

What Have We Done with Evaluation Report Recommendations?

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ABSTRACT

In 2004, Hydro-Québec launched programs to encourage energy efficiency initiatives and projects in the business market. The programs were evaluated in relation to process (validation of assumptions), market reaction (effectiveness of marketing strategy, public awareness and satisfaction) and net energy impact (validation of free ridership rate).

The findings revealed that program objectives were not being met in terms of energy impact, due primarily to high free ridership levels. Because the baseline assumptions were not based on an in-depth study of common industry practices, a significant number of projects ended up in the "common practice" category. The motivation of partnering professionals was somewhat dampened by long processing times and the number of documents required in order to determine financial support.

Evaluation challenges and observations were inadequately documented program assumptions, a lack of well articulated program theory, no evaluation plans, and poorly integrated databases. After the evaluation was completed, a special team was put in place to develop an action plan for the implementation of the various recommendations. A two-stage action plan was developed. The first phase (short-term) addressed the most urgent problems, which could be resolved quickly. The second (mid- to long-term) involved the implementation of strategies and measures requiring in-depth study and analysis. The team proposed a series of measures which addressed each of the evaluator's recommendations.

The program evaluations had unexpected impacts on the organization of program work, from program design, through implementation and evaluation.

Context

Hydro-Québec offers financial assistance to its business customers to implement energy efficiency measures through its Empower Programs (the Programs). The goal of these programs is to encourage and support a market focus on energy optimization within while buildings; including the envelope, embedded systems, and production processes. The *Empower Program for Building Optimization* assists commercial customers in reducing building operations-related electricity consumption by adopting measures that treat the whole building as a system. The *Empower Program for Industrial Systems* is designed for small and mid-sized industrial clients to replace or retrofit production facilities and systems, as well as to improve the efficiency of industrial processes while maintaining current levels of output, and improving product quality.

The Empower Programs, launched in February 2004, were created quickly and had relatively modest goals, with an original savings goal of 197 GWh over three years (2007). Due to their success, program goals were raised and the Programs were extended through 2010. With this new demand, Hydro-Québec wanted a thorough program review to match offerings with evolving demand and to meet requirements established by the *Régie de l'énergie*, Québec's Energy Board.

Hydro-Québec hired an independent third-party firm to conduct the evaluation. Reviews for projects completed in 2004 and 2005 were conducted during the spring and summer of 2006. Evaluations questions addressed included:

- Were projects being carried out according to submitted plans?
- Was a whole-building approach adopted?
- Were there specific steps that needed to be followed?
- Were there impediments that discouraged program participation?
- What level of satisfaction was achieved among program participants and partners?

Program assessments analyzed implementation processes, underlying program theories, market context, energy impacts, and marketing effectiveness. Cause-and-effect relationships—between program-sponsored activities and observed outcomes—were also tested, helping to establish net-program effects. A market study assessed program popularity, customer/partner satisfaction as well as to identify opportunities for market actors. From these assessments, recommendations were developed to improve program outreach and monitor broad market trends.

Summary of Findings

Based on findings, the evaluators formulated recommendations to improve the outcomes of Hydro-Québec's programs. Recommendations were made for all program development phases to address:

- Program theory development
- Distortion effects and accompanying operational considerations
- Building reference scenarios
- Administrative processes
- Program partnering
- Marketing strategies

Program Theory Development

The evaluators asked Hydro-Québec stakeholders to clarify the program theory behind the development of program plans. Several meetings were held between evaluators and program designers. Despite efforts to communicate underlying program design strategy, several key program theory aspects were missed. As such, key intervention strategies were missed in the initial assessment, requiring a follow-up market assessment to compensate for initial misunderstandings.

The evaluation concluded that a review of intervention strategies, measure cost-effectiveness, market assumptions, savings objectives, and target customers was necessary. By refocusing these components, Hydro-Québec could adapt the programs to the needs of their small client, single measure, and more complex whole-building or whole-system initiatives.

Distortion Effects

At the programs' launch, clients wanted to delay energy-efficiency projects, developed in conjunction with Hydro-Québec, until program incentives were formally available. Hydro-Québec program staff encouraged clients to move forward with projects and not delay energy efficiency for administrative reasons. As such, Hydro-Québec paid incentives on projects completed prior to program application submission.

Evaluators concluded these participants were free riders, who diminished net-program savings. To mediate stakeholder concerns, program staff and partners were briefed on key program components

and how distortion effects were calculated. In the end, stakeholders understood that clients would have to install measures beyond existing market standards to become eligible for financial incentives.

