Strategies and Challenges in Measuring Non-Energy Benefits from a Low-Income Weatherization Program

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ABSTRACT

This paper presents the process of evaluating and quantifying non-energy benefits from the Econologis program, a low-cost weatherization program administered by the Quebecois Agence d'Efficacite Energetique (AEE). A participant billing analysis for program years 2004-2006 revealed energy savings of only 30% of program savings goals. As an alternative measure of success, Econologis implementers requested that program evaluators investigate several non-energy benefits related to the program.

Evaluators conducted an extensive review of past Econologis evaluations and other literature addressing these non-energy benefits. From this literature review, quantification methods and point estimates were discussed from studies addressing programs similar to Econologis. Finally, 2004-2006 program year non-energy benefit estimates were developed for Econologis using the best quantification methods available. Some non-energy benefits were easy to quantify, while others were challenging. Benefits were either: quantifiable and associated with monetary savings for Econologis; quantifiable but not associated with monetary savings for this program due to small program scale; or benefits were not quantifiable. In the case of the Econologis program, we estimate quantifiable savings of about $2.1 million in non-energy benefits associated with water savings and local economic support for program years 2004-2006. Ultimately, AEE did not to attribute non-energy benefit savings to the Econologis program, but plans to quantify non-energy benefits in a new pilot program that includes more extensive home weatherization.

Introduction

Energy efficiency programs often create benefits for program implementers, participants, and society in general in addition to energy savings. For instance, program recipients might implement measures for energy efficiency reasons, but experience benefits other than lower energy bills, such as increased comfort, safety and indoor air quality. These benefits are called non-energy benefits (NEBs). In some cases it is possible to quantify these benefits and assign them a dollar value. This quantified non-energy benefit value can then be added to program energy impacts to further demonstrate program success.

The Econologis Program

The Econologis program was administered by the Quebecois Agence de l'Efficacite Energetique (AEE). The primary objective of this program was to provide low-income households with advice and products to help them reduce their energy bills. Secondary objectives included non-energy goals such as improvement in comfort and health for participating households and a reduction in the number of participating households in arrearages. The target market was Quebecois households that paid for utilities each month and whose income fit the definition of low income established by AEE. For the

program years studied (2004-2006), income eligibility ranged from a maximum of $18,360 CAD for one person to a maximum of $46,800 CAD for a household of seven.

The Econologis program was comprised of two sub-programs. The first offered households personalized advice and services to improve their home's energy efficiency. Actions were tailored to the individual needs of each household and included weatherization and energy-saving products. Products installed included hot water heating measures like water heater blankets and low-flow shower fixtures; lighting measures like compact fluorescent and halogen light bulbs; infiltration measures like door sweeps and weather-stripping; and other measures such as refrigerator thermometers. The second sub-program consisted of the free installation of electronic thermostats (both programmable and non-programmable) by qualified electricians in housing units heated by electric baseboards with wall controls. Clients were either eligible for both sub-programs or for sub-program 1 only.

To participate in the Econologis program, the client expressed interest in an advisory visit and installation of energy-saving products. Two employees from a participating community organization determined that the client was eligible to participate, and then carried out the initial visit. This visit was approximately 90 minutes, and was comprised of:

- An inspection of the home
- Energy efficiency advice and information specific to the household
- The production of an energy assessment
- Installation of weatherization and energy and water efficient products (maximum $60 value).

If the participant was eligible for sub-program 2, the community organization returned for a second visit and installed a thermostat.

Evaluating Non-Energy Benefits as a Measure of Program Success

An in-depth billing analysis revealed that savings were significantly higher for participants in sub-program 2 versus sub-program 1. Also, average electric savings in participating households were only 38.6% of projected savings, and average gas savings were even lower, at 22.5% of projected savings (Ad hoc recherche & KEMA Inc., 2008). This discrepancy indicated that program projections of household impacts over-estimated the potential savings for the average program participant. As an additional measure of success for this program, Econologis program evaluators and implementers investigated the following non-energy benefits targeted by this program:

- Comfort/Well-being
- Reduced arrearages
- Alleviation of hardships such as moving and paying bills
- Positive effect on Utility image[1]
- Increased property value
- Local economic support
- Water savings

Evaluators conducted an extensive review of past Econologis evaluations and other literature addressing these non-energy benefits. From this literature review, quantification methods and point estimates were reviewed from studies addressing programs similar to Econologis. Finally, 2004-2006 non-energy

[1] Utilities funding the Econologis program included Hydro Quebec, Gazifere, and Gaz-Metro.

benefit estimates were developed for the Econologis program using these quantification methods applied to data specific to the program.

