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# RESIDENTIAL DSM PROGRAMME DEVELOPMENT AND IMPLEMENTATION: LESSONS FROM 'PRIME'

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# RESIDENTIAL DSM PROGRAMME DEVELOPMENT AND IMPLEMENTATION: LESSONS FROM 'PRIME'

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**SYNOPSIS:** This paper describes a multi-pronged programme designed to stimulate residential-sector efficiency investments in Québec, and discusses some lessons learned about selling EE to decision-makers.

**ABSTRACT:**

In 1996, a provincial *Summit on the Social and Economic Destiny of Québec* was held in which government and the private sector were invited to present large-scale, job-creation projects. One project designed to this end was the PRIME, a large-scale, community-based programme aimed at increasing residential-sector investments in energy efficiency improvements. Given the summit's aims, detailed cost-benefit and job impacts studies were conducted to identify the direct and indirect economic and employment opportunities associated with this energy efficiency programme. These studies, which pointed to net savings of $1-2 billion (CDN)[1] and roughly 15,000 job-years of employment, went a long way toward securing a government commitment to funding and initiating the PRIME. However, the programme has also stumbled, in part due to its complexity, and financing for full-scale launch (beyond pilot projects) remains uncertain.

[1] In April, 1998, $1 CDN is equal to roughly $0.70 USD.

## INTRODUCTION

In 1995, the Premier of Québec announced an historical *Summit on the Social and Economic Destiny of Québec*, aimed at bringing together business, labour, government and NGO leaders in order to achieve compromise on principles for developing Québec's economy as well to initiate new private- and public-sector investments aimed at boosting economic output and job creation. More specifically, the summit was a political process with a political aim: it sought to achieve widespread consensus on setting specific timetables for annulling the province's budgetary deficit as well as instilling a sense of public optimism through the announcement of new and significant job-creating projects.

The author of this paper was appointed to the summit's Business and Jobs Committee. As such, I was asked to search for energy megaprojects which could possibly be announced at the summit, to be held six months thereafter. I was also empowered to bring financiers, government representatives and other parties together in order to further the chances of success of any such projects.

As an advocate of energy conservation, I chose to focus on bringing to the table a large-scale energy efficiency project in lieu of the traditional large dam option. After discussion with the Energy Efficiency Office of the Ministry of Natural Resources, it was agreed that I would coordinate a small team whose objective it was to redesign and solidify a

previously conceived programme, and to assess the programme's potential economic spinoffs. The PRIME was eventually proposed to Summit leaders and, given its job creation impacts, was accepted for announcement as a major job creation project of the Québec government.

The following paper describes the programme we developed as well as its economic and employment imapcts. The paper will also describe the state of the programme today and some lessons learned about surmounting the obstacles to government funding and commitment.

## THE PRIME APPROACH

### Overview

The programme we designed, called PRIME (for *Programme résidentiel d'intervention et d'investissements en matière d'efficacité énergétique*), is a multi-pronged approach aimed at stimulating residential-sector investments in home energy efficiency improvements[2]. To do so, the programme focuses on eliminating information and market barriers to residential-sector investments in energy efficiency. Specifically, the PRIME offers :

- neutral, credible and free information;

- superior financial products and services, which take into account the reduced repayment risks associated with home efficiency improvements;
- market recognition of the lower operating costs and added resale value associated with EE investments; and
- service and work quality guarantees.

The programme focuses on each component of a household's energy bill, including the thermal envelope, HVAC systems, appliances as well as occupational habits. It focuses strongly, though not exclusively, on home visits and personalized assessments, which are carried out by local, non-profit organizations.

**Learning Lessons the Easy Way — The U.S. and Ontario Experiences**

In designing the PRIME, particular attention was given to not reinventing the wheel and, more significantly yet, to learning the appropriate lessons from others' experiences. This review of other experiences focused primarily on two North American approaches: (1) the Home Energy Rating Systems (HERS) and Energy Efficient Mortgages (EEMs) in the U.S. and (2) Green Communities in the neighbouring province of Ontario.

[2] All discussion hereafter regarding the details of PRIME is from Dunsky et al. 1996.

