

Funding for Purchasing Renewable Energy Certificates

Recommendation:

That the September 14, 2016, Sustainable Development report CR_3803, be received for information.

Report Summary

This report outlines how the funding for purchasing renewable energy certificates is intended to be utilized and provides a high level synopsis of the various greenhouse gas reduction options available if the existing funding were reallocated. As well, it explains that green power purchases and related instruments (such as renewable energy certificates and carbon credits/offsets) are the most immediate way of achieving large reductions in greenhouse gas emissions from City operations.

Previous Council/Committee Action

At the September 6, 2016, Agenda Review Committee meeting, this report was rerouted to the September 14, 2016, Urban Planning Committee meeting.

At the June 14/15, 2016 City Council meeting, the following motion was passed:

That Administration provide a report outlining how the funding for purchasing renewable energy certificates is intended to be utilized, including:

- options for how this funding could be re-directed to other Edmonton Energy Transition initiatives,
- the impact this reallocation would have on the achievement of the City operations greenhouse gas emissions targets, and
- a list of local renewable energy companies providing renewable energy certificates.

Report

Background

In 2012, the City developed the City Operation's Greenhouse Gas Management Plan (the Plan) which set a target to reduce greenhouse gas emissions by 50 percent by 2020.

The Plan proposed various energy efficiency initiatives to reduce greenhouse gas emissions in new City-owned buildings, existing buildings, streetlights, and the municipal fleet. It was understood that the majority of the greenhouse gas benefits from

Funding for Purchasing Renewable Energy Certificates

these initiatives would be realized over the medium to long term, and that the purchase of green power would be required in order to meet the 2020 target. More specifically, the Plan called for a 66 percent of the overall reduction to be achieved through the purchase of “Green Power” using instruments such as renewable energy certificates and/or carbon credits/offsets. Attachment 1 explains how these instruments work and provides a summary of the City’s 2013-2015 renewable energy certificate purchases.

In 2015, approximately 353,000 carbon dioxide equivalent tonnes were emitted from City operations. The main emission sources were buildings (61.4 percent), streetlights (19.0 percent) and remaining landfill emissions (12.2 percent). The main fuel types were electricity (60.2 percent) and natural gas (20.2 percent). Attachment 2 provides a more detailed breakdown of this inventory for 2015.

As explained in The Way Ahead Progress Report 2015, the Corporate Measure (City Operations Greenhouse Gas Emissions) is not on track to achieve its 2018 target of 179,228 carbon dioxide equivalent tonnes. Rather, based on current forecasts, emissions from City Operations are expected to total approximately 394,000 carbon dioxide equivalent tonnes in 2018 (without the purchase of renewable energy certificates) and 296,000 carbon dioxide equivalent tonnes if the approved 2018 budget (\$1,560,000) is used to purchase renewable energy certificates.

Expressed in another way, 2018 emissions would be expected to increase by approximately 28 percent if renewable energy certificates are not purchased (compared to the City’s 2008 greenhouse gas baseline upon which the Plan is based) or decrease by approximately 4 percent if renewable energy certificates are purchased (compared to the 2008 baseline). Both of these expectations fall short of the 2018 target of 179,228 carbon dioxide equivalent tonnes which is equivalent to a 42 percent reduction in greenhouse gas emissions (compared to the 2008 baseline).

While achieving the 2018 target is still possible, it would require the purchase of additional renewable energy certificates (\$1.8 million) in addition to what is already approved in the 2018 Operating Budget (\$1.560 million), for a total of approximately \$3.3 million. Moreover, this level of expenditure would need to continue each year in order to maintain the target.

While renewable energy certificates are an important short-term strategy for reducing City operations greenhouse gas emissions, it is important to stress that the Plan’s longer-term vision involves a power purchase agreement in which the City would purchase 100 percent of its electricity from a renewable energy source (as laid out in Section 7.3 of the City Operations Greenhouse Gas Management Plan). Typically, this would require a long-term agreement (in the range of 20 years and longer) and would involve the construction of a large generation facility that would produce (and feed into the grid) an amount of electricity equal to the City’s consumption.