Building Reference Scenarios

The Empower Programs use an engineering tool modeled after DOE-2 to forecast energy savings. Reference scenarios included in this tool's design reflect current practices. The deemed savings of the project are calculated using the difference between the estimated energy use after the measure is installed and the most appropriate reference scenario (baseline conditions).

Evaluators found that the reference scenarios used were out-of-date, which caused deemed savings estimates to be overstated. Measure admissibility was a particular concern. Some measures once considered high-efficiency are now standard for the market. For example, in earlier programs Hydro-Québec offered rebates for electronic thermostats installed in new construction; however, due to wide market adoption, electronic thermostats are no longer considered an eligible energy efficiency measure. Hydro-Québec was advised to update reference scenarios to better match current market practices to ensure deemed savings estimates more accurately match net savings for a given measure.

Administrative Processes

To facilitate submission of valid financial applications and accelerate file processing, Hydro-Québec was asked by program partners to simplify the application process and offer training. The process needed to maintain a balance between administrative controls while encouraging greater energy-efficiency investment. Hydro-Québec identified administrative hurdles and set aside time to resolve problems with individual applications.

Program Partnering

Building engineers and architects did not consider themselves ambassadors of the programs and did not feel they were true partners. As such, only a few firms integrated our offerings into their daily operation, leaving a small proportion of program partners that excelled at attracting new clients to the program. To improve partner participation, Hydro-Québec as advised and adopted the recommended strategy to work closely with these partners to establish new reference scenarios. By sharing the administrative and technical considerations associated with this development task, the partner relationships were strengthened. Also, partners learned how net savings calculations were used to establish the level of financial incentives available. With this success, Hydro-Québec began to search for true partnering opportunities.

Marketing Strategies

Hydro-Québec has account representatives who work closely with commercial accounts. Several program partners sought greater involvement from Hydro-Québec, so a coaching strategy was recommended that would have account representatives accompany program partners to encourage clients to adopt energy efficiency measures. This effort offered program partners a competitive advantage in selling whole-building and whole-system solutions.

Hydro-Québec relied on mass-market media to commercialize the program with particular attention given to the program website. Website content was not in-sync with evolving program initiatives, so Hydro-Québec was advised to adopt a targeted marketing strategy focusing on trade ally journals and networking events to leverage professional associations.

How Hydro-Québec used evaluation results?

Hydro-Québec used the evaluation results in two ways:

1. to realize program improvements, and
2. to improve the process of moving programs from concept to market.

Programs improvements

Following the evaluation reports, Empower Programs' management established a plan of action to implement the evaluators' suggestions. (This plan accompanied the evaluators' reports delivered to the Québec Energy Board.)

A *Project Committee* was established to carry out an in-depth Empower Programs' restructuring. After a rigorous program review, the project committee was to tailor the programs for greater GWh attribution. The committee was focused on reaching the ambitious 2010 energy-efficiency goals while meeting the cost/benefit criteria established by senior management.

The committee was also directed to increase customer and partner satisfaction. Administrative improvements were necessary to adjust for evolving market trends, speed file processing, and lower free ridership rates. Additionally, many believed that better provisions to address market needs and increase program flexibility would contribute to this goal.

The committee was guided by the principle of balancing program participation ease with proper management control. To accomplish this, the committee favoured a functional approach. The programs would leverage existing tools, partners, and practices to strengthen the programs—contrary to emergent tendencies for portfolio-based designs. Programs responded to the real needs of clients and business partners; management controls were made transparent to clients and program partners.

Program task force: joint effort between designers, implementers and evaluators

The *Project Committee* responsible for the plan of action was led by the *Program Manager*. The committee gathered representatives from different administrative departments; program design, development, marketing, and other program management. Six people formed the core of this committee, who initiated work orders to internal specialists to conduct specific project tasks.

The *Project Committee* issued 10 mandates, corresponding to the recommendations made in the categories defined previously. These mandates were progressed to the *Management Committee*, since top management took an active role in program development. Figure 1 shows the hierarchy in place to address program redesign.