The basic approach to quantifying non-energy benefits is to multiply benefit factors (benefit per dwelling unit or benefit per unit of energy) by the number of units or estimated energy savings per unit. Past NEB studies have employed two basic methods of estimating the value of NEBs to residential program participants. These methods include computational methods (exact estimates of monetary benefits) and Participant Surveys, which can be used to approximate value associated with less tangible benefits. Methods applied to the valuation of NEBs from residential retrofits include willingness to pay (WTP) surveys, comparative valuations (CV), or other similar value judgment questionnaires (Amann 2006).

Our literature review revealed that a 2002 AEE work committee report had included a discussion of non-energy program benefits related to the Econologis program. Local economic impact was quantified, whereas health, comfort, fewer moves, reduced isolation, increased education, and cross-program referencing were discussed qualitatively (Drouin, Lamontagne, Edma, Girard, Michaud & Ribaux 2002). Where applicable, the results from this report are compared to the qualitative findings from the current evaluation.

The literature review also revealed that there has been one meta-study of non-energy benefits from low-income weatherization programs. In 2002, Oak Ridge National Laboratory (ORNL) prepared a report for the US Department of Energy, summarizing all the results to date from the US Weatherization Assistance Program (WAP). The WAP has been in operation for many years, and is a more comprehensive program than Econologis. An average grant of $1,600 in weatherization funds is awarded for each home for installed energy efficiency measures, as opposed to $60 for Econologis homes. In addition to installing air sealing measures and pipe/duct insulation, WAP practitioners install attic, floor, and sidewall insulation, conduct blower door tests before and after weatherization, and conduct a thorough evaluation of the heating system as well as health and safety testing of all combustion appliances (ORNL 2002).

Despite their difference in scope, these programs are comparable in that they are both whole-house weatherization programs for low-income households. Additionally, no other study has attached point estimates to such a comprehensive group of "intangible" non-energy benefits.[2] Consequently, we refer to the ORNL point estimates for all NEBs examined, but cannot use these estimates to accurately quantify NEBs for Econologis since the WAP and Econologis programs are quite different in their scope.

Comfort/Well-Being

Customers often report increased comfort and decreased health problems as a result of participation in a weatherization program. Included under comfort and health benefits are improved airflow, reduced drafts and temperature swings, and better humidity control. Related benefits provided by weatherization programs are lower noise from added insulation or HVAC equipment replacement, additional features on replacement equipment, and improved indoor air quality. Specific measures installed as part of the Econologis program that contributed to increased comfort and improved health were: devices to direct heat (e.g. reflective panels); prevent infiltration (thresholds, weather-stripping, caulking, etc.); increase insulation; and allow homeowners to control temperature and humidity (programmable thermostats, humidity gauges).

[2] Some state program evaluations, like the 1999 Vermont WAP evaluation include a literature review and assign point estimates to quite a few non-energy benefits as well; these results are folded into the 2002 national WAP literature review and point estimates (Riggert, Oh, Hall & Reed 1999; ORNL 2002).

Comfort. All of the aforementioned measures contributed to comfort benefits that are real but are very difficult to measure objectively. Some researchers have attempted to quantify comfort and well-being through valuation questions in participant surveys. However, the values calculated using this survey technique rely on respondent opinions and are therefore not precise. For this reason, the ORNL WAP literature review does not attempt to assign a point value to comfort-related non-energy benefits (ORNL 2002 p.23).

The participant phone survey results indicated that 89.7% of respondents (n=704) felt that the Econologis program improved their level of comfort in their home (Figure 1). This is an increase from 67.1% found by the 2002 Work Committee (Drouin, Lamontagne, Edma, Girard, Michaud & Ribaux 2002). Nearly half of respondents felt that the program improved their comfort very much. Not surprisingly, sub-program 2 participants were more likely to say that the program had increased their comfort "very much," whereas participants in sub-program 1 only were more likely to say that their comfort had increased "a little" or "not at all." Given this highly favorable response, it seemed that comfort was a very important NEB to program recipients.

