City Council

Type of Decision									
Meeting Date	October 6, 2020				Report Date	September 25, 2020			
Decision Requested		Yes	X	No	Priority		High	X	Low
	Direction Only				Type of Meeting	X	Open		Closed

Report Title
Street Lighting Project Update

Resolution	Relationship to the Strategic Plan/Health Impact Assessment
For Information Only	The Roads and Transportation Division's principle responsibility is to provide a road network system that is safe and efficient for both vehicular and pedestrian traffic. Street lighting is a key service in achieving that aim. The City's strategic plan contains a strategic objective on Climate Change and a goal to complete and implement a Community Energy and Emissions Plan that will provide guidance to reduce greenhouse gas emissions. This objective reflects values such as: Managing the resources in our trust efficiently, responsibly and effectively Acting today in the interests of tomorrow Not only will the conversion lower the City's carbon footprint but it would also result in Operating Budget savings.
Resolution Continued	**Background Attached**

Report Summary	Financial Implications
This is an update for the ongoing LED street lighting project.	The project is currently in an estimated surplus of approximately $0.5 million. Any surplus remaining upon completion of the project will be returned to holding account in accordance with the Capital Budget Policy. The project was approved with funding from the Capital Financing Reserve Fund - General account as part of the 2020 Budget. Future energy savings will be contributed back to the reserve fund until the total amount is replenished.

Report Prepared By	Division Review
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Recommended by the Department	Financial Implications
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Recommended by the C.A.O.
Ed Archer Chief Administrative Officer

Purpose

At the September 15th, 2020 meeting of the Finance and Administration Committee, the report from the General Manager of Corporate Services titled Street Lighting Project Update was referred to City Council. The purpose of this report is to fulfill this direction and to provide additional information and detail regarding the street lighting conversion project including the scope, design considerations, financial projection and status of the installations and the projected completion dates.

Background

The City of Greater Sudbury owns over 15,000 streetlights. The electricity is provided by Greater Sudbury Utilities (GSU) and Hydro One Networks Inc. (HONI), depending on the area serviced. GSU also provides technical support and is contracted to maintain the system including the streetlight inventory database and the repair and maintenance of the streetlights.

Prior to commencement of the 2020 streetlight conversion project approximately 4,000 of the 15,000 street lights had been converted to LED. Approximately 1,300 were converted in a 2012 project with the remaining converted on an ad-hoc basis since 2009 as HPS lights came to end of life.

During the 2020 budget deliberations, Council chose to approve a business case for the conversion of the remaining approximately 11,000 HPS street lights to LED. The business case was predicated on not only the financial benefits such as reduced energy costs, and an incentive provided by the Independent Energy System Operator (I.E.S.O) resulting in a payback of 6 years, but a number of other advantages such as environmental and quality of life considerations outlined below.

Advantages of LED Street Lighting

-Low energy consumption: when compared to HPS, LEDs are more efficient by 40% to 60%. Direct lighting also contributes to lower light pollution.

-Reduced glare: Directing the light downward onto the roadway reduces the amount of light that is directed into driver's eyes.

-Long and predictable lifetime: The projected lifetime of LED street lights is usually 15- 20 years; two to four times the life of HPS.

-Quick turn on and off: Unlike HPS, which take time to heat up once switched on, LEDs come on with full brightness instantly.

- Restriction of Hazardous Substances (RoHS) compliance: LEDs do not contain mercury or lead, and do not release poisonous gases if damaged unlike HPS.

-Less attractive to nocturnal insects: Nocturnal insects are attracted to ultraviolet light emitted by many conventional light sources.

-Optically efficient lighting equipment: Other types of streetlights use a reflector to capture the light emitted upwards from the lamp.

Strategically, this project aligns with Council's declaration of a climate emergency and the City's affirmation of action on climate change as a pillar in Council's strategic plan. A target of net zero greenhouse gas (GHG) emissions by 2050 was directed by Council Resolution (CC2019-151).

The Community Energy and Emissions Plan (CEEP) draft presented to City Council on Nov 12th, 2019, details initiatives to reduce energy consumption and greenhouse gas production and aims at Net zero emissions by 2050. The projected 60% reduction in energy costs as a result of the LED conversion is aligned with the CEEP.

The LED conversion project was awarded to RealTerm Energy via the Association of Municipalities of Ontario's (AMO) Local Authority Service (LAS) program.

Scope

RealTerm's proposal for converting all the current HPS street lights to LED was for a fee of approximately $5.6M. The RealTerm proposal is a "one for one" replacement of current HPS fixtures and does not contemplate adding streetlights to the network.

RealTerm's scope included

- Initial Assessment of the Existing Streetlight Network – RealTerm visually confirmed the streetlight inventory and the various styles inherent in the system.
- Comprehensive Investment Grade Audit- In conjunction with the initial assessment, RealTerm costed the project based on the types and numbers of lights in addition to field experience for contingencies.
- Photometric Designs – the designs intend to optimize lighting in the various locations while minimizing costs.
- One for One replacement of HPS to LED and recycling of old fixtures.
- Processing all IESO Incentive paperwork.
- Transfer of all inventory files and data into the GIS system.
- Transfer of all warranties at commissioning.

In addition to this scope, the completion of the investment grade audit determined that the mix of decorative LED fixtures, decorative HPS fixtures and non-decorative fixtures in the downtown core provided an inconsistent lighting pattern. In order to provide a consistent approach to the lighting in the downtown, decorative LED fixtures are to be installed. The downtown Business Improvement Area (BIA) has been consulted and is supportive of the initiative. The BIA has committed to contributing $100,000 towards the approximately $595,000 cost of conversion and has been involved in the selection of fixture type and colour preferences.

Design Standard

The most current design standard for street lighting is ANSI/IES RP 8 which is produced by the American National Standards Institute (ANSI) and the Illuminating Engineering Society (IES). In the case of the LED conversion project, adherence to this standard is not entirely possible as it the project consists of one for one replacement. However, RealTerm endeavoured to get as close to this standard as possible.
Realterm Energy's technical evaluation team reviewed the collected geospatial dataset and formulated a hybrid approach to completing the roadway designs. After evaluating the configuration of each light fixture for road classification, pedestrian activity, pole spacing, mounting height, arm length and curb setback. A design solution was selected consisting of LED luminaries that follows RP-8-2018 recommendations wherever possible within the existing infrastructure configuration. RP-8 could not be achieved in all instances. This is due to several factors including inadequate pole spacing, insufficient mounting height or missing fixtures to eliminate gaps.

In the instances where RP-8 could not be achieved with the new LED fixture, photometric design has been utilized to select an LED luminaire for which the wattage and distribution pattern combine to meet or exceed the existing lighting levels. In order to truly conform to RP-8 standards, additional light sources will be required along with readjusting the pole spacing, which is beyond the scope of this project.

Lighting Hues

Various hues of lighting are used in different circumstances. In subdivisions and the downtown core, a softer, yellow hue will be prevalent. Conversely, on high traffic, arterial and collector roads, the lighting will appear white. Light colour is also chosen based on the dark adaptation of drivers. Dark adaptation is the ability of the human eye to adapt between dark and light spots. Design included colour considerations to assist in avoiding high contrast areas where poles are widely spaced and drivers are subjected to contrasting areas of light and dark.

Financial

The approved budget, net of incentives for this project is $6.1 million. As part of the project, RealTerm Energy was required to complete an investment grade audit of the streetlight network to ascertain a firm cost estimate. The net cost provided including provisions for contingencies and decorative lighting conversions in the downtown core is $5.6 million. If this positive variance of $0.5 million remains at the end of the project, the surplus will be returned to the holding account per the City's Capital Budget policy.
A full conversion of the remaining HPS streetlights is expected to result in approximately 61% energy savings that would subsequently result in approximately 41% or $1,060,000 of monetary savings. This would generate a payback of approximately 5.5 years on the capital investment. The financial savings are contingent upon GSU and HONI continuing to provide electricity at similar rates into the future.

Timelines

The LED street lighting project was approved in the 2020 budget process. RealTerm energy commenced work in late December 2019 in order to locate, assess and confirm the City's street light data. Design commenced in February with completion in early April 2020. In spite of the COVID-19 pandemic, materials were procured from Asia and delivery was staged from late June into August. Coinciding with receipt of lighting inventory, RealTerm employed several crews to install the LED lights. On average, crews are installing approximately 150 LED lights per day. As of September 22, approximately 7500 of the 10,800 conversion are completed. Installation is continuing and is expected to be complete by November 2020.

Of the 7,500 conversions completed they are dispersed widely across the City and all wards have seen significant progress. The total fixtures, installations complete and pending installations by ward are outlined in Table 1 below.

TABLE 1

Ward	Total Fixtures	Installed	Pending
1	850	618	232
2	726	606	120
3	1042	729	313
4	1094	861	233
5	978	877	101
6	910	906	4
7	748	137	611
8	741	539	202
9	868	372	496
10	979	507	472
11	925	808	117
12	938	555	383
Totals	**10,799**	**7,515**	**3,284**

As of the writing of this report, the contractor's schedule for the remaining 3,000 conversions anticipates the completion of the following sections of the City at the indicated time frames.

Late September – Cambrian College area

Late September/Early October – Garson, Falconbridge and Skead

Mid October – North along Highway 144, Onaping and Levack.

Late October/November – Remaining lights in Sudbury including Flour Mill, Donovan, and Gatchell.

November – Clean-up of uninstalled lights due to issues such as additional infrastructure required or high voltage that requires specialized attention.

Conclusion

Council approved a budget option in the 2020 budget for the replacement of HPS street lights with LED lighting. This decision provides numerous benefits including increased visibility, reduced light pollution, reduced energy use and a positive financial outcome. The project is projected to be complete by November 2020, and is projected to be approximately $0.5 million under budget.