

Evaluation Design for a Community-Based Approach to Conservation in Espanola, Ontario

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Introduction

Ontario Hydro has a peak capacity of about 24 GW, serving 3.6 million customers throughout the province, the majority (75%) of whom buy power through our wholesale distributors (311 municipal utilities). By the year 2000, demand management is expected to save 5,200 MW of power, representing an aggressive target of 16% of our peak capacity. Ontario Hydro will be spending about six billion dollars to achieve this target with a variety of broad-based demand management programs involving incentives, promotion and standards.

As an alternative, more aggressive approach to demand management, a pilot test was developed to assess the "community-based" delivery concept as a cost-effective method which could be transferred to other small communities. It is anticipated that this approach will generate much higher participation and installation rates over a shorter period of time than more broad based demand management initiatives. This pilot test is designed to determine the extent of electricity savings possible from a geographically-concentrated area, through intense marketing, community involvement, comprehensive audits, high levels of personal contact and high incentives. The goal is to achieve maximum energy efficiency in a cost-effective manner, by completing energy retrofits in commercial and residential buildings and creating a culture shift to wise electricity use into the future.

The "community" selected for the pilot test, Espanola, is a small town in Northern Ontario with a population of about 6,000. The local electric utility serves approximately 2,000 residential homes and 300 commercial establishments, for a total load of 12 MW. The pilot has been in operation since June 1, 1991 and audits and installations are scheduled to be completed by December 31, 1992.

The Espanola Power Savers Project and the Hood River, Oregon Project are similar in design and objectives, however, Espanola includes commercial customers as well as residential; and includes a long-term culture shift in attitudes and behaviour with regards to energy use as one of its objectives.

Ontario Hydro selected two delivery allies, an auditor/inspection firm and a general contracting firm, through a

bidding process, to assist with project delivery. Walk-through audits are conducted by the auditor and a representative of the general contractor so that cost estimates can be made at the same time as the recommendations for energy improvements. Trained and qualified sub-contractors, under the direction of the general contractor can then install the selected measures, followed by an inspection by the audit/inspection firm.

The primary demand management measures offered include lighting, high levels of insulation, air sealing, window and door upgrades, and efficient heating systems or HVAC tune-ups. Other lower cost measures include water heater tune-up/wrap, energy efficient showerheads and outdoor timers. An expanded product list of these same types of measures are offered to commercial customers, where appropriate.

Incentives are designed to provide the full installed cost of the measure or the total avoided cost, whichever is less. The amount of the incentive is dependent upon the type of heating energy used. For some measures where the customer is required to pay some of the cost, other province-wide programs offering funding assistance through low interest loans are available.

The target for the pilot project is to result in participation levels of 80% to achieve a total demand reduction of 2 MW of electricity in two years. Results to date indicate that these targets will be surpassed.

Evaluation Approach

An integral part of the Espanola Power Savers Project is the desire for an in-depth evaluation encompassing many issues related to the design, implementation, results and transferability of a "community-based" project. An evaluation plan for the Espanola Power Savers Project was designed to address five major evaluation issues:

- development of the project's design
- efficiency and effectiveness of project operations
- extent of long-term shifts in attitudes and behaviour

- net benefits and costs of the project
- project's transferability to other communities.

The evaluation plan has a broad reaching mandate, requiring about C\$800,000 over three years to complete. Numerous research tasks are required, both qualitative and quantitative, including market research, load analysis, environmental impact assessment and cost-benefit analysis. Each of these tasks need to be coordinated to result in a comprehensive evaluation report addressing the five major objectives. To ensure that data are collected in the most efficient and effective manner, an Evaluation Team was developed. It is comprised of various individuals from market research, load analysis, program screening, program evaluation and finance, as well as representatives from program design. This team is responsible for the evaluation tasks and ensuring that all pertinent issues are identified and included in the evaluation, and appropriate conclusions are reached.

Numerous key players are involved in the Espanola Power Savers Project including residential and commercial customers, auditors, inspectors, contractors, a community advisory group, local schools, the local utility, local community groups and the Town Council. In order to assess all aspects of the project operations and impact, it is necessary to conduct research amongst each of the various groups involved, addressing a variety of issues. These issues include the impacts to the customer, community, environment and electricity use; process evaluation; cost-benefit analysis; and an assessment of the transferability of a "community-based" project. Each of these issues are discussed below.