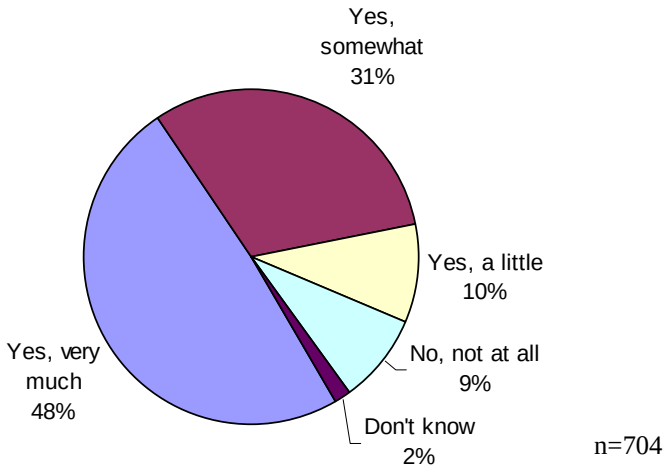

Figure 1. Participant Perception of Comfort Increase as a Result of Program Participation

The 2004 evaluation of Wisconsin's WAP program, prepared by Skumatz Economic Research Associates (SERA), assigned an overall dollar value to improved comfort by first determining the range of NEBs dollar values using the comparative valuation method, then computing the "share" that each NEB contributed relative to the other NEBs. This determined how much effect each individual NEB had on households in proportion to all other NEBs, where all NEB proportion values added up to 100%. Using this method, SERA Inc. found that overall comfort represented 16% of total non-energy benefits, corresponding to an approximate dollar value of $44-$56 (USD) per participant per year (Skumatz, Dickerson & Coates 2000).

SERA's result was difficult to adjust to the Econologis program; on one hand, we would anticipate this dollar value to be much lower for Econologis participants, since the value of installed products at each home is about 26 times smaller than that for WAP. On the other hand, only 64% of WAP participants noticed a positive change in their home's overall comfort as a result of the program, compared to 90% of Econologis participants. This indicated that perhaps the "share" of comfort as a NEB should be higher for Econologis participants. However, survey responses proved only a perception

of comfort rather than measured improvements in indoor temperature or home air tightness; the overwhelmingly positive participant perception of comfort might have come from an appreciation of the work done by the community groups installing measures and giving advice to participants free of charge. Also, most measures intended to increase comfort as part of the Econologis program were temporary measures that could not be associated with an improvement in comfort for more than one heating season. For these two reasons, we could not confidently assign a monetary value to comfort for the Econologis program.

Health Improvement. It has been suggested that residents in poorly heated homes are more likely to develop illnesses during the winter, which can ultimately affect an adult's availability to go to work if they must remain home to tend to themselves or a dependent. Prolonged sickness can lead to a loss of wages or even loss of employment. ORNL suggests a point estimate of $55 USD per home, based on survey findings regarding the number of lost workdays avoided and an assumed average wage earned by the affected workers.

In our survey of participating households, we found that 71% of respondents felt that the measures installed had contributed to improving their households' health (Figure 2). This is a major increase from 24% found by the 2002 Work Committee (Drouin, Lamontagne, Edma, Girard, Michaud & Ribaux 2002). This survey result indicates that there may be real monetary savings associated with this benefit, although certainly not as high as the ORNL estimate for the WAP program. However, just as for the comfort NEB, it is important to keep in mind that most Econologis measures were temporary improvements, and that participant survey responses indicate customer perception rather than hard data on reduced doctor visits or sick days. For these reasons, we cannot confidently assign a monetary value for health improvement.

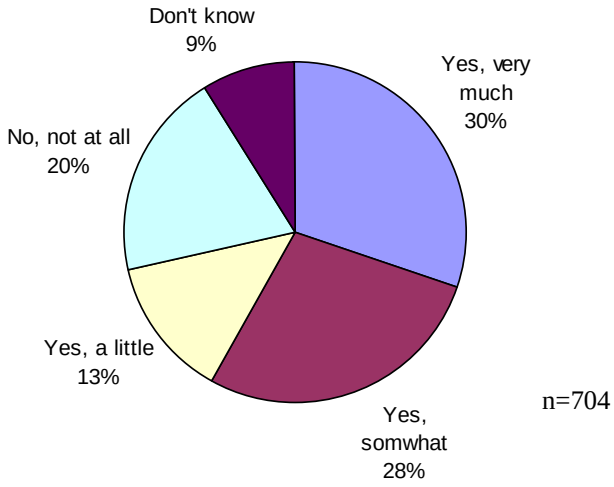

Figure 2. Participant Perception of Decrease in Health Problems as a Result of Program Participation

Reduced Arrearages

By reducing energy bills for households, weatherization programs can have the direct effect of reducing late payments on these energy bills. As customer debts are reduced, utilities also see a reduction in costs, in the form of interest paid on debts. This NEB is found by reviewing billing data for participating households before and after program participation, and sometimes also by analyzing billing data of non-participant households. ORNL reports that the net present value of this benefit ranges from $4 to $110 USD per participant for the WAP program; $57 USD is chosen as a point estimate.