The HERS programme in the U.S. was very instructive, particularly as to the need for some central coordination and the opportunities associated with energy efficiency financing. However, it was the Green Communities programme in Ontario that largely served as "spiritual guide" to the design of the PRIME (see box 1).

**Box 1. Ontario's Green Communities Story**

In 1994, a left-leaning government in Ontario launched the Energy Efficient Communities Program, whose goal was the establishment of community organisations dedicated to substantially improving energy efficiency both in stationary and transportation modes. The program quickly evolved into **a network of community groups dedicated to energy conservation improvements** as well as the delivery of other environmental services within their communities. With significant government assistance, the **Green Communities Association (GCA) soon represented nearly two dozen Ontario communities** in which local energy efficiency and other services were offered to residents free of charge.

With the election of a right-wing government in 1995, the GCA lost all of its funding. Still, a handful of green communities survived, and more have since been created. **With a new focus on financial self-sufficiency, the GCs now generally offer services for a fee**, though financial support from a variety of sources (federal government, utilities, etc.) and cross-subsidization often allows them to minimize cost as a barrier to public participation.

Each Green Community within the GCA is entirely independent. For example, fees differ greatly among communities, as do the type of services and activities offered (ie. energy efficiency, community organic gardening, composting, preserving public spaces, etc.). However, **energy efficiency home visits represent the core activity in every community.** *See GCA 1997 and Green$aver 1995.*

From our review of both the HERS (and EEMs) in the U.S. and the Green Communities in Ontario, we learned the importance of:

- developing financial products and services adapted to consumers' needs, including energy efficiency home mortgage rates and personal loans for energy efficiency impovements and retrofits;
- ensuring that home visits and energy efficiency diagnoses are conducted by a local organization dedicated to energy efficiency and created solely as a community initiative (i.e. not imposed from "the outside");

- ensuring that home visits and diagnoses can be offered free of charge (or close to free) for homes with significant potential[3];
- developing a province-wide protocol for ensuring the quality of energy efficiency measures and diagnoses;
- developing a method of explicit recognition of energy efficiency investments (i.e. rating systems); and
- ensuring that local energy efficiency groups have the flexibility required to develop — beyond the PRIME's specific goals — other products and services attuned to the needs of local citizens.

**PRIME's Complex Set of Roles, Responsibilities and Services**

Because of its multi-pronged approach, the PRIME is best viewed and understood through two distinct perspectives : the designer's and the consumer's.

**From the designer's perspective,** the PRIME's primary components are divided between the province-wide secretariat and each Local Energy Efficiency Organization (LEEO) which is ultimately responsible for delivering the PRIME's services (i.e. home visits, etc.) to the community. Table 1 describes this division of labour.

[3] Experience at Ontario's Green Communities Association tends to indicate that $25 is, on average, the maximum fee that can be required without significantly hampering public participation rates (Green Communities Association 1997).

| Table 1. Designer's Perspective: Central vs. Local Responsibilities | |
|---|---|
| **Provincial PRIME Secretariat** | **Local Energy Efficiency Organizations (LEEOs)** |
| ✓ Negotiations with large banks, lending institutions<br>✓ Negotiations with large-scale retailers, wholesalers, manufacturers<br>✓ Negotiations with real estate agencies<br>✓ Training of LEEO coordinators<br>✓ Protocol for measures, diagnoses<br>✓ Data analysis (retrieved from LEEOs) | ✓ Negotiations with local financial cooperatives<br>✓ Negotiations with local retailers, wholesalers and manufacturers of energy efficient products<br>✓ Negotiations with independent brokers, local real estate agencies<br>✓ Training of home visit inspectors<br>✓ Advertising, marketing, etc.<br>✓ Home visits<br>✓ Ensuring follow-up<br>✓ Information retrieval (sent to Secretariat)<br>✓ Other services (ie. waste reduction, social assistance, etc.) |

**From the consumers' perspective,** services can be broken down into four key segments: (1) home visits and diagnoses, (2) financing, (3) quality guarantees and (4) recognition of added value from efficiency investments. Table 2 describes each of these components offered to consumers by PRIME.

