Managers' Reports

Presented To:	Priorities Committee
Presented:	Wednesday, Nov 05, 2008
Report Date	Friday, Oct 03, 2008
Type:	Managers' Reports

Request for Recommendation

Energy Efficiencies Strategy

Recommendation

That Council direct staff to prepare a budget option for hiring of a Certified Energy Manager and $50,000 per year for facility audits and for expenses relating to energy efficiencies.

Finance Implications

If approved, a budget option totalling $165,000 will be prepared for the 2009 budget.

Signed By

Report Prepared By
Stephen Monet
Manager of Environmental Planning Initiatives
Digitally Signed Oct 30, 08

Division Review
Bill Lautenbach
Director of Planning Services
Digitally Signed Oct 30, 08

Recommended by the Department
Doug Nadorozny
General Manager of Growth and Development
Digitally Signed Oct 30, 08

Recommended by the C.A.O.
Mark Mieto
Chief Administrative Officer
Digitally Signed Oct 30, 08

Energy Efficiency Strategy for the City of Greater Sudbury

Energy Efficiencies Strategic Project

Team
October 29, 2008

Executive Summary

The City of Greater Sudbury has made and is continuing to make significant strides in becoming more energy efficient in its operations. This report presents a coordinated strategy for achieving additional energy efficiencies, in terms of liquid fuels and electricity/natural gas for facilities and infrastructure. Each division concerned will continue to allocate resources in their respective areas to ensure energy efficiency receives due consideration. In addition, the organization as a whole must foster an energy-wise corporate culture.

While many of the costs associated with energy efficiencies will be borne by the various Divisions' operating and approved capital budgets, hiring a Certified Energy Manager and conducting energy audits of City facilities are key components that are dependent on the approval of a budget option.

Recommendation:

That during budget deliberations, Council approve a budget option for hiring of a Certified Energy Manager and $50,000 per year for facility audits and for expenses relating to energy efficiencies. Creation of this position would assign clear responsibility for energy management to a single person. Responsibilities would include monitoring and analyzing energy usage at City facilities; determining priorities for facility audits and retrofits; and liaising with division and section heads to ensure a coordinated approach to energy management.

Background

The City of Greater Sudbury spends approximately 3% of its budget on energy to run its fleet of 1100 vehicles and other motorized equipment (650 licensed vehicles); to treat water and wastewater; to power over 600 municipal buildings; and to light its streets.

The City of Greater Sudbury's direct energy budget totals over $15.1 million. Roughly 30% ($4.5 million) is allocated to fuel, 55% ($8.5 million) for electricity, and

15% ($2.1 million) to natural gas.

While these expenses are necessary to maintain municipal services, there is little doubt that efficiencies can be brought to a number of areas that would result in substantial reductions in energy use. These efficiencies are made more important by the rise in energy costs predicted for the years ahead.

Council has shown its support for energy efficiency. For example, Council approved the EarthCare Sudbury Local Action Plan and the Health Community Strategy, both of which identify energy efficiency as a means of becoming a more sustainable community. Likewise, the Canadian Union of Public Employees (CUPE), which represents a large number of the City's workforce, has worked for many years to preserve healthy and liveable communities and recognizes the need to curb energy use to fight climate change.

Achievements to date

Energy efficiencies have been implemented in most areas of the City's operations over the past several years, both in terms of its fleets and its buildings. Highlights of these energy efficiency initiatives include:

- Development of a 1.6MW power station from captured landfill gas.
- Purchase of seven hybrid cars to replace aging fleet of large engine cars. Internal testing reveals that our Toyota Prius' achieve 62 mpg in the City compared to 20 mpg for our Ford Crown Victoria's.
- Installation of a solar wall and geothermal heating at the Wanapitei Water Treatment Plant.
- Numerous energy retrofits to several City buildings, including Tom Davies Square.
- Replacement of roughly 50% of incandescent traffic signals in Greater Sudbury's urban area with LED lights, which consume only about 10% of the energy of regular signal lights.
- Installation of actuators at traffic signals and coordination of traffic signals to reduce the idling time of vehicles.
- Optimization of snow plow and salting routes to minimize travel time. Optimization of spreader-laid sand, which further reduces energy related to spring cleanup of catch basins and street sweeping.
- Training of all transit drivers with the SmartDriver for Transit program.
- Use of asphalt recycling whenever possible to reduce the need for harvesting

new aggregates and producing new asphalt which thereby reduces the related equipment energy consumption.
- Savings achieved through securement of competitive fuel/electricity/natural gas purchasing agreements.
- New Pioneer Manor construction is rated to at least LEED (Leadership in Energy and Environmental Design) Silver standard.
- A Continuous Improvement Program, which was initiated by CUPE Local 4705, often receives suggestions on energy reduction in the workplace.