2004-2006 program participants' billing data were analyzed to determine the magnitude of this benefit for the Econologis program. Unfortunately, Table 1 shows that risk factor levels remained the same for most participants, and number of demerits actually *increased* for many participants after participating in the program. Therefore, we must estimate no real non-energy benefit for reduced arrearages, despite the fact that some participants claim to be better able to pay their bills (see Figure 3).

Table 1. Payment Ability changes after participation in Econologis

Program Year	Indicator	Better	Same	Worse	Unknown
2004-2005	Risk factor category	9.1%	54.5%	6.4%	30.0%
2005-2006		11.4%	54.9%	7.6%	26.2%
2004-2005	Demerits	21.2%	29.6%	49.2%	0%
2005-2006		22.9%	31.1%	46.0%	0%

Alleviation of Difficulties

A non-energy benefit often associated with low-income weatherization programs is the reduction of "difficulties." This broad category encompasses multiple non-energy benefits associated with a reduced energy bill, most commonly reduced utility shut-offs and reconnections and a reduced number of forced moves.

Avoided Shut-offs and Reconnections. Weatherization programs can theoretically lower energy bills enough to prevent low-income residents from having to shut off their utilities. There are two advantages associated with avoiding utility shut off for these households: first, they continue to use their utilities and avoid inconvenience or illness; second, they do not have to pay a new fee to turn their utilities back on at a later date. The values for avoided shut-offs and reconnections presented in the literature range from $0 to $52 USD per participant. ORNL offers a point estimate of $17 USD (ORNL 2002).

Reduced Mobility. Weatherization programs can also have the effect of allowing funds previously used for energy bills to cover other necessities such as rent or mortgage payments. Many low-income households are forced to move out of otherwise desirable homes if they cannot afford their rent, mortgage, or energy bills. Frequent moving stresses families and produces unfortunate side effects such as school drop out rates in these households. Past weatherization studies have measured this NEB by finding the difference between the number of household moves before and after program participation, and then monetizing this value based on the average effect of moving on school drop-out rates, and the difference in earnings between graduates and drop-outs over a lifetime. ORNL suggests a point estimate of $278 USD per participant for the WAP program (ORNL 2002).

After careful consideration, we found that the two aforementioned benefits did not apply to the Econologis program. Program impacts were found to be relatively small; this fact, combined with the knowledge from our billing analysis that arrearage levels have were not positively affected by program participation (see "Reduced Arrearages"), allowed us to safely assume that more extreme hardships such as fewer shut-offs and forced moves were beyond the realm of influence for Econologis. If Econologis were to expand in scope to resemble the US WAP program, NEBs would be expected to be comparable to those found by WAP program evaluators.

Although we did not estimate any monetary savings for a reduction in difficulties, we did find that the majority of program participants *perceived* a reduction in payment hardships, which was very encouraging given the small program scope. Specifically, 55% of survey respondents felt that they were at least a little better able to pay their bills after participating in the program (Figure 3). Interestingly, perceptions of increased ability to pay bills were not different for sub-program 2 and sub-program 1 participants, although energy savings were significantly greater for sub-program 2 participants. This supported our assumption that in reality, energy savings were not high enough to affect shut-offs, mobility, or other such hardships.

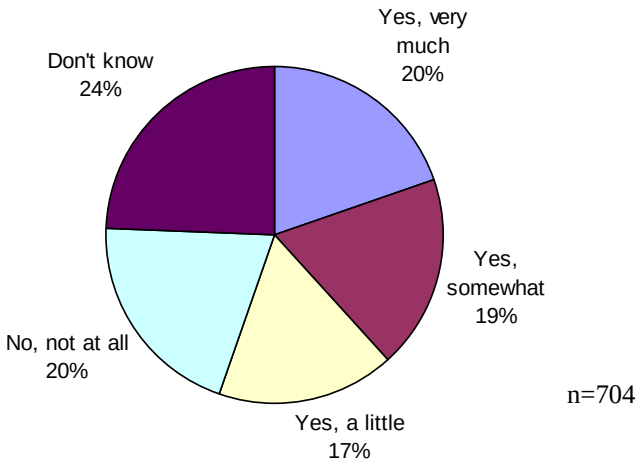

Figure 3. Participant Perception of Increased Ability to Pay Energy Bill as a Result of Program Participation

Positive Effect on Utility Image

Low-income programs are often not profitable for utilities, but may add to a positive customer image of the utility as a charitable institution concerned with providing service to all customers, regardless of income. In other words, successfully implementing weatherization programs helps utilities to be perceived as good corporate citizens.