| Table 2. Consumer's Perspective: What PRIME Offers | | | |
|---|---|---|---|
| **Diagnosis/Visit** | **Financing / Affordability** | **Quality Control and Guarantee** | **Recognition of Added Value** |
| *Phase I: Info and Awareness*<br>✓ Wide-scale distribution of a comparative energy consumption table[4] | ✓ Negotiation and development of financial products and services, including: | ✓ Training and certification of specialized energy efficiency renovation | ✓ Negotiations with municipal (tax) assessors, property (tax) assessors, real estate companies, etc., for: |

[4] Based on a programme carried out in France by the Agence de l'environnement et de la maîtrise de l'énergie (ADEME), these tables (published in pamphlet form) allow consumers to compare, in a simple, illustrated manner, the efficiency of their appliances or buildings relative to what would be considered an energy efficient home.

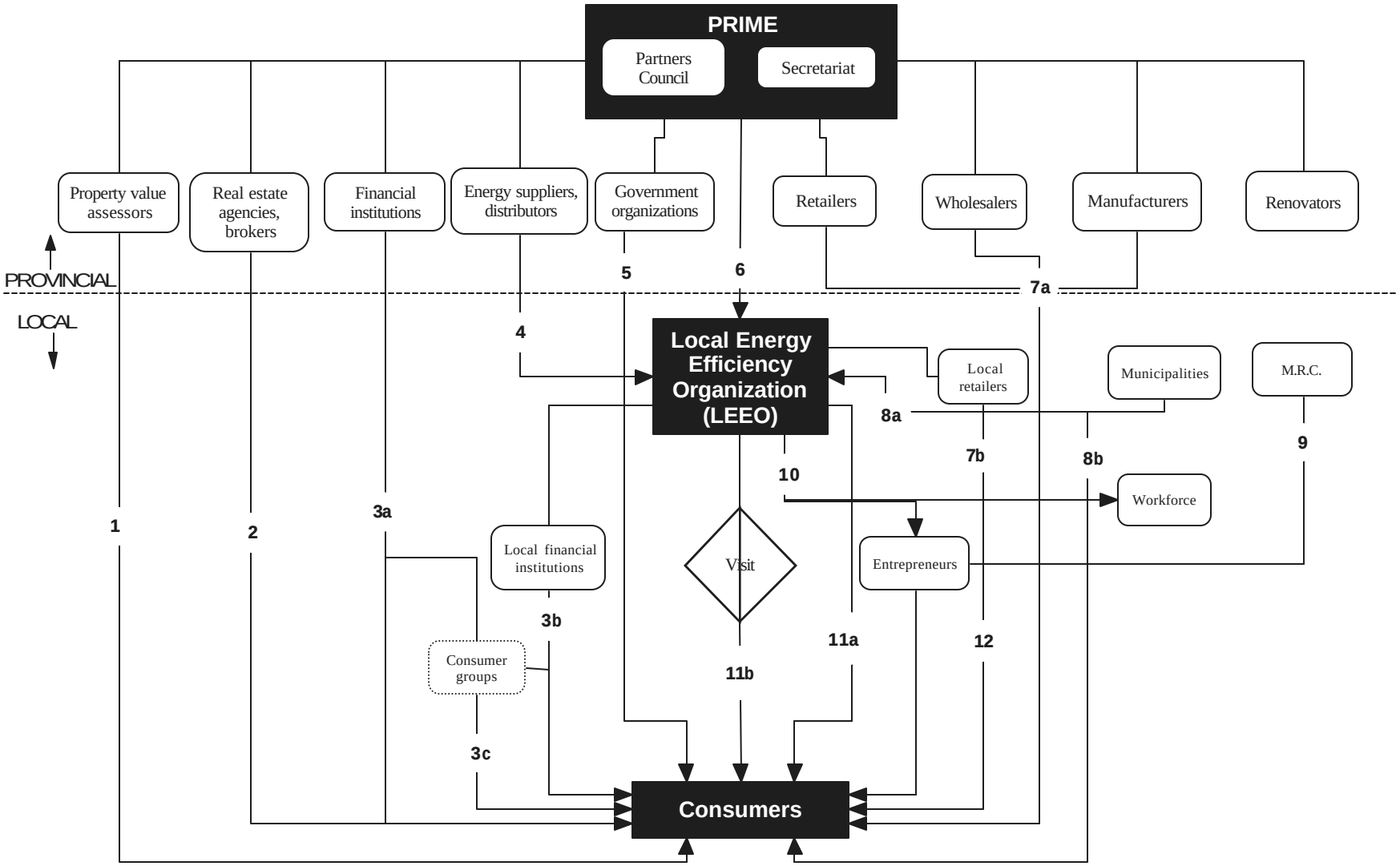
| | | | |
|---|---|---|---|
| *Phase II: Home Visit*<br>✓ Data collection, incl. thermal envelope, heating systems, etc.<br>✓ Questionnaire on occupational energy habits<br>*Phase III: Report and Recommentations*<br>✓ Printed personalized assessment of energy performance of building, appliances and occupants<br>✓ Recommendations for specific measures, incl. cost-benefit analyses and suggestions for financing | – energy efficient mortgages<br>– energy efficient loans<br>– purchase rebates on energy efficient materials, appliances, heating systems, etc.<br>– tax credits<br>– others | workers<br>✓ Development and distribution of a list of PRIME-accredited entrepreneurs and workers<br>✓ Design of work quality guarantees | – recognition of added market resale value<br>– recognition of value of lower operating costs<br>– temporary (e.g. 5 years) suspension of property tax increases associated with higher resale value |