Customer Impact

Before the project was implemented, a control community of similar size, weather patterns and customer make-up was selected, and baseline surveys were conducted in both communities to assess customer attitudes and behaviour with regards to energy use. Mid-term and post-project interviews (in-home) with 300 residential and 150 commercial customers in Espanola and the control community have been designed to assess the overall impact of the project on participants and non-participants. These interviews address customer satisfaction with the project, measures offered and installed, and decision criteria for participation; shifts in attitudes and behaviour patterns related to energy use; and the net impact of electricity savings.

Community Impact

Community impacts are potentially significant in this type of project, although they may not be fully realized for a few years. A project such as this obviously creates considerable employment during the operational phase, particularly for trades people. In the long term, however, future business may be eroded. The business community of contractors, trades, retailers of hardware and lumber may be impacted further down the road.

A socio-economic profile of Espanola was completed before the project was introduced. This profile looks at factors such as the economic base, economic development, labour supply, employment and income levels, community character, social acceptance, attitudes, beliefs, values, lifestyle and culture within the community. These factors will be re-assessed to determine what changes have occurred. Interviews with business and community representatives to obtain their views on the community impact will help to assess the impacts related to this project.

Environmental Impact

An environmental impact study is required to assess the environmental impacts of this project and to identify opportunities and barriers for environmental management. Air quality measurements taken before and after installation of measures will be used to assess issues related to tightening of homes.

Solid waste streams created through the removal and installation of measures will be investigated to document and quantify the types of materials and packaging used for energy efficient measures, and to evaluate the waste disposal methods. Customer and contractor surveys, and interviews with personnel involved with waste disposal will be required.

Load Impact

Load monitoring equipment has been installed in a sample of over 100 electrically heated residential and commercial buildings in Espanola and the control community. Before and after installation of measures, hourly consumption data for total load, space heating, water heating and an appliance will be utilized to determine changes in consumption by major end uses.

Monthly customer billing data will be combined with customer survey data, project research data (e.g., blower door tests) and the project database on measures installed to quantify savings at the customer level and to evaluate the impacts by measures or bundles of measures.

Total load of the municipal utility will be analysed to compare monthly and yearly differences with the control community and 30 other small northern communities.

All data will be corrected for weather and adjusted to reflect changes in population and employment rates so that regression analysis can be conducted to determine the disaggregated impacts and the demographic and building characteristics which have most significantly influenced the electricity impacts.

Process Evaluation

Modifications to the project design have been ongoing, based on feedback from the various groups involved. To conduct the process evaluation it is necessary to first of all document the original project design and the evolution of the project. Through review of available records and material as well as personal and telephone interviews with the numerous key staff and agencies involved we can then identify the lessons learned and potential future design enhancements. Focus groups will also be held with customers and allies. The process evaluation is structured around the key project elements of marketing/communications; energy efficiency measures; audit/inspections; contractors; training; metering/monitoring; information systems; and project management.

Cost-Benefit Analysis

Based on the costs and energy impacts identified through the evaluation, a cost-benefit analysis will be conducted to determine the cost effectiveness from the perspectives of the customers, participants, Espanola Hydro and Ontario Hydro.

Transferability

Analysis and interpretation of data from the various research tasks is required to summarize the characteristics or components which are critical to the project's success. The effects of such things as community, customer and building characteristics; other demand management programs; utility interest and co-operation; local political/climate will be analyzed to assess the potential for transferability and will be compared to other experience with "community-based" projects.

An attempt will be made to understand what motivates participation, to determine the types of communities where this approach to demand management would be most appropriate, identify the key elements for a successful program, identify the specific tools created for the Espanola pilot project which can be used again, estimate the total potential electricity savings available in the province of Ontario using this approach to demand management, and estimate the costs which would be involved.

Summary

An in-depth impact and process evaluation plan has been developed, encompassing many issues related to the design, implementation, results and transferability of a "community-based" conservation project such as that in Espanola. The evaluation plan has a broad reaching mandate, requiring numerous research tasks to assess a variety of issues from a variety of perspectives. A comprehensive evaluation report will be compiled to summarize the results and implications. Due to the intended long-term impacts of this type of project, full impacts will not be realized for a few years.