The following sections outline the recommended strategy for achieving greater efficiencies in energy use in municipal operations and facilities.

Fuel Efficiencies

Significant reductions in fuel use at the City will only result through the implementation of an integrated strategy based on shared responsibility, behavior modification, and use of appropriate technology. The strategy involves a three-prong approach that is self-reenforcing and, therefore, stands the best chance of effecting permanent change in the organization's energy use. The approach involves:

1. Purchasing fuel-wise vehicles and putting in place fuel-saving technologies appropriate to the intended use;
2. Creating fuel-wise habits in CGS personnel through education and training; and,
3. Monitoring to ensure fuel-wise use of CGS resources.

Fuel-wise Vehicles and Technologies

The Fleet Services Section will continue to track, test and implement technological innovations in fuel efficiency for City vehicles and motorized equipment.

White Fleet / Cars: Our current fleet of cars is primarily Ford Crown Victorias. To purchase a Hybrid car there is approximately $6,000.00 per vehicle of additional capital required. On fuel costs alone the pay-back on the capital is two (2) years. In our seven (7) year life cycle we would realize a fuel savings of approximately $15,000.00 per vehicle ($3,000.00 per vehicle annually).

In addition to savings in fuel costs Hybrid vehicles also realize savings in

maintenance costs. These are realized in extended oil change intervals, extended brake change intervals, extended tune-up intervals, etc… The Hybrid battery costs are not significant in our maintenance costs as they are under warranty for eight (8) years, one (1) year longer than our life cycle.

Supervisor's Pickup Trucks: Most of our supervisors currently drive pickup trucks. In most cases the need for a pickup truck is questionable. As we live in a community where we have many gravel roads pickup trucks will be replaced with small Hybrid SUV vehicles. Replacing supervisor's pickup trucks with small Hybrid SUV vehicles will increase fuel efficiency from approximately 19mpg to approximately 40 mpg.

Approximately $6,000.00 per vehicle of additional capital is required. On fuel costs alone the payback is approximately three (3) years. In our seven (7) year life cycle we would realize a fuel savings of approximately $7,000.00 per vehicle ($1,750.00 per vehicle annually).

Auxiliary Heaters: The Fleet Services Section will test independent vehicle heating systems that allow the vehicle to be shut off and still maintain comfortable cab temperatures. At a cost of $150,000 from the reserve fund, the City will purchase 40 to 50 units at $1,500.00 to $3,500.00 per vehicle depending on system selected. In the future these heaters will be included in the specifications when replacing vehicles. These heaters typically use 10% of the fuel that would be consumed during idling. Idling times can be significantly reduced using these heaters to heat the engine cooling system and to keep the interior of the vehicles warm without having to run the engine.

Payback on these heaters can be as little as two (2) years depending on application. Since these heaters can be removed and installed in replacement vehicles several years of reduced fuel consumption can be achieved.

LED Lighting: The Fleet Services Section will continue to test and implement LED vehicle light systems that operate on reduced amounts of electricity and allow vehicles to be shut off while certain lights remain on. The current or amperage required to operate these lights is minimal and will not draw down the vehicle's battery over the work periods of a shift. LED lighting is currently specified during the purchase of new vehicles and equipment. LED lights have a greater life expectancy than regular lighting offering reduced maintenance costs as well as fuel savings realized through reduced idling time.

Education and Training for fuel efficiency

Educating and training City personnel in adopting fuel efficient habits in their day-to-day work is an important component of a comprehensive fuel efficiency and conservation strategy at the City. Once employees adopt fuel efficient habits at work, they are also more apt to adopt these in their personal vehicles as well.

The SmartDriver in the City Program, developed by Natural Resources Canada (NRCAN), has been designed to make fleets more fuel-efficient, reduce business costs, protect the environment and provide employees with defensive driving techniques. NRCAN also offers the SmartDriver for Transit program. All transit drivers have been trained by NRCAN's SmartDriver for Transit, but they are so far the only City employees to have been SmartDriver trained. The City has qualified instructors within Transit that can offer the training to City employees. The basic course involves approximately four (4) hours of in class training. Class size can be for twenty (20) to thirty (30) staff per session. The training costs per employee will be funded through each Division's current operation budget.