Should Council pursue direct investment in City operations rather than further investment in energy certificates, consideration should be given to amending corporate reduction targets for greenhouse gas emissions.

Funding for Purchasing Renewable Energy Certificates

Responses to Council's Questions

The following are responses to Council's questions contained in the Motion that directed this report.

Council Question: *How is the funding for purchasing renewable energy certificates intended to be utilized?*

Table 1 shows the funding that was approved through the 2016-2018 budget along with \$390,000 carried forward from the 2014 and 2015 operating budgets. The 2016-2018 Operating budget explained that the funding was for *"Purchase of Green Power for City Operations - purchase green power (excluding transit) to achieve 2014 Council-approved target to reduce greenhouse gas emissions from operations by 42 percent below 2008 levels by 2018."* The budget did not direct which specific instruments (purchase of renewable energy, renewable energy certificates, carbon credits/offsets or other) would be used to achieve the "green power" requirement. In developing the budget, the purchase of renewable energy certificates was shown to continue based on their relevance, price advantage and availability.

Table 1: Approved Budget for Renewable Energy Certificate Purchases

Renewable Energy Certificate Details	2016	2017	2018	Total
Approved Budget	\$780,000*	\$935,000	\$1,560,000	\$3,275,000

* \$390,000 of this total is carried over from 2014 and 2015.

Council Question: *What options exist for re-directing this funding to other Edmonton Energy Transition initiatives? What impact would this reallocation have on the achievement of the City operations greenhouse gas emissions targets?*

The purchase of green power (renewable energy) and related instruments such as renewable energy certificates and carbon credits represent the City's most effective tool for achieving immediate, large reductions in City operations greenhouse gas emissions.

Alternatively, the City can re-direct this funding to other clean energy and energy efficiency initiatives that will deliver smaller reductions, but provide some level of cost recovery to the City. Two alternative options to reduce greenhouse gas emissions from City operations are provided below:

Option 1:

Redirect funding to energy efficiency improvements in existing City-owned facilities (beyond the \$9.4 million approved in the 2015-18 Capital Budget to leverage building energy retrofits).

A wide range of energy efficiency improvements are possible in City-owned buildings/facilities, with best opportunities involving improvements to building lighting, envelope, and heating, ventilation, and air conditioning systems. While the costs and

Funding for Purchasing Renewable Energy Certificates

benefits vary from building-to-building, literature and research reviews conducted by the Alberta Energy Efficiency Alliance indicates a \$3 million investment in building energy efficiency is expected to result in emission reductions of approximately 43,100 carbon dioxide equivalent tonnes accumulated over the life of the upgrades (ranges from 8 to 20 years depending on the type of upgrade). The Alberta Energy Efficiency Alliance indicated average simple payback of five years, once cost savings or avoidance from the energy efficiency upgrades are taken into account.

Option 2:

Redirect funding to renewable or alternative energy installations at City-owned facilities.

A number of renewable or lower carbon energy opportunities exist for City facilities including solar photovoltaic, solar heating, geothermal and combined heat and power. Research indicates that a \$3 million investment in building-mounted solar photovoltaic, for example, would be expected to result in emission reduction of approximately 23,000 to 28,050 carbon dioxide equivalent tonnes accumulated over 30 years. The simple payback is 19 to 23 years once the value of the generated electricity is taken into account.

Immediate emission reductions cannot be realized with either of these two options. The anticipated emissions reductions based on the investment in Table 1 from either option will account for less than one percent reduction in the City's current annual total greenhouse gas emissions. Aside from spreading the emission reductions out over the lifetime of the installation, it also takes time to identify and develop specific projects where this investment can be made. The magnitude of reallocated funding and the timing of the realization of the emissions reduction benefit would make the achievement of the 2020 target impossible based on solely using these two approaches.

Table 2 provides a high-level summary and comparison of the different green power purchase options that have been outlined in this report and their impact on emissions reductions for City operations.