Surveys conducted in 2005 and 2006 with Hydro Quebec customers found that 75% of customers feel that it is important for Hydro Quebec to have energy efficiency programs specifically for low income households (CROP 2006). Thus, program success and low-income customer satisfaction also contributed to general utility customer satisfaction. As the program evolves over time, Hydro Quebec may gain local and national media attention for its efforts on behalf of this program, which will help to foster this general customer satisfaction.

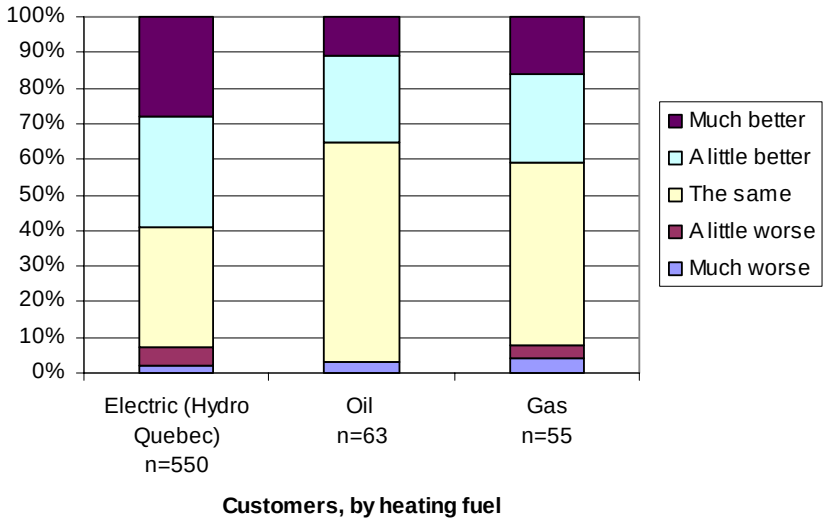

Figure 4. Change in Customer Perception of Major Utility Since Program Participation

When asked whether program participation had changed their perception of their major (heating) utility, the response from Hydro Quebec customers was very favorable (Figure 4). Oil and gas customers from Gazifere and Gaz Metro also gave a positive response, but were more likely to report no change in their perception of their major utility. This non-energy benefit has not been monetized in other studies, so we limited our analysis to the survey responses.

Local Economic Support

Weatherization programs can directly and indirectly affect local employment opportunities. Economic NEBs are usually estimated using the "multiplier effect," which calculates the portion of each dollar that is kept in the local economy as a result of the program. Input/output models are generally used to estimate this benefit; it is important to identify the "net" impact, which is the effect the weatherization program had on employment minus the employment effect that might have resulted from the same magnitude of expenditure on likely alternative projects. Benefits from the WAP literature for direct and indirect employment range from $115 to $4354 per household; ORNL gives a point estimate of $801 (ORNL 2002).

The Econologis program was administered by local community organizations that employed local people to complete the program site visits. These people received training in installing weatherization measures, administering the energy use diagnostic test, and effectively explaining bill payment options to customers. In many cases, the community organizations chose to employ high-school graduates with entry-level skills. Sixty counselor and technician jobs were created seasonally, and employees received an hourly rate of about $17.00 CAD (this varied between organizations), for a total salary of about $27,375 CAD.

We calculated the non-energy benefit associated with the creation of jobs as the difference between the total salary amount of all seasonal employees, and what their salary would have been without the program. Since seasonal employees tended to be entry-level, we assumed that without program training they would be working at minimum wage jobs. The minimum hourly wage in Quebec was $8 CAD in 2007. Consequently, the economic program benefit is demonstrated in Table 2. Our per participant NEB estimate for local economic support was on the low end of the WAP range of estimates, which was not surprising given the small relative scope of the Econologis program.

Table 2: Local Economic Support NEB Estimate

Added CAD/hour/employee	**Number of employees**	**Total CAD for 04-06 Program**
$17-$8 = $9	60 people x 2 years	$1,738,536

Water Savings

The Econologis program included the installation of not only measures that saved energy, but also those that saved water. According the government organization *Environment Quebec*, the average Quebecois uses 424 liters of water each day; 35% of that is used in showers and baths, and 10% is used at kitchen and bathroom faucets. Low-flow shower and faucet fixtures can therefore make a large contribution to water savings in the home. Water savings measures installed as part of the Econologis program are shown in Table 3.

Table 3. Water Savings Measures Installