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Progress Report Manitoba Hydro LED Traffic Signals -- Energy Savings at Every Corner



ment and material resources needed to install and maintain LED traffic indicators, in-service energy consumption, cold-climate operation and long-term performance of LED signals.

Phase One: Installation

In good weather, it takes an experienced, well-organized traffic signal crew 1.2 to 1.5 man hours and 0.25 to 0.3 hours of bucket truck time per indicator to convert whole intersections to LED traffic indicators. Additional time may be required for new installations, depending on the condition of the existing traffic heads; corroded lamp heads can be difficult to open. Closely tracking installation costs in this project has provided the City and Manitoba Hydro with meaningful insights into the real cost of converting existing incandescent traffic signal indicators to LED indicators.

Calculating the energy use with “assumed” incandescent lamp characteristics resulted in an overestimation of the energy savings potential of converting to LED traffic signals. When assumptions regarding lamp wattages and operating schedules were corrected, measured and estimated energy use came into

In the spring of 2004, Manitoba Hydro and the City of Winnipeg began a pilot study to monitor the feasibility of a scheme to retrofit the entire city with Light Emitting Diode (LED) traffic signals. With help from Natural Resources Canada and the City of Winnipeg, Manitoba Hydro installed sets of full ENERGY STAR qualified pedestrian and traffic signals at 15 intersections around Winnipeg. The first phase, now complete, involved gathering background information and installing LED traffic signal indicators at selected intersections. The second phase of the project, currently underway, is focusing on the long-term performance of LED traffic signal indicators through routine monitoring of the study traffic signals over a period of three years. Market barrier analysis had shown that affordability and certain performance characteristics were of concern to prospective users.

The Winnipeg study will provide us with valuable information on labour, equip-

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Look for the ENERGY STAR symbol on product packaging, in product literature and advertising and, of course, on the products themselves. Ask your local retailer to help you identify products that qualify for the ENERGY STAR mark so you can begin saving energy and money. For more information, visit the ENERGY STAR website at: energystar.gc.ca



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close agreement. Table 1 highlights the 534 kWh per month per lamp set energy savings achieved from the LED traffic signal conversion. The 15 intersections converted to LED signals consume only 4440 kWh of energy per month compared to the 38 520 kWh per month needed to illuminate incandescent lamps.

Table 1.

Phase Two: Long-term Performance

Maintenance and Lamp Failures - As part of this project, the City implemented a system to track maintenance and failures of lamps in the study. By mid-November 2004, the City reported that seven study lamps had failed; of these, six were from one manufacturer. This emphasizes the need for proper records, including not only LED lamp failures but also where and what lamps are installed. Reviewing lamp serial numbers and date codes can result in bad batches being identified and isolated.

Traffic Signal Indicator	Calculated Energy Consumption (kWh/Month)	Measured Energy Consumption (kWh/Month)
Incandescent	642	608
LED	86	74

Light Intensity Measurement - Manitoba Hydro is currently testing light output for red and green solid signals with two light output meters. Field measurements for LED traffic indicators, such as physical, mechanical and electrical requirements, photometrics, and quality assurance, are in accordance with the Institute of Transportation Engineers (ITE) standards.

Communication with Other Users - Routine contact is made with other major municipalities in western Canada (Calgary, Edmonton and Vancouver) to discuss LED traffic signals.

Qualitative Assessment of Lamp Performance - Snow accumulation is a concern for both incandescent and LED signals. In low ambient light conditions, the LED signals remain acceptably visible, even with substantial snow cover.



A common complaint about east and west facing traffic signals is that morning and evening sunlight can make it very difficult for motorists to discern whether lights are on or off. This appears to be less of a problem with the LED signals which have a flat clear face over a dark background. LEDs do not cause ghost lighting, thus improving driver ability to discern which indicators are energized and which are not.

Natural Resources Canada estimates the potential savings from an LED traffic signal retrofit across the country to be 285 million kWh/year or \$14 million/year, where energy costs 5 cents/kWh.



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