
SUBJECT:	Southeast Markham Community Centre & Library Project – Energy Conservation and Sustainability Initiatives
PREPARED BY:	Henry Tse, P. Eng., Senior Project Manager, Asset Management Graham Seaman, P. Eng., Senior Manager, Sustainability Office

RECOMMENDATION:

- 1) **THAT** the report titled “Southeast Markham Community Centre & Library Project – Energy Conservation and Sustainability Initiatives” be received; and,
- 2) **THAT** Council approves the recommended energy conservation and sustainability initiative of targeting LEED Gold level of certification on the basis of adding a 300kW Solar Photovoltaic system and other additional enhancements to the base building design; and,
- 3) **THAT** Perkins + Will be authorized to proceed with the LEED Gold design including the Solar Photovoltaic rooftop array in the amount of \$37,175 to be funded from the ‘South East Community Centre/Architect Consultant Services’ 2011 Capital Account #70-5350-11318-005; and,
- 4) **THAT** Council approves the recommended additional enhancements to the base building design to enable targeting LEED Gold level of certification, at an additional capital cost of \$247,000, funded from “South East Markham Community Centre and Library” 2013 Capital Account #13500, and;
- 5) **THAT** Staff be directed to include a 300kW solar photovoltaic rooftop array as an option in the construction contract tender of the project, and;
- 6) **THAT** Staff be directed to make a recommendation, once bids are received, whether to include the solar photovoltaic rooftop array as part of the construction contract award, or lease the roof top area to PowerStream Solar, and;
- 7) **FURTHER THAT** Staff be authorized and directed to do all things necessary to give effect to this resolution.

1. Purpose 2. Background 3. Financial

PURPOSE:

The purpose of this report is to seek Council approval on the recommended sustainability initiative option for the Southeast Markham Community Centre & Library (SECC&L) of targeting to achieve LEED Gold level of certification, primarily by the implementation of a 300 kW solar photovoltaic rooftop array.

BACKGROUND:

Council had previously passed resolution directing that all new City of Markham (City) owned buildings shall be designed to achieve LEED Silver level of certification.

Council, at their June 26, 2012 meeting, passed the following resolution

“staff be directed to further explore the 60% better than National Energy Code of Canada for Buildings (NECB) 2011 Sustainability Initiative as part of the Southeast Community Centre & Library;”

Council passed the following resolution at their October 3, 2012 meeting:

“staff be directed to evaluate and report back to Council the costs and benefits of incorporating additional energy reducing and sustainability features towards application for Green Municipal Funding”

OPTIONS/ DISCUSSION:

SECC&L is being designed to achieve **LEED Silver** level of certification. Features incorporated into the design to achieve this goal include the following:

- **Site:** alternative transportation; storm water quantity and quality control;
- **Water Efficiency:** rain water storage and recycling; bio-swales; low flow plumbing fixtures; indigenous planting;
- **Energy Efficiency:** heat recovery; envelope design; efficient lighting systems; measurement and verification;
- **Material & Resources:** recycled and regional materials;
- **Indoor Environmental Quality:** low emitting materials; indoor pollutant and chemical control; day-lighting;
- **Innovation In Design:** Education kiosk; green housekeeping.
- **Solar Ready:** The base building design includes structural provisions to support a south facing solar photovoltaic system on the roof, as well as associated electrical conduits. This will permit a solar photovoltaic rooftop array to be added to the construction contract or at a later date without additional structural modification or disruption to the interior.

LEED Gold level of certification

LEED Gold certification can be targeted on the basis of adding a 300kW Solar Photovoltaic system and other additional enhancements to the base building design. The addition of the 300kW of solar photovoltaic rooftop array to the project would increase the potentially targeted LEED credits to approximately 60 which is the threshold for LEED Gold level of certification. Given that some credits depend on activities performed later in the project (energy modelling after design, recording and reporting construction processes, etc) and cannot be accurately determined in advance, it is prudent to target a potential surplus of credits in the order of 10% for greater certainty.

After review of potential additional credits and rejecting those deemed not cost effective, the team recommends the additional enhancements which could amount to an additional 5 credits to target achieving LEED Gold (targeting 65 credits):

Energy Efficiency:

- Air handling unit casings will be sized for enhanced efficiency.
- Ductwork distribution will be sized for enhanced efficiency.
- Heating water system supply and return temperature difference will be increased to reduce the system flow rate and hence pumping energy. Pipe sizing will be reduced accordingly.

Indoor Environmental Quality:

- Individual comfort controls for 50% (minimum) of the building occupants will be provided to enable adjustments to meet individual needs and preferences. Areas affected will be private offices, open-plan workstations, reception areas and conference/meeting rooms.
- Air handling units will be furnished with humidifiers and additional humidity controls to enhance overall thermal comfort.