**Finally, from a societal perspective,** PRIME brings together a vast array of "partners":

- Construction entrepreneurs and artisans;
- Renovation industry professional associations;
- Retailers, wholesalers and manufacturers;
- Energy suppliers and distributors;
- Financial institutions;
- Real estate agencies and brokers associations;
- Municipalities;
- Property value assessors;
- Regional municipal counties ("MRCs");
- Consumer aid organizations;
- Government and para-governmental organizations; and
- Local groups interested in community-based energy efficiency (enviros, chambers of commerce, etc)

Each of these partners would have its own particular role in the overall PRIME strategy. Figure 1 and accompanying notes illustrate the roles and responsibilities of each party.

**Figure 1. Roles and Responsibilities of Various PRIME Partners (see notes below for circled number references)**



**Notes for Fig. 1 (refering to circled numbers)**

1. **Property value assessors** would incorporate into their assessments an explicit recognition of energy efficiency performance, and would further ensure that their indices are available to potential buyers.
2. **Real estate agencies** would inform their clients of the value associated with energy efficiency performance in terms of lower operating costs and higher resale value.

3a. **Financial institutions** would offer special financial products and services for investments in energy efficiency (incl. lower rates and easier access to loans).

3b. **Local financial institutions** would offer additional financial products and services geared to the specific clients they serve (note: in Québec, most consumers hold an account at a branch of the province-wide cooperative; local branches have near total autonomy in the products and services they can offer)

3c. **Consumer groups** could, in certain cases, manage loans to low-income customers, in order to facilitate their access to financing and minimize repayment risks. This type of management help for low income citizens is an integral part of the work conducted by consumer groups throughout Québec.

4. **Energy suppliers and distributors** (electricity, gas and oil) would offer, with their clients' consent, information on energy use patterns in specific households.
5. **Government organizations** would play various roles: the Québec Housing Society (SHQ) would seek to protect low-income tenants from the possibility of rate hikes when they are not responsible for paying energy bills; the Ministry of Natural Resources would contribute to research and development and would assume, at least in the PRIME's formative years, the PRIME's secretariat; other ministries, such as the Ministry of Environment and Fauna, could also join the team.
6. The **PRIME Partners Council**, through the **PRIME secretariat**, would offer financing to local energy efficiency organizations (LEEOs) and other technical and organizational help. LEEOs would also provide data from visits to the secretariat.

7a. PRIME's secretariat would negotiate specific agreements with **retailers, wholesalers and manufacturers** interested in having special access to this market and willing to offer rebates or other advantages to participating consumers.

7b. **Local retailers** (and wholesalers and manufacturers, where pertinent) would offer rebates or other advantages to participating consumers.

8a. **Municipalities**, in collaboration with property value assessors, would offer information to the LEEOs concerning the state of specific buildings (i.e. age, recent renovations, etc.); they could also participate in the financing of water conservation measures.

8b. **Municipalities** would also be invited to offer temporary (~5 years) relief from tax increases associated with increased property values.