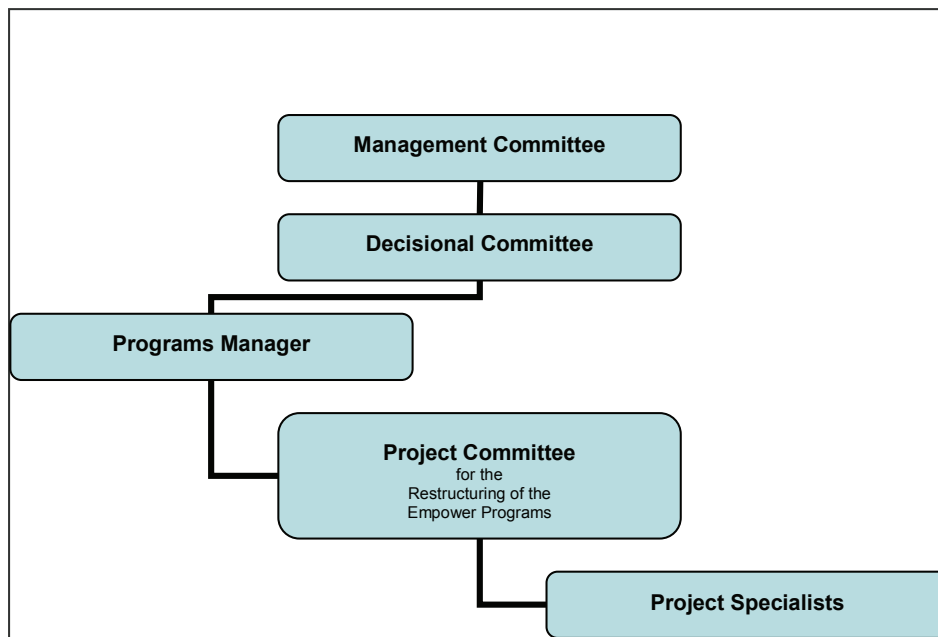


Figure 1. Organizational Structure of the Project

Hydro-Québec’s energy-efficiency executive presides over the Management Committee and is joined by various department managers. This committee’s role is to align energy-efficiency initiatives with regulatory requirements and corporate objectives.

The Decisional Committee is an inter-departmental team of managers, who help integrate energy efficiency offerings with other initiatives. The Program Manager presents alternatives to balance programmatic issues with associated risk support. The committee’s functions include a broad range of interactions between Hydro-Québec and their clientele.

The Project Committee is a task-specific entity that was convened to restructure Hydro-Québec’s Empower Programs for Building Optimization and Industrial Systems. The project committee coordinates all project tasks, administers mandates given to program specialists, and formalizes a range of options that the Program Manager can take to the Decisional Committee. The Project Committee often weighed the risks and attempted to balance programmatic issues to find the best design strategy possible. As such, the Program Manager and Decisional Committee were presented with a very narrow range of options from which to consider.

Project Specialists are responsible for the delivery of various mandates assigned by the Project Committee. They provide solutions for specific operational considerations and submit possible alternatives to the Project Committee. Following the review and approval of their recommendations, the specialists retain responsibility for the development of these solutions.

This organizational structure is advantageous because all levels of management were involved in the program evaluation and redesign process. Issues could be rapidly addressed by all levels of management. External partners were regularly consulted as needed. The active participation of management and other stakeholders in the design initiatives helped assure that information was communicated to all interested parties.

Adopted Solutions

Each administrative team proposed a series of strategies addressing evaluators' recommendations.

A *Declaration of Intent* is now required from the customer prior to the installation of energy efficiency measures. This was implemented to lower the level of free-ridership in the Empower Program for Building Optimization.

Engineering calculations embedded in the PEP tool, the software application used to estimate project energy savings within the Building Optimization Program, were adjusted to account for current market practices. This has reduced the disparity between estimated and realized savings.

New steps were introduced to ease administrative hurdles that discouraged some partners from submitting claims to the Empower Programs. Workflows were improved to eliminate administrative delays, and registering a project in the program is now much simpler. In fact, submission requirements were halved. Document reception and transmission tasks have been optimized and an efficient processing system implemented. The necessity to verify every application was replaced by a randomized sampling process. Improved methods for calculating financial initiatives resolved program constraints; this effort reduced approval times for customers and facilitated active program participation.

For standard and small projects, a new fast-track procedure allowed immediate payment of financial incentives. Processing was automated requiring limited technical documentation to qualify applicants. A *green light* procedure was implemented to confirm financial support before carrying out project, which authorized 80 percent of allocated financial support to the customer. These modifications streamlined the treatment of project files, removing bottlenecks.

