



## Sudbury, Ontario: Strategic Energy Planning

The Regional Municipality of Sudbury, Ontario (now the City of Greater Sudbury) is located on the Canadian Shield 400 kilometres north of Toronto. Comprising two cities (Sudbury and Valley East) and five towns (Capreol, Nickel Centre, Onaping Falls, Rayside-Balfour, and Walden), the Region's population is 165,000. It ranks third among Canada's 25 biggest cities in terms of the amount of parkland per capita. The Region is best known as home to one of the largest integrated mining complexes in the world.

### Goals

- Reduce energy consumption by 32 per cent and optimize municipal operations.
- Identify and implement extensive energy-retrofit initiatives with an overall simple pay-back (total project costs divided by anticipated annual energy and related cost savings) of approximately seven years.

### Issues Addressed

This case study shows how strategic energy planning can help municipal governments maximize energy-saving opportunities.

### Key Management Concept

A thorough and methodical process of quantifying potential energy efficiency, combined with council involvement, leads to better program design, stronger support for initiatives, added negotiating strength

during implementation and greater likelihood of reaching efficiency targets.

### Importance of the issue

A strategic energy plan allows municipal governments to take an integrated approach to energy management. A project-by-project approach leads to many projects appearing less cost effective. An integrated approach, however, allows municipalities to include projects with varying cost effectiveness to achieve an overall rate of return. The process establishes a baseline for energy use. This detailed knowledge strengthens a municipal government's negotiating position with contractors and energy service companies.

### Abstract

In January 1995, Sudbury Regional Council agreed to a strategic planning report to identify all potential energy-efficiency retrofit projects and options for funding. The resulting strategic energy plan identified technical and financial options. Council subsequently approved the Plan and implementation is now under way.

### Case study

In 1993, Sudbury's commitment to develop a strategic energy plan was followed by Council resolutions of support and the appointment of two Council members to work with staff. Sudbury's experience with an initial assessment of facilities encouraged it to proceed with the development of a comprehensive strategic energy plan designed



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to reduce energy use at facilities, with implementation costs recoverable through energy savings. A non-profit firm, ICLEI Energy Services, was retained to complete the strategic energy plan.

Strategic energy planning activities included: benchmarking existing carbon dioxide (CO<sub>2</sub>) emissions from facilities owned and operated by the Region;

- projecting emissions reduction as a result of the energy retrofit activities;
- analysing existing energy management funding activity and comparing cost/benefit of both internal and external funding options;
- analysing the proposed retrofit activity with reference to existing capital maintenance plans and Region-operated programs;
- identifying and evaluating partnerships that would maximize technical capacity and improve the cost-effectiveness of program activities;
- analysing the local economic impact of each proposed retrofit activity;
- analysing the non-financial resources necessary for each proposed retrofit activity; and
- carrying out a financial analysis of the incremental cost of post-retrofit monitoring and verification, and the expected post-retrofit benefits.

The success of the strategic energy plan depended on:

- thorough collection and analysis of relevant energy-use data, not standard industry estimates;
- extensive consultation with Regional staff; and
- reducing plan development costs by maximizing services available from partners represented on a steering committee comprising Council and regional staff, provincial and local utilities, and external consultants.

## Results

1. Thirty facilities representing 89 per cent of the Region's electrical consumption and 87 per cent of its natural gas consumption were audited for energy-efficiency and cost-savings opportunities.
2. Eighty-six energy and/or energy cost-saving measures were identified.
3. The audited facilities identified \$990,844 in annual savings, or a reduction of 28 per cent in the current annual energy bill of \$3.4 million.
4. Cost of the identified measures was estimated at \$4.23 million, including project engineering and contingencies.
5. The simple aggregated pay-back was 4.27 years.
6. Analysis indicated that the identified measures could result in the reduction in carbon dioxide emissions of 24 per cent.
7. Implementation of the strategic energy plan was estimated to create 300 local jobs.
8. A financial model was created that established the cash flow resulting from a full capital commitment to the identified retrofit potential. The model also assessed various implementation schedules with reduced capital commitments.
9. The financial model showed that with an 18-month staged implementation schedule, the capital commitment to the project could be reduced by \$500,000, compared to immediate full implementation. This was made possible by implementing short pay-back projects first and reinvesting the related savings in the projects with longer pay-back.



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10. A discount rate of 8 per cent was applied to determine net present value and benefit/cost ratio for investments. This is approximately equal to the Region's cost of capital from external sources.

### Funding

The Region's finance department opted to fund retrofit activity from internal sources. Two internal funding scenarios then were further examined.

These included:

1. Funding from current capital budget: Funding the retrofit measures entirely from the current capital budget would include a repayment scenario; all savings resulting from the measures could immediately reduce operating budget energy costs. The Region could re-invest all savings that resulted from the measures in other regional initiatives.
2. Funding from a combination of current capital budget and reserves. In this scenario, it was assumed that the Region was prepared to use approximately \$1.2 million of its current capital budget towards the retrofit measures. In order to minimize interest costs for the retrofit program, it was assumed that the first \$1.2 million would be made available at no interest. In addition, a draw of up to \$3 million was assumed to be available from corporate reserves at an annual interest rate of 4 per cent. Interest was calculated monthly during the 24-month construction period, and annually thereafter. It was also assumed that all energy savings would be used to repay the reserves.

The Region chose to finance the retrofit program from the capital budget.

### Outcome

- In 1998, Sudbury Regional Council approved \$4.23 million from internal funds for the implementation of the municipality's strategic energy plan.
- The implementation schedule ultimately depended on the availability of project management, engineering and contractor skills over the course of the program. It was determined that phasing in the implementation would not have a strong impact on the long-term financial performance of the measures since the measures have higher rates of return than the cost of borrowing for the program.
- A monitoring and verification program was established to ensure energy-efficiency savings are realized.

### Lessons learned

1. A municipality committed to energy efficiency can go beyond the conceptual stage of identifying energy savings and proceed with full implementation.
2. Strong Council support by way of resolutions, appointment of two Council members to a steering committee and regular Council updates, ensured continuing support of the program.



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3. Meetings between supervisors and operating staff introduced the program and helped solicit input and support.
4. Initial cost estimates may seem daunting but strong Council support and thorough analysis of potential savings and financing estimates ensure well-designed energy-efficiency programs that achieve savings.
5. A monitoring and verification program is an integral part of the total energy-management program helping ensure savings are realized. Monitoring and verification programs are also deemed critical by financing institutions.

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