



Corporate

NO: R150

Report

COUNCIL DATE: July 15, 2002

REGULAR COUNCIL			
TO:	Mayor & Council	DATE:	July 9, 2002
FROM:	General Manager, Engineering	FILE:	5460-40
SUBJECT:	Conversion of Incandescent Traffic Signals to LED Traffic Signals		

RECOMMENDATIONS

1. That Council approve the Traffic Signal Light Emitting Diode (LED) Replacement Program together with the associated budgetary and repayment provisions contained in this report.
2. That Council approve the establishment of a Traffic Signal LED Replacement Reserve, funded from energy savings, to provide for the ongoing replacement of the new infrastructure.

INTENT

To obtain Council approval to proceed with the conversion of the City's traffic signals to LED technology to:

- take advantage of the B.C. Hydro's 50% cost sharing and interest free loan;
- capture substantial power savings as well as minimize the impact of future power cost increases;
- reduce the maintenance costs of existing traffic signals;
- provide for the maintenance and replacement of critical traffic signal infrastructure;
- provide for signal rehabilitation that is currently unfunded; and
- buffer the impact of future Hydro power cost increases.

BACKGROUND

Historically, traffic signals have been illuminated using incandescent lamps ranging from 69 watts to 135 watts per lamp, having a reliable life of one or two years. Light Emitting Diode (LED) technology has improved to the degree that LED's are warranted for six years and fixture costs have recently decreased from over \$200 for a 300mm RED signal to less than \$90.

In addition, the new technology offers substantial electrical power savings. Typically, the power consumption is up to 90% less than existing incandescent lamps. For Surrey, this would mean that our estimated 3.5 million (kWh), annual electrical consumption for signals could be decreased by approximately 3.1 million kilowatt hours. The actual total power saving for traffic signals will be less than 90% because there is no power savings associated with the signal controller cabinet, and the WALK and AMBER signals would remain incandescent.

Under the Power Smart Program, B.C. Hydro is offering substantial financial incentives to convert the City's current incandescent signal infrastructure to LED technology over a two year period. Engineering staff worked with Finance staff to prepare a Business Case to test the financial, technological, and logistical feasibility of partnering with B.C. Hydro in the conversion to LED Traffic Signals.

DISCUSSION

LED signals use far less electricity, have a longer life, but have much higher initial and replacement costs. Consequently, a Business Case needs to be undertaken to determine long-term economics of their use.

The Business Case analysis (please see Appendix A) shows that even when allowing for the replacement cost of the LED lamps, that there will be cost savings, in the order of \$0.75 million over 9 years, from energy reductions and lower labour and equipment costs for changing lamps. Consequently, the Engineering Department is recommending the conversion of the existing incandescent lamps to LED lamps under the B.C. Hydro Power Smart Program. The replacement would include the RED, GREEN, and DON'T WALK signal indications, however, the usage (percentage of time illuminated) of AMBER and WALK signals is too low to justify the conversion cost at this time. Staff are also proposing the replacement of existing Fibre Optic Left Turn arrows with LED Arrows to improve brightness and safety, although these fixtures are not eligible for cost sharing under the Power Smart program.

The capital cost of the LED fixtures for the City's 250 traffic signals is estimated at \$1,090,000, and conversion would be accomplished over a 2 year period starting in 2002. The Power Smart Program will pay for 50% of the eligible fixture cost (\$495,000) and provide an interest free loan to Surrey for the balance of \$495,000, to be repaid over 5 years through Hydro's monthly billing process. The two year cost of installing the fixtures, approximately \$230,000, is included in the Street Light and Signal Maintenance Contract with Cobra Electric, approved by Council earlier this year. The capital cost of the LED arrows is approximately \$100,000.

Surrey is paying approximately \$205,000 per year for power for signals. This is less than the true cost, because over the past few years the Engineering Department has been adding primary signal heads per direction per intersection and this has yet to be included in B.C. Hydro's billing. In addition, B.C. Hydro records do not include some of the recently installed signals despite notification having been sent to B.C. Hydro. With an accurate accounting of inventory, the cost for Surrey would be in the order of \$250,000 per year. As part of participating in this Power Smart program, B.C. Hydro has agreed not to back charge for these additions.

The Business Case Benefits of partnering with B.C. Hydro in converting to LED traffic signals include:

- The one-time contribution by B.C. Hydro of 50% of the capital cost of new LED fixtures.
- An "interest free" loan by B.C. Hydro for the 50% balance of capital costs over 5 years and the ability to

finance the debt charges directly from power savings.

- B.C. Hydro agrees to waive back charges for past signal head additions (could be up to \$300,000).
- Initial bridge financing is available from within current Traffic and Transportation capital and operating budgetary resources. *No additional funding is required.*
- Provision of Replacement Reserve Funds from within existing budgetary resources for the long-term replacement of the new LED infrastructure. This results from both the power savings and the savings in the current annual cost of incandescent maintenance and signal relamp programs and is consistent with the Reserve Policy and infrastructure maintenance principles.
- Reinvestment of future power cost savings in signal rehabilitation.
- Increased reliability and safety for the travelling public.
- Reduced maintenance costs.
- Reduced CO₂ emissions equivalent to removing 580 vehicles from the road.

It is proposed to use power and maintenance savings from this program to partially fund a traffic signal rehabilitation program that is currently not funded. Traffic signals need full rehabilitation every 25 years and partial rehabilitation every 12 – 13 years. At the present time there are a number of traffic signal installations that require either full or partial rehabilitation.

CONCLUSION

The B.C. Hydro Power Smart program is offering to provide a 50% capital cost contribution for replacing incandescent traffic signal bulbs with LED signal technology and to further provide a five year, interest free loan to the City for the remaining 50%. It is necessary to establish a replacement reserve to finance the future replacement of the LED signals, however, the full cost of these contributions will be available from maintenance and power cost savings. In addition, it is proposed that future cost savings attributable to this LED conversion program will be used to offset the cost of rehabilitating traffic signals within the City.

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Attachment

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