Measure eligibility criteria were tightened, such as increased performance level of installed measures, so that certain projects that would have taken place even without financial support (free-riders) were no longer allowed into the program. More importantly, our partners now appreciated the need to focus on net market effects. Through a better understanding of distortion effects and their impact on net program savings, greater attention was given to the customer's decisional processes.

New analytical software was developed incorporating technical data from 1,200 project files handled during the prior three years. Technical analysis guides were also developed and distributed, which standardized the treatment of simple projects and identified more complex projects for additional consideration.

Due to serious consideration of evaluation findings throughout the Hydro Quebec organization, the program is much improved. The programs are currently being re-evaluated. The evaluators will see the effects of modifications made in response to the initial evaluations. The program is on target to achieve the ambitious efficiency goals set for 2010, as well as meeting customer and partner satisfaction expectations.

Benefit of the Evaluation for Hydro-Québec and the Customers

The implementation of program improvements was completed in September 2008. For customers, the changes greatly reduced the number of documents required by the program, making it easier to participate. The amount of data required for a project was streamlined, which allowed Hydro-Québec to process participant filings faster than done in the past. Now, customers obtain an estimate of the likely financial support available for a project. Additionally, partners have benefited from ongoing support and training from Hydro-Québec.

For Hydro-Québec, the improvements increased customer and partner satisfaction. Also, internal staffing requirements to process customer applications were reduced.

From these activities, winning conditions for program participation were established.

Winning Conditions

The restructuring project was very demanding for all who were involved. The success of the project hinged on essential conditions: the need to work as a team; the cooperation of multidisciplinary teams; and each team understanding the implications of their work across the important C & I sector.

Project ownership by each team member was essential. The availability of all stakeholders contributed to our success, especially considering the volume of work and the tight schedule for the implementation.

Several consulting firms supported the project committee and its team members. Their dedication to the program restructuring, and collaboration with team members were essential to our success. These consultants facilitated the communication between team members, committees, and program partners and provided technical assistance at critical stages in the project.

In summary, the evaluation led to an in-depth restructuring process that focused on the goal of realizing efficiency gains. Simplicity and profitability summarize the results of the restructuring.

Systemic Changes: Integrating Evaluation in the Design and Implementation Process

Past evaluations had resulted in high net-to-gross ratios, due in part to the reference scenarios used in the PEP, our energy savings tool.

It was essential that the groups responsible for evaluation management and program design collaborated among themselves, and with the Program Manager. This collaboration was necessary for evaluation recommendations to result in more effective program designs. Changes were made in the manner with which the groups interacted to facilitate collaboration. For example the creation of a committee to review deliverables together versus having tasks independently produced and handed from one department/team to the next.

Currently, the program planning and design teams are leveraging external evaluation expertise to guide their efforts, particularly for a market effects study. This consultant also serves as a liaison between program development and evaluation managers to help both sides appreciate each other's role and the value of formative and summative research to realize of energy efficiency objectives.

Major Changes in Design and Implementation Approach

Hydro-Québec made process changes to the development of energy efficiency program offerings, as a result of the Empower Program evaluations for Building Optimization and Industrial Systems.

All programs are based on program theory, supported by logic modeling. A specialist in market transformation theory and performance tracking was hired within the design team. This specialist also serves as a liaison with the evaluation team. He assists our design teams in developing comprehensive program theories, including establishing up-front key evaluation metrics by which our efforts will be evaluated.

The assumptions upon which program objectives were based are now well documented in the program theory, providing a basis for our evaluation efforts. Market impediments known to deter energy efficiency investments are clearly identified, as are the intervention strategies to address them.

Another important change occurring as a result of the program evaluations is programmatic cooperation between departmental management and evaluation groups via oversight by the Management Committee. At the beginning of program design, a Project Committee is established and staffed with representatives from different groups to provide the necessary technical knowledge needed to address

most program design and evaluation issues that might arise. This ensures continuity across all stages of the project, including evaluation efforts, from its inception through to program launching.

Cooperation between program managers and evaluators also improved, especially during the second phase of evaluations. Evaluators are open to discuss their approach with managers, and managers express their requirements and specify underlying program theory, resulting in more effective team collaboration. Prior to this, each group was suspicious of the other. Evaluator felt the design team was “creating” theories to defuse critical findings, while designers felt evaluators were judging design components that negatively biased evaluation strategies against the program. Most notable were those components related to market transformation.

Program managers expressed concern that not all program effects were considered in the evaluation. They specifically mentioned spillover from changes in engineering and contractor practices, as well as small projects that were completed as a result of the program but not submitted for financial assistance.