9. **MRCs**, the regional county governments, would coordinate the lists of accredited construction/renovation entrepreneurs.
10. A training and accreditation process would be offered to interested **entrepreneurs and workers** by the LEEOs.

11a. The **LEEO** would arrange the local marketing approach in order to maximize local participation.

11b. The **LEEO** would also coordinate and conduct the personal home visits. It would also offer property owners a personalized report with a list of recommended measures, a cost-benefit analysis of these measures and suggestions for financing.

12. At the request of a participating consumer, an **accredited entrepreneur** would do the renovations or other works aimed at increasing the building's energy efficiency.

*Note: all partners would be responsible for distributing to the owners with which they are in contact, the comparative tables used to verify initial potential and initiate a visit.*

**Marketing : From Interest to Investment and Beyond**

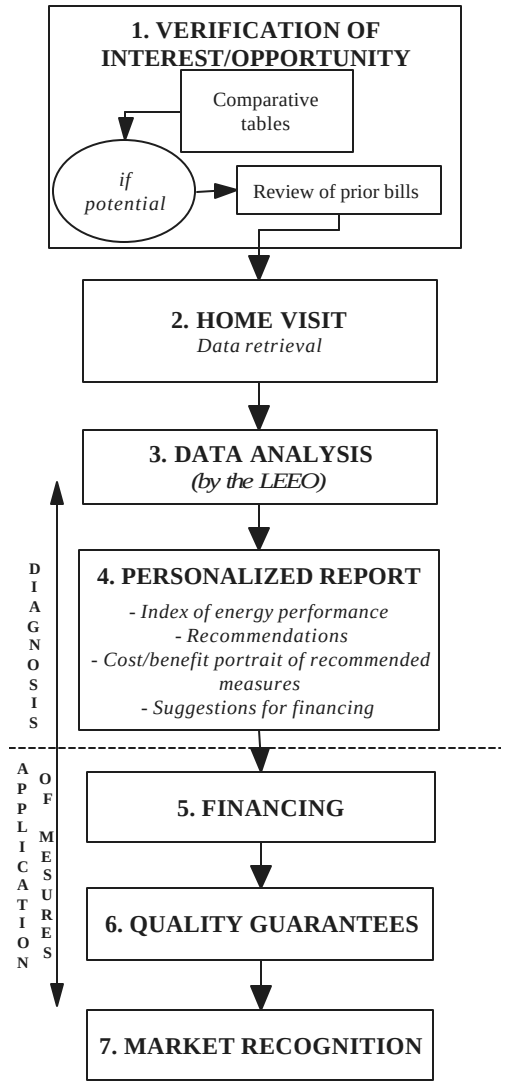
Through a complex web of partners, the PRIME would seek to meet consumers at key moments in their investment decisions. For example, municipalities would inform potential participants when they inquire about renovation permits or available renovation subsidies; lending institutions would intervene when customers inquire about home loans or mortgages renewals; accredited entrepreneurs would inform them of PRIME possibilities when asked to submit a bid for renovation work; real estate agents would inform clients seeking a new home of the benefits of PRIME; retailers would reach customers at the storefront; and the local energy efficiency organizations would use their knowledge of — and presence in — the local community, to maximize PRIME's visibility to those not otherwise reached.

A potential customers' first contact with the PRIME would likely be through the comparative tables noted earlier (see footnote 4). These tables would allow a summary understanding of whether there is significant potential for cost-effective efficiency investments in the dwelling. If the potential seems interesting, the customer can authorize her utilities to divulge detailed historical billing information, after which a home visit can be arranged, followed by a personal diagnosis and report with recommendations. It is then up to the customer to select an accredited worker or company to which the special loan rates and conditions offered by participating financial institutions are tied. Figure 2 illustrates the steps from interest to investment and beyond.

**Flexibility to Local Needs**

The PRIME was designed for the provincial government's Ministry of Natural Resources. However, it was agreed that while the Ministry's programme itself could not go far beyond energy issues, local energy efficiency organizations (LEEOs) should have the flexibility needed to meet other objectives, including environmental and social objectives not relating specifically to energy efficiency. This was deemed particularly important given the central role a home visit can play in the efficient delivery of so many programmes and services, whether they touch on composting and gardening, water conservation or consumer information and education. To avoid duplication of costs, LEEOs are required, in order to receive funding and be recognized as a part of PRIME, to deliver the energy efficiency services. However, they are also free to pursue whatever other objectives they may set for themselves.