Table 2: Summary of Investment Options and Their Impact on Achievement of City Operations Greenhouse Gas Targets.

Option	1: Energy Efficiency Improvements in City-owned Buildings*	2: Renewable Energy Installations in City-owned facilities	3: Purchase of certificates from existing facilities in Alberta	4. Purchase of certificates from new, local projects (referenced in next question)
Greenhouse gas reductions in carbon dioxide equivalent tonnes (tCO ₂ e)				
Unit cost per tCO ₂ e	-\$67	Solar: -\$8 to \$16	\$23**	Unknown

Funding for Purchasing Renewable Energy Certificates

Total tCO₂e reduced based on \$3 million investment	43,100 (accumulated over 20 years)	Solar: 23,000 to 28,050 (accumulated over 30 years)	128,000 (one time, annual)	Unknown
Yearly reductions as % of actual total City Ops tCO₂e in 2015*	0.4%	Solar: 0.2 to 0.3%	36%	Unknown
Financial Return on Investment (from avoided energy purchases)				
Simple Payback	5 years	Solar: 19-23 years	n/a	n/a
Impact on Local Community Energy Transition				
	Low-Moderate	Low-Moderate	None	High

* The same business case can be broadly applied to energy efficiency improvements through LED streetlight conversion

** Approximate blended rate for renewable energy certificates or Carbon Offsets purchased in 2016 to 2018. A significant increase in unit cost is anticipated due to introduction of the Carbon levy of \$30 per carbon dioxide equivalent tonne in 2018.

Council Question: Are there any local renewable energy companies providing renewable energy certificates?

According to ENMAX (the City's agent that arranges renewable energy certificates purchases) there are no local, Edmonton-based renewable energy facilities that generate renewable energy certificates. However, Administration could explore the possibility of using 2016-2018 green power funding to incentivize Edmonton's fledgling renewable energy industry in exchange for renewable energy certificates that could be applied against the City's greenhouse gas inventory. This would involve conducting a request for proposals in search of energy companies that would be prepared to establish renewable energy generating facilities in Edmonton (or Edmonton region) from which renewable energy certificates would be produced and sold to the City for up to the approved \$3.044 million 2016-2018 budget.

This strategy could allow the City to reduce its greenhouse gas inventory while at the same time advancing Edmonton's renewable energy industry. However, it is possible that there would not be a significant response unless the City was willing to enter into a long-term arrangement (probably greater than ten years) and at a higher rate than has been paid in the past for renewable energy certificates. This approach can be done in

Funding for Purchasing Renewable Energy Certificates

conjunction with or separately from the electricity supply procurement process. However, the key to enabling the development of new and local renewable energy projects is a long term commitment to purchase the environmental attributes (e.g., renewable energy certificates), the electricity supply, or both.

Policy

C532 Sustainable Building Policy

C585 Edmonton's Community Energy Transition Strategy Policy

Budget/Financial Implications

This report focuses on approved funding totaling \$3,044,000 identified in the 2016-2018 Operating Budget that will be spent on the purchase of "green power" unless otherwise directed by City Council.

Metrics, Targets, Outcomes

Metrics	The City measures greenhouse gas emissions from City operations. Greenhouse gas emissions are one outcome that can be impacted through the sustainable building policy. Greenhouse gas emissions from City operations 2015: 353,000 carbon dioxide equivalent tonnes.
Targets	(2018): 179,228 carbon dioxide equivalent tonnes, which is equivalent to a 42% reduction from 2008 levels.
Outcomes	Greenhouse gas emission from City operations has exceeded targets for the past few years and is expected to not meet targets for future years.

Attachments

1. Description and Background on Carbon Offsets and Renewable Energy Certificates
2. 2015 City Operations Greenhouse Gas Inventory

Others Reviewing this Report

- A. Laughlin, Deputy City Manager, Integrated Infrastructure Services
- T. Burge, Chief Financial Officer and Deputy City Manager, Financial and Corporate Services
- G. Cebryk, Acting Deputy City Manager, City Operations