Benefits of the SmartDriver in the City training program include:

- Reduce fuel consumption
- Control unnecessary idling costs
- Reduce collisions
- Reduce maintenance costs
- Enhance our corporate image
- Keep our employees healthy
- Enhance existing training efforts
- Promote effective route planning

SmartDriver training will be mandatory for all CGS employees who regularly use vehicles as part of their work. Training will be rolled out over a 24-month period.

The Fleet Services Section has initiated the "Idling Gets You Nowhere" program which depends not only on new technology but also on a strong education program for all City employees aimed at reducing consumption and costs through proper driving habits. Studies indicate that approximately 40% of our fuel costs are directly related to idling. Reducing the amount of unnecessary idling will provide significant savings in the expenditures for gasoline and diesel.

In terms of educational opportunities, the Fleet Services Section within the Asset Services Division will continue to host vehicle and vehicle technology information sessions like the one held on September 16th at Tom Davies Square. The City's EarthCare Sudbury Program will continue to provide the community with information on fuel efficiency and alternative transportation. The Transit Division will continue with initiatives aimed at increasing transit ridership.

Monitoring Systems

Putting in place monitoring systems will allow tracking of fuel and vehicle use and will help to ensure fuel-wise practices are adhered to by City employees. Monitoring will require establishing three initiatives:

1. **Reassignment of Fuel Budgets**: First, following the principle of shared responsibility, fuel budgets will be assigned by Section or Division rather than the current assignment to Fleet Services only. This will assign responsibility for fuel consumption directly to user groups. C urrently hourly and monthly equipment rental rates used are all inclusive. The rate covers all expenses related to vehicles and equipment. Included in the rate are costs for: capital (initial & replacement), repairs & maintenance, damage, fuel, licences and insurance. Rental rates will be amended to include capital, routine repairs and maintenance, licences and insurance. The end user will be responsible and accountable for fuel used and preventable damage to the unit. The monthly rate will be determined using established formula for each unit in the fleet. This type of charge back system leads to better accountability and provides managers with a better tool to develop business plans.

2. **Fuel Storage and Management System**: Second, a comprehensive Fuel Storage and Management System is scheduled to be in place by spring of 2009. The System will provide a number of advantages, including:

    - Ensuring that vehicles are all fueled using the City's bulk supplies purchased through competitive pricing;
    - Ensuring that the City has better control of its fuel reserve in emergency situations;
    - Ensuring timely monitoring of vehicle use and optimizing vehicle utilization;
    - Ensuring appropriate supporting documentation to allow successful application for fuel rebates;
    - Ensuring appropriate data for benchmarking; and,
    - Allowing one employee to manage fuel storage, dispensing, inventory and control rather than involving several employees from various departments,

divisions, and sections as is now the case.

As part of the 2008 Capital approved project, Fleet Services Section will be issuing an RFP for the supply and installation of a new fuel management and storage system with fueling sites in each of the City's five (5) geographical areas. Dispensing our own fuel allows an approximate savings of 10% per litre used. Once all sites are operational, there will be no need for fuel purchases to be made at private stations, other than in extenuating circumstances. The electronic controls will eliminate any unauthorized use of the City's fuel sites and will provide reporting on fuel consumption and charge backs will be allocated accurately.

3. **Automatic Vehicle Locators**: Third, increased use of Automatic Vehicle Locators (AVL) in City vehicles will allow direct, real-time vehicle monitoring. AVLs are small onboard computers that record vehicle position and engine use and transmit this information to fleets personnel for analysis by specialized software. Use of AVLs will allow supervisors to be notified if a vehicle's operation is out of the norm (e.g., vehicle stationary for extended period with motor running).

Facilities and Infrastructure Efficiencies

Electricity and natural gas are consumed by the City to maintain over 600 facilities, treat water and wastewater and maintain road safety through street lighting and traffic signals. Although accounts are set up for various Divisions and Sections for electricity and natural gas, the Finance Division typically is solely responsible for actual bill review and payment. Managers and Directors in other Divisions do not have the appropriate information to make specific decisions relating to energy use. More importantly, no current position at the City has oversight of coordinated energy management, including applying for retrofit grants and setting priorities for key retrofit projects based on facilities audits.

A four-prong strategy is recommended as a first phase in achieving coordinated efficiencies for CGS facilities and infrastructure:

1. Deploying an Energy and Environmental Management System;
2. Conducting energy audits for CGS facilities.
3. Creating a position for a Certified Energy Manager; and,
4. Creating a position for an Energy Clerk

Energy and Environmental Management System

The foundation of the energy efficiencies strategy relies on reliable information about the City's energy use. The best means of achieving this is by deploying an Energy and Environmental Management System. Currently, no such system is in place at the City.

An Energy and Environmental Management System (EEMS) is an electronic information system that stores and analyzes energy utilization data provided by utility companies. The EEMS is able to provide reports to managers as to energy use by facility; comparisons between years (taking into account weather differences); and highlight variances to help managers identify potential problem areas.

The Association of Municipalities of Ontario (AMO) and the Local Authorities Services Ltd. (LAS) have launched an EEMS, which they have named the Energy Management Tool (EMT). The EMT allows all AMO members to benchmark and compare facility performance, measure and verify savings from energy conservation projects, reduce operational costs and improve processes, and meet corporate environmental stewardship goals including greenhouse gas (GHG) reductions. Those municipalities with interval meters are also able to utilize the software to manage demand control schemes.

In terms of functionality, the EMT has robust reporting, billing, trending, and modeling capabilities that can create text, numerical, and graphic summaries of sophisticated operations on any range of data sets—simple or complex.

The EMT is a web-based system available to all municipalities across the province regardless of location, size, number of facilities, or internal resources. Two types of service packages for the EMT are offered to address diverse municipal requirements: Self-Serve and Full-Serve. The Self-Serve option allows users to handle many of the day-to-day tasks themselves so it is ideal for municipalities who can allocate their own resources to the project, whereas Full-Serve users can take advantage of the LAS staff expertise to carry out these tasks for them. The following chart breaks down the responsibilities between LAS and the municipality for the Self-Serve and Full-Serve Options respectively.

	LAS Responsibilities	Municipal Responsibilities
Self-Serve Option	• Hosting • Maintenance and Upgrades • Support including Help Desk • Communications • Net System Load Shape and Greenhouse Gas Emission Factor Updates	• Ongoing Data Entry • Bill Verification • Report generation and Analysis • Greenhouse Gas (GHG) Tracking and Reporting
Full-Serve Option	• Hosting • Maintenance and Upgrades • Support including Help Desk • Communications • Net System Load Shape and Greenhouse Gas Emission Factor Updates • Ongoing Data Entry • Bill Verification • Report generation and Analysis Greenhouse Gas (GHG) Tracking and Reporting	• Provide On-going Data to LAS staff (once per month for non-interval accounts, liaise for meter hook-ups for interval accounts)

Both self-serve and full-serve versions offer the following services:

- Help desk support on the use of the software plus data verification
- LAS takes care of all hosting and maintenance requirements plus software upgrades
- Automatic updates to greenhouse gas emission factors and net system load shapes
- Access to training and education sessions offered on-line and throughout the

province

In addition, LAS staff also provides the following for full-serve users:

- Ongoing data entry provided
- Utility Bill Verification
- Production and dissemination of all requested reports to all interested local staff.

The EMT pricing is still being firmed up by AMO/LAS at the time of writing, but is expected to be offered at $1000 per month for the Self-serve Option.

Energy Audits for CGS Facilities

Prior to amalgamation in 2001, the former Region of Sudbury had a Strategic Energy Plan whereby it invested a total of $7 million to achieve annual energy savings and a reduction in tonnes of equivalent carbon dioxide emissions (eCO_2), a unit of measurement used to measure global warming effect. With amalgamation of seven former municipalities and the former Region in January of 2001, the newly formed City was now managing over 600 facilities. It was identified that the Strategic Energy Plan had to be expanded to include the additional facilities and as a result ICLEI conducted additional audits for the City.

Endorsed by the Ontario Ministry of the Environment, the City of Greater Sudbury applied to the Federation of Canadian Municipalities (FCM) for funding under the Green Municipal Enabling Fund (GMEF) to assist with the funding for the development of a Strategic Energy Plan to identify efficiency initiatives within municipal operations. This application was for a study on the performance of 45 major facilities with recommendations to increase the energy efficiencies of these facilities. These facilities represented 1.5 million square feet of total municipal facilities. The facilities included Arenas, Fire Stations, Pools, Libraries, the Transit Garage, Museums, Community Centres, former Municipal Offices and a few smaller facilities all of which were not included in previous audits. The application was approved and funding was secured for approximately 50% of the audit and the Strategic Energy Plan.

