managers Association (BOMA), RealPac and others validating that the City's approach is consistent with industry.

Great progress has been made in improving the City's waste diversion rate. To improve it further and to reduce the overall amount of waste created, will require raising the visibility of the issue within the City leading to the eventual change of attitudes and behaviour. Communications to all Divisions from senior City management requiring the establishment of paper reduction targets is a first step leading to longer-term behavioural change.

RECOMMENDATIONS

The Chief Corporate Officer recommends that:

- (1) The Parks and Environment Committee receive this report information.

FINANCIAL IMPACT

To accelerate the use of recoverable debt to finance energy initiatives could require up to \$40,000 per year. To extend the waste diversion program to all 528 ECDM facilities could require up to 4 staff.

The 2015 – 2024 Capital Plan includes funding of \$36.500 million to perform energy audits and implement energy retrofit projects at City facilities, including Agencies.

The Deputy City Manager & Chief Financial Officer has reviewed the report and agrees with the recommendations.

ISSUE BACKGROUND

At the June 22, 2015 meeting of the Parks and Environment Committee, the Chief Corporate Officer (CCO) was directed to report back to the September, 2015 meeting:

- a. with an outline of what service standard would be needed to start a program for examining all City Buildings for energy retrofits;
- b. on the cost of increasing the corporate waste diversion rate beyond the rate currently being achieved;

- c. on the target and cost to achieve the target for normalized energy consumption for corporate buildings that exceeds the global standard for municipal buildings; and
- d. on the cost of accelerating plans to achieve greater energy efficiency of municipal buildings using recoverable debt.

Item A: Service Standard for Examining All Buildings

Table 1 – all properties

Table 1 illustrates the distribution of the 4,809 City properties identified in SAP. Once we account for properties having no energy consumption, properties where bulk (not individual) metering is used and properties already part of the City's ECDM plan, there are 1,077 properties remaining where energy consumption data is tracked.

City of Toronto Property Summary		
Notes		
Total number of properties without buildings	2692	Non energy consuming properties
Individual properties identified in SAP that are grouped together for utility billing purposes	512	The energy consumption in these facilities is being actively managed by City ABC&D's
Total properties within the ECDM plan	528	Buildings meeting the criteria establish by the Ontario Ministry of Energy for the Green Energy Act
Properties not included in ECDM	1077	For associated details see Table 2
Total number of properties listed in SAP	4809	Include all properties such as vacant land, open spaces, walkway and buildings

Table 2 – Energy using properties outside of ECDM scope

Table 2 focuses on the 1,077 energy-consuming properties not included the ECDM initiative.

Group A includes the City Agencies, Boards, Commissions and Divisions (ABCD's) that have significant energy consumption, but were outside of scope for inclusion in the ECDM by virtue of the building or operational type. For example, the Green Energy Act specifically excluded industrial facilities, transportation hubs, street lighting, etc. Toronto Water and TTC operate 229 sites, that have dedicated energy management staff and their own initiatives to reduce energy consumption. Transportation Services operates the City's street and traffic lighting and are currently working to identify opportunities to implement LED technology. Similarly, certain Agencies, e.g. Ex Place and the Zoo, have their own energy initiatives under development. Parks, Forestry and Recreation (PF&R) operates 500 properties including outdoor sites with a mixture of seasonal energy use and lighting. The PF&R locations may be candidates for a generic technology retrofit, e.g. lighting upgrades. The Environment and Energy Division (EED) is working with these divisions to identify, analyze and implement energy saving and/or revenue generating initiatives.

Group B consists of properties having energy savings potential considered as low to medium. The average annual per-site energy costs would be close to the cost of performing an energy audit. Therefore, these locations are perhaps a better fit for a standard energy upgrade strategy where lighting, heating, etc. is upgraded without the benefit of an energy audit. Several case studies would have to be undertaken to demonstrate the effectiveness and validity of this approach.

ABCD		2014 Consumption (000's ekWh)	2014 Costs (000's)	Notes
Group A – Energy Using Properties Outside of ECDM Scope				
Toronto Water	96	383,648	\$66,035	Industrial facilities and dedicated energy management resources and conservation plan
Transportation	52	273,464	\$30,316	Street and Signal Lighting. LED projects under investigation
TTC	133	446,723	\$61,899	Commercial facilities and dedicated energy management resources
Union Station	1	13,847	\$2,762	
The Ex	7	36,282	\$3,315	Opted out of ECDM. Dedicated energy management resources and conservation plan
Toronto Zoo	6	11,964	\$2,025	Opted out of ECDM. Dedicated energy management resources and conservation plan
Solid Waste	12	32,992	\$2,774	Transfer stations which did not meet the OEM/Green Energy Act criteria
Parking Authority	95	24,161	\$2,629	Outdoor lighting for parking lots
Parks, Forestry & Recreation	500	1,619,515	\$7,490	Parks Lighting, Seasonal Operation (40+ outdoor rinks, 30+ pools, etc.)
Arena Boards	5	4,524	\$770	Opted out of ECDM. Dedicated energy management resources and conservation plan
Build Toronto	8	2,498	\$368	Actively manage their own properties
Public Library	15	2,882	\$323	Dedicated Energy Management Teams
Community Centre Boards	1	302	\$22	Opted out of ECDM. Dedicated energy management resources and conservation plan
Group B – Properties with Low Energy Savings Potential				
TESS	5	2,933	\$447	Based on average annual energy cost in Group 'B' of approximately \$15,000 and commensurately low estimated annual savings, these locations are categorized as having medium to low potential. They may be better candidates for a standardized energy upgrade strategy and will be evaluated for energy saving projects after the completion of higher potential buildings.
Unallocated Loads	54	1,333	\$242	
City Clerk's Office	2	1,476	\$223	
Animal Centres	4	1,549	\$211	
EMS	8	571	\$96	
Children Services	6	664	\$85	
Economic Development & Culture	8	1,232	\$64	
Police Services	5	322	\$44	
Public Health	2	97	\$16	
Fire Services	3	109	\$20	
Non-ABCD	2	27	\$5	
Other ABCs	5	41	\$9	
Facilities	42	4,858	\$675	
ECAP Excluding ECDM	1077	1,559,665	\$182,863	

The ECDM plan includes all of the major energy-consuming buildings in the City's portfolio. Staff recommends continued emphasis on the ongoing identification and implementation of energy management projects within the portfolio of buildings covered by the ECDM. Smaller, seasonal and lighting opportunities will be evaluated in turn.

Item B: Cost of Increasing Corporate Waste Diversion Rate

Council has established the corporate waste diversion rate at 70%. In 2014, the City diverted 89% of the waste from its thirteen largest buildings, with City Hall achieving 90.4% and attaining zero waste status. Collectively, these buildings diverted 1,444 metric tonnes of recyclable materials from landfill. Since 2012, the total amount of waste generated has been decreasing, while the diversion rate has been increasing, implying that we are creating less waste and recycling more. To make further progress on this issue, the City will have to address the behaviour of both individuals and departments related to the use and storage of paper. Electronic filing and information management will present opportunities for paper use reduction.

To further increase our corporate waste diversion rate, and to continue to reduce the total amount of waste created, we will need to pursue three strategies.

1. Raise the visibility of the issue within the City. Strategies could include:
 - a. Targeted communications from senior City management requiring the pursuit of strategies to reduce paper consumption.
 - b. The establishment of divisional paper and waste reduction targets incorporating the publication of results.
 - c. Extend the creation and use of waste diversion teams to a greater population of City buildings.
2. Ensure that we address both the increase in diversion rates and a corresponding reduction in the absolute amount of waste generated.
3. Employ new technology and strategies for information management and storage where appropriate, to ensure appropriate use of electronic storage in order to minimize costs.

Currently, 22 corporate buildings are managed under the EED Waste Diversion initiative. The remaining facilities, 506 buildings, are a collection of large and small buildings providing a full array of services. It is estimated that one supervisor can manage 30 these buildings, so to extend the current program to all 528 ECDM buildings will require the addition of 17 staff-years. If the program is implemented over 4 years, this number can be reduced to roughly 4, as the major effort will be in the establishment of waste diversion teams, doing base-line waste production audits and the development and delivery of training and communications. The ongoing effort to conduct waste audits, provide analysis, implement on-going strategic initiatives and to generate reports will require 2-3 staff.

To improve the City's waste diversion rate and an overall reduction in the waste created, will require raising the visibility of the issue within the City leading to the eventual change of attitudes and behaviour. Communications to all Divisions from senior City management requiring the establishment of paper reduction targets is a first step leading to longer-term behavioural change. Four additional staff will be required to establish the initiative and 2 – 3 to maintain it.

Item C: Cost and Target for Normalized Energy Consumption

The methodology utilized for the ECDM plan set an energy efficiency performance target of having all buildings within common groups achieve the energy performance of the top 25th percentile within the group. Buildings were categorized based on archetype, operation type and division to which they belong. Accordingly the ECDM plan established an annual target of 20.1 ekWh/sq.ft (equivalent kilowatt hours per square feet) for the City's administrative buildings. By way of comparison, BOMA and RealPac applied a similar approach towards analysis and targets set for the office industry across Canada resulting in a top quartile target of 20.3 ekWh/sq.ft for office buildings. Although there are no current global standards for energy consumption for municipal buildings, the City of Toronto's approach is consistent with industry performance standards within Canada and North America.

EED will continue to work with our commercial and institutional partners to ensure that they both the methodology and targets remain valid.

Item D: Cost of Accelerating Energy Efficiency

Project development requires progress through a number of steps including: energy audit, scoping, engineering, implementation and monitoring & verification. The use of recoverable debt for all stages requires that all monies be repaid through savings or revenues created by the specific project. In the event that an energy audit is performed and subsequently it is determined that there is no economic potential for the project, the monies spent on the audit are effectively stranded – there is no repayment stream created. Projects that proceed through implementation will have the ability to repay the loan. It is estimated that 80% of projects that are initiated will progress to implementation, therefore, the annual risk is 20% of the monies allocated for energy audits. Each audit is estimated to cost roughly \$20,000. So for every 10 projects we undertake, the risk to be mitigated would be roughly \$40,000. Each project, and the portfolio would still need to meet the requirements for the use of recoverable debt, mainly to exceed the City's cost of borrowing by 2% and to repay the loan within 20 years. Further the repayment schedule is independent of energy savings.

Options to mitigate this risk and to expedite energy conservation projects, include:

1. Focus on opportunities identified from the ECDM portfolio having a high likelihood of proceeding as a consequence of either facility management or the magnitude of the savings. This strategy is currently being implemented: If a project does not materialize, the division will be required to repay the loan from other operations.

2. Grouping multiple projects into portfolios to ensure that the costs of all the energy audits are supported by the portfolio as opposed to project supporting their own costs. Savings or revenues generated by the portfolio would cover the costs of any undeveloped project within the portfolio.
It is estimated that 8 out of 10 energy audits will result in the identification of a viable project. The average cost of an energy audit is roughly \$20,000, so a 10-project portfolio will need to cover approximately \$40,000 in stranded audit costs.
3. Use of non-recoverable funds to support projects that do not proceed and for which site specific energy audits have been performed. Similar to #2, it is estimated that for every 10 energy audits performed, \$40,000 will be needed to support stranded audit costs.

Recoverable debt will be used to finance all aspects of project identification (energy audits), scoping, engineering, implementation and monitoring & verification. The risk associated with using recoverable debt to finance project identification and scoping phases can be addressed using several strategies including strategic prioritization of high potential projects, grouping of projects into portfolios and the use of non-recoverable funds.

CONCLUSION

The Environment and Energy Division will continue working on the Energy Conservation and Demand Management Plan. EED will develop updated performance targets while prioritizing projects and working with the appropriate stakeholders. All projects will be subject to a risk evaluation and will require a satisfactory business case to qualify for financing through the recoverable debt program. A target of 25th percentile energy use performance will be used to ensure consistency with industry standards. The Waste Reduction Program will also be reviewed and enhanced with the focus on the reduction of the use of paper throughout the corporation.

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