**Figure 2. Steps from A to Z**




## ECONOMIC BENEFITS

### Cost-Benefit Analyses

After designing the programme, we conducted a detailed cost-benefit analysis from the perspectives of four key players: participants, all Québec consumers, Hydro-Québec and the government of Québec[5].

The analyses followed detailed studies of the energy savings from a variety of measures, their costs as well as programme costs. It further incorporated a series of hypotheses regarding public participation and interest in the PRIME, as well as expected follow-up investment[6].

*Figure 3.* **Costs and Benefits to Participants (tot.: +$1,52B)**

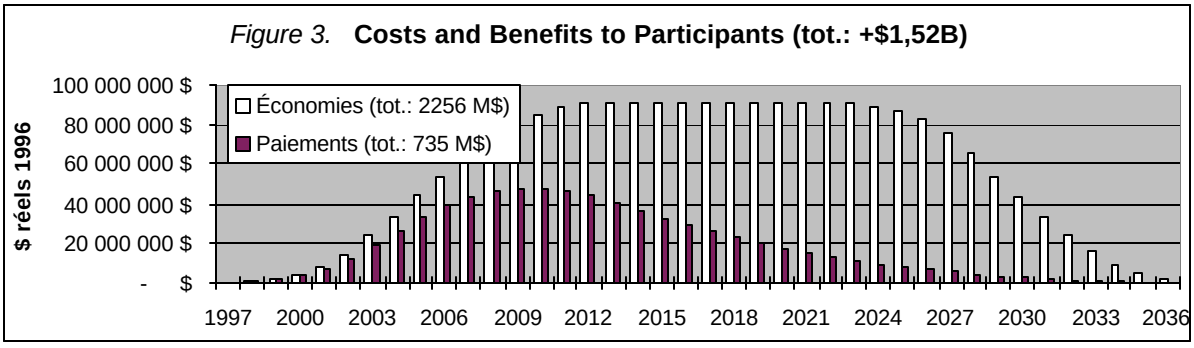
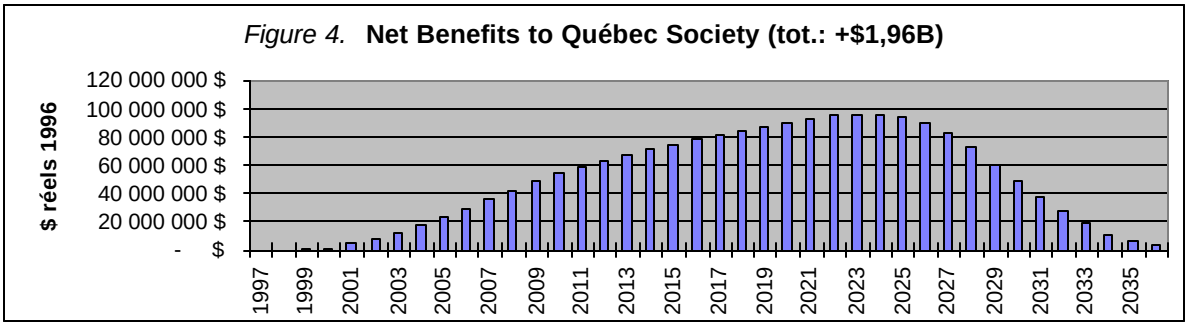
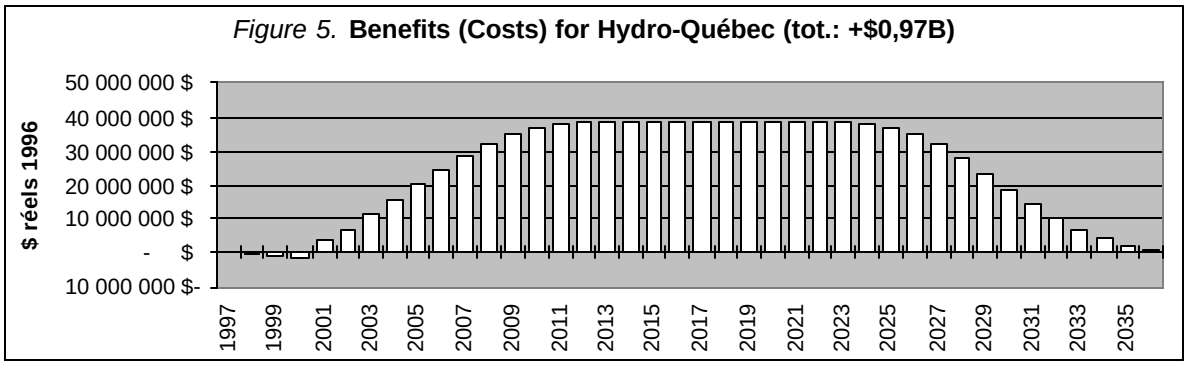



*Figure 4.* **Net Benefits to Québec Society (tot.: +$1,96B)**




[5] The first three of these four analysis were conducted, respectively, on the basis of the participant cost, the total resource cost (TRC) and the rate impact measures (RIM) tests. The participant cost test compares the participant's investment with his bill savings; the TRC test compares total programme costs (participants and any others) with avoided energy (and capacity) costs, and the RIM test compares the utility's investment with the difference between its rates and its avoided costs (CPUC 1987). The fourth analysis compared the Government of Québec's financial participation in the programme with the additional tax revenues the net increase in employment and sales would generate (see section on employment, next).

[6] In particular, we compiled data from a study done for PRIME by the Québec Statistics Bureau (BSQ 1995) which allowed us to determine the types of financial services homeowners would use, which homeowners had recently done renovations and the payback periods expected of energy efficiency investments. We also reviewed polls on Québeckers sensitivity to environmental protection and energy conservation in particular (MRN 1994 and Groupe Léger et Léger 1991).



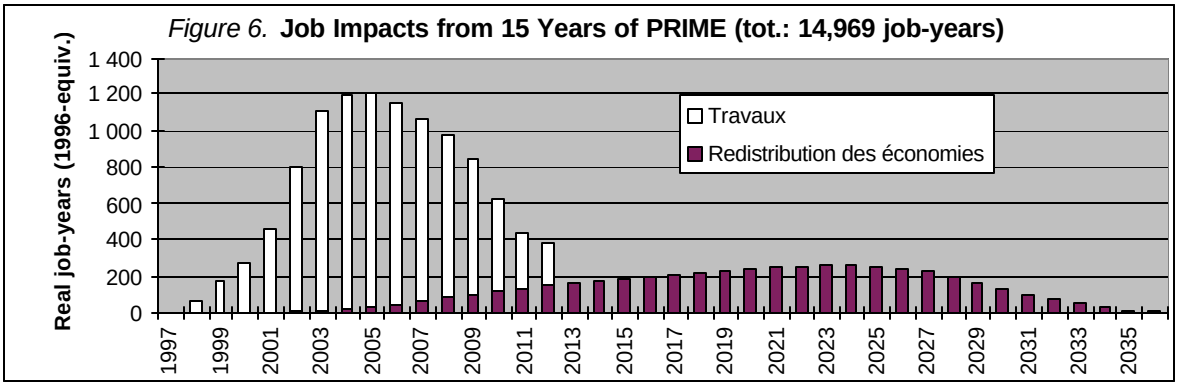

As figures 3 to 5 illustrate, net benefits to participants, over the lifespan of the program (assumed 15 years) and its measures (assumed 25 years), would top $1.5 billion (CDN), while net benefits to all consumers would be just under $2 billion and to Hydro-Québec, just under $1 billion. Furthermore, it was assessed that the government of Québec would pull in additional tax revenues of roughly $118 million, compared with a total investment of several million dollars.

**Employment Impacts**

We then conducted a detailed employment impacts study of the PRIME. This study used the same market penetration and total investment hypotheses as for the cost-benefit analyses, and further used a study we had commissioned from the Québec Statistics Bureau (BSQ 1996) which determined a generic estimate of jobs-per-million in the residential energy efficiency retrofit sector. We further looked at studies conducted in other regions, to verify that the numbers were relatively consistent (ours were very much on the low side)[7]. Finally, we included in our assessment the net residual job impacts, i.e. the net impacts of reduced spending on energy and increased spending in other economic activities. Figure 6 illustrates the results of this analysis.