The agreement for funding with FCM was prepared and ICLEI Energy Services started auditing the facilities in 2003. The final reports were submitted to the City in June of 2005. The reports include audit results and recommendations for forty-five facilities. The Executive Summary of these reports identified savings of

approximately 4.8 million kilowatts of electricity, and 668 thousand cubic meters of natural gas. While the study focused on fuel and energy saving opportunities, 41,000 litres of water conservation opportunities were identified and included in the total utility cost saving potential. Total annual utility cost potential for all facilities was found to be $455,000. The cost to implement the 222 recommendations to achieve such savings was estimated at $3.4 million with a payback of 7.4 years.

While some of the recommendations have been implemented as part of on-going capital projects, there has been no common approach to study and implement the recommended measures of the ICLEI reports. As some of the original audits and recommendations are in excess of 10 years old, they should be revisited to identify additional deep retrofit initiatives now available due to more recent technologic advancements, process changes, and newly recognized initiatives. Consideration must be given to recent energy cost increases necessitating immediate action.

Certified Energy Manager

The hiring of a Certified Energy Manager (CEM) at the City is the keystone to ensuring the success of the energy efficiencies strategy presented herein. The CEM would be a qualified engineer with the added certification of “Certified Energy Manager.”

The CEM would:

- review and implement the 222 recommendations of the Energy Audit report prepared for the City by ICLEI delivered in 2005;
- determine which additional facilities require energy audits and commission these to be undertaken ($50,000 per year is recommended to allow for audits);
- set priorities for retrofits for the City’s 600 facilities and set priorities for any green energy projects tied to facilities;
- interface with divisional and sectional managers to ensure dialogue and coordinated follow-through on energy efficiency actions;
- ensure continued reliability and use of data and information from the Energy and Environmental Management System;
- actively seek provincial and government grants relating to energy efficiency retrofit needs at the City.

Currently, none of the key tasks at the City are being performed in a coordinated manner, if at all.

Energy Clerk

A new fuel management system will be in place by spring of 2009. One full-time position will be re-allocated to implement the new system at five locations. The position would coordinate the city's fuel system (control fuel inventory, storage, dispensing and maintaining the system, reconciliation of accounts, etc.) and the EMT for facilities.

Fostering an Energy-wise Corporate Culture

To ensure the success of the strategy outlined above there is a need to establish consistent energy efficiency expectations for staff. This can be achieved through training and education as well as by setting appropriate policies, such as the anti-idling by-law adopted by Council on August 13, 2008. The following initiatives will help foster and support an energy-wise corporate culture:

SmartDriver in the City Training: CGS will establish fuel-wise policies, such as mandating that all City employees that use a vehicle as part of their regular duties follow the SmartDrive training. SmartDriver in the City is offered at no cost by NRCAN. The only cost would be for employees' wages for the 3- to 4-hour training session. All affected personnel shall be trained before the end of 2010.

Vehicle Right-sizing: The Fleet Section will develop a vehicle needs assessment process to ensure that vehicles are 'right-sized' to the position or duty and that the most fuel efficient vehicles possible are assigned. Reviewing the City's operational processes may help identify areas where reduced number of vehicles is possible.

Promote Efficient Route Planning: By effectively planning our routes and travel plan, we can reduce the distances travelled and reduce duplication of vehicles travelling the same streets unnecessarily. This will reduce the amount of fuel consumed and provide greater efficiency.

Accountability and Responsibility: The City needs to promote responsibility and accountability to the front-line supervisors. In turn, front-line supervisors must promote energy-wise initiatives of the City to ensure buy-in from our employees.

Continuous Improvement Program: CGS management and union staff will continue to support the Continuous Improvement Program, a co-sponsored initiative between CUPE Local 4705 and City management. Supervisors will strive to respond to all suggestions and follow-up quickly on those that merit immediate attention.

Community Initiatives: The City, through its EarthCare Sudbury Program, will continue to raise awareness and educate the community on matters relating to fuel efficiency and car dependency. Other groups, such as Rainbow Routes and the Bicycle Advisory Panel, will continue to work toward increasing the infrastructure for safe, active transportation options. Finally, Transit Division