Market transformation initiatives now co-exist within our resource acquisition programs. For example, a program promoting Energy Star doors and windows is underway. It specifically aims to raise energy efficiency standards as well as increase market share of higher efficiency doors and windows. Another program *Recyc-FRIGO* was also launched this program is a hybrid program of resource acquisition and market transformation. Under it, aged refrigerators were voluntarily removed from homes and then recycled to take high energy-using refrigerators off the grid.

Overall, program stakeholders are much more cooperative today. The designers expanded their program portfolios and produced documentation valued by our evaluators. In turn, the evaluation managers participated in the program redesign.

Major Changes in Evaluation Approach

During the second evaluation the internal team, along with the external evaluators, decided to present preliminary findings to Program Managers prior to drafting an initial report. This would make it possible to validate evaluation findings and place conclusions within the proper context to appreciate the impact of the recommendations made.

Sharing the results earlier in the program could eliminate any net program savings surprises. It could also enable program staff to understand the results and contribute to programmatic recommendations. The preliminary report could also reflect discussions before and during drafting the report. As a result, the final report was better received by a wider spectrum of program stakeholders.

The evaluation managers validate program theory prior to program development. Each anticipated cognitive and behavioural outcome is reviewed along with the performance metrics specified by the Project Committee. By doing so, the data that is collected during the course of the program will be available to future evaluators.

Moreover, for each program, an evaluation plan is produced simultaneously with the development of the program theory. The evaluation plan is created with the cooperation of the original program design team, program manager, and evaluation manager.

Another important change was the inclusion of market effect analysis in our studies. Following program evaluation results, it was recognized that a large portion of the energy savings recorded were actually less because of the rate of free-ridership. Program designers reacted to the net savings attributed their programs, citing that Hydro-Québec had a causal influence on the observed changes in market best practices.

Are customers more demanding of their engineers and architects to produce more energy efficient construction and renovations? What is the program’s impact on the sale of energy efficient

products? In order to meet this need, an analysis of market effects was integrated into the evaluator's mandate.

These examples illustrate how the results of the evaluation were used, not only to improve the programs targeted by the evaluation, but also to improve the whole program development lifecycle.

Summary

Lessons learned from the evaluations performed for the Empower Programs include:

- 1) Investing time to develop the program theory at the planning and design stages. Lacking market transformation theory, we found it difficult to claim the broad range of anticipated market effects.
- 2) The importance of having a well-documented program theory and supporting logic models to support program design and evaluation.
- 3) The importance of including the evaluation team from the program's inception to ensure that program goals are measurable and the criteria for assessing market effects are understood by all program stakeholders.
- 4) Making evaluators available to Program Managers may to validate the efficacy of program design and operational changes.
- 5) Preliminary, internal release of evaluation findings. Releasing evaluation results as they become available is necessary to allow managers and evaluators to discuss the results before report submittal; the results are then better understood and accepted.
- 6) Ensure that evaluators have a well-documented program theory and supporting logic models that address all key components of program theory. Without them, our evaluations missed key market interactions and, as a consequence, were not well received by program management.
- 7) A closer relationship between the design, development, and evaluation managers makes it possible to identify potential problems and provide opportunities for timely resolution.

The Empower Programs review, which followed the submittal of the evaluation report, resulted in adopting new methods of program design and also program development and evaluation. In the short- to mid-term, the evaluation team serves as a partner to the design and development teams to reach the goals set out in our DSM strategy. We believe that the Hydro-Québec team is on the right road to ensuring that all departments work together to further success.

Warning Signs and Cautions

We conclude with a summary of warning signs and cautions. Our experience has been that resource acquisition programs have market affects—a strong trend within our province and probably across North America. Greater energy savings are constantly sought within utility energy efficiency portfolios. At some point in the near future, other utilities like ours will have programs exhibiting market transformations, as well as resource acquisition. Our experience has shown that evaluators will not utilize the appropriate market effects protocol without documented program theory. Our troubles stemmed from the lack of a well-documented program theory.

Looking back we saw warning signs. We were not provided with adequate program documentation. While the evaluator worked with the design team to understand the program, valuable time was being lost. Methodological decisions had to be made without a full understanding of the program, and evaluation findings failed to match the energy savings' forecast made by program designers. To avoid that shortcoming in future, we recommend that program managers consider

emphasizing detailed program theory development to support evaluations and build upon evaluation findings to refine program theory and refine program offerings.