[7] See Goodman Group 1991 and 1994, Hydro-Québec 1992a and 1992b, Groupe SECOR 1993, ACEEE 1992, Jaccard and Sims 1991, CEC 1979.

*Figure 6.* **Job Impacts from 15 Years of PRIME (tot.: 14,969 job-years)**




It is important to mention that the analysis of job impacts was limited to impacts from measures aimed at increasing thermal enveloppe insulation. The impacts study did not reflect estimated savings from the PRIME's other key components, including reduced consumption from appliances, HVAC and occupational habits. This limitation also goes for the cost-benefit analyses.

## Environmental Benefits

In addition to economic benefits, we also estimated the potential environmental benefits of PRIME. On the basis of projected savings of 1.1 TWh/yr average (27,4 TWh cumulative) electricity, 471 million litres of heating oil and 163 $m^3$ of natural gas, the following environmental savings were estimated:

**Table 3. Avoided Environmental Impacts Due to PRIME**

| | **Electricity** | **Natural Gas** | **Heating Oil** | **Total** |
|---|---|---|---|---|
| **$CO_2$** ***(thousand tons)*** | 466.3 – 1,935.4 | 311.8 | 1,328.2 | 2,105.4 – 3,574.5 |
| **$NO_X$** ***(tons)*** | — | 265.0 | 1,081.0 | 1,346.0 |
| **VOC** ***(tons)*** | — | 13.9 | 40.0 | 53.9 |
| **Flooded land** ***($km^2$)*** | 173.4 | — | — | 173.4 |
| **Others** *(health, social impacts, etc.)* | *unquantifiable* | *unquantifiable* | *unquantifiable* | *unquantifiable* |

## BEYOND STUDIES: WHAT REALLY HAPPENED AND WHAT HAVE WE LEARNED

The Minister of Natural Resources appreciated both the principles behind the PRIME and the economic spinoffs, and chose the project for a major announcement at the Economic Summit. In particular, he guaranteed funding for three pilot projects to be launched in as many communities throughout Québec, which are currently into their second year running. However, government funding for a full-scale, province-wide launch (originally set for September, 1997) has yet to be announced, and a decision to that end has now been put off until 1999, at the end of the initial pilot phase.

Whether province-wide implementation will occur depends on a number of factors, primarily:

1) **Results of detailed cost-benefit analyses.** Technically, the decision on implementation is to follow the results of cost-benefit analyses of the results of the three initial pilots. No determination seems yet to have been made regarding the cost-effectiveness tests that would be used.

2) **Utility / regulatory interest.** Beyond the government's own agenda, the decision to move forward will ultimately require significant contributions from Québec's gas and electric utilities. Their participation will either be voluntary or enforced by Québec's new energy utilities regulator in the context of approval of resource plans. It is noteworthy that to date, both utilities have strongly resisted contributing to the programme, and Hydro-Québec has recently adopted a staunchly pro-growth, anti-DSM approach.

3) **Challenges brought about by a newly-launched *federal* programme ("EnerGuide").** The federal government's newly-launched programme, similar in some ways to PRIME, will create both political tensions and technical challenges to the cost-effective implementation of PRIME. It is unclear whether common ground will be found.

Beyond these issues, however, a more fundamental explanation of the difficulties PRIME faces in being fully-implemented lies in its complexity. PRIME's use of multiple partners and offer of multiple services, each working in a symbiotic relationship, has in fact been an important hurdle in gaining both the approval of key decision-makers and the backing of interest groups. It has also resulted in minimal media coverage, despite several significant opportunities.

Of course, the PRIME's complexity is also key to minimizing costs and maximizing potential savings. In particular, it is precisely this complexity that allowed us to optimize the participation of a web of market players who could both benefit from and significantly help to ensure the PRIME's success. Still, in retrospect, greater attention could and should have been paid to minimizing the complex nature of the PRIME. With more effort at simplification, what I believe to be a solid programme in theory could have had more success at being so in practice as well.

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