The resulting benefits expected are:

- 390,000 kWh total energy avoidance per year (256,000 kWh electrical savings + 134,000 kWh natural gas savings)
- 52 tons of carbon dioxide reduction per year
- \$36,000 total energy cost avoidance per year

The estimated capital cost for the above additional enhancements is \$247,000 which does not include the cost of Solar Photovoltaic system (Solar PV). The consulting fee associated with the additional enhancements is \$6,175, above base building design.

Delivery of Solar Photovoltaic System (Solar PV)

Staff and the consulting team have determined that the most appropriate size solar photovoltaic rooftop array for this project is a 300 kW system. The expected capital cost is \$1.2M - \$1.8M. Through the Ontario Power Authority Feed-in-Tariff (FIT) program, revenue can be expected to be \$175,000 in the first year, reducing by 1% per year due to solar panel degradation to \$140,000 in year 20.

Based on past Solar PV installations on City facilities, and through investments made in PowerStream for other Solar PV initiatives, there is a strong business case to proceed with a 300 kW rooftop installation for the SECC&L, irrespective of any LEED considerations. However, it is too early to determine whether the City should own and operate the Solar PV or if it is more prudent to lease the rooftop to PowerStream. As such, Staff recommends that the design of the Solar PV system be included in the construction documents, at an additional consulting fee of \$31,000 to allow for the flexibility to decide upon either option.

The construction tender will be developed such that the cost for the Solar PV rooftop array will be separately priced and the award deferred until it can be evaluated. This would allow the City to potentially negotiate with another party to supply and install the Solar PV rooftop array using the same design.

The decision to own and operate the Solar PV or lease out the rooftop to PowerStream does not have an impact with respect to LEED certification.

Green Municipal Fund (GMF)

Council directed on June 26, 2012 that staff evaluate the feasibility of designing SECC&L in order to gain eligibility to apply for the Green Municipal Fund from the Federation of Canadian Municipalities. Staff and the consulting team explored various design options in the evaluation of costs and benefits for incorporating additional energy reducing and sustainability features in order to qualify for a potential GMF combination grant and low

interest loan. The maximum possible funding could be a \$1M grant and a \$10M low interest loan, if the appropriate energy targets are achieved.

The results of the analysis showed that the extra costs involved in enhancing the SECC&L, estimated at a minimum of \$2.7M, do not outweigh the benefit, even under the assumption the facility would qualify for the maximum GMF funding. Furthermore, there would be risk associated with not being able to achieve GMF funding as it is a competitive process open to all municipalities in Canada. Therefore, Staff does not recommend pursuing the GMF funding.

FINANCIAL CONSIDERATIONS AND TEMPLATE:

The additional consulting fee required from Perkins + Will to target LEED Gold level of certification including Solar PV will be \$37,175. This is comprised of \$31,000 for Solar PV and \$6,175 for LEED Gold. This will be funded from the existing capital account, 'South East Community Centre/Architect Consultant Services' 2011 Capital Account #70-5350-11318-005.

The additional enhancements to the base building design to enable targeting LEED Gold level of certification at an additional capital cost of \$247,000 will be funded from "South East Markham Community Centre and Library" 2013 Capital Account #13500.

Staff will report back on the delivery model of Solar PV with an anticipated capital cost of \$1.2M - \$1.8M.

ENVIRONMENTAL CONSIDERATIONS:

The SECC&L project will incorporate an environmentally friendly building design, energy consumption and product procurement in the development of the facility. It is recommended to be designed to achieve LEED Gold level of certification.

ACCESSIBILITY CONSIDERATIONS:

The facility will be designed to comply with the Ontario Building Code and the City of Markham Accessibility Guidelines.

ALIGNMENT WITH STRATEGIC PRIORITIES:

The SECC&L project is identified in the Integrated Leisure Master Plan – Recommendation No. 15. This project supports Greenprint, Markham's Community Sustainability Plan, through its programming which will be focused on Individual Health, planned energy and water conservation features support Water Efficiency and Energy & Climate priority areas. Targeting LEED Gold Certification moves Markham toward the Greenprint objective – net zero energy, waste, water and emissions by 2050.

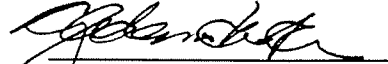
BUSINESS UNITS CONSULTED AND AFFECTED:

Sustainability Office and Financial Services have been consulted.

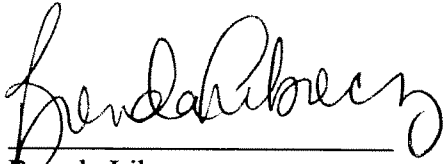
RECOMMENDED BY:



Graham Seaman, P.Eng.
Senior Manager
Sustainability Office



Gary Adamkowski, P.Eng.
Director,
Asset Management



Brenda Librecz
Commissioner
Community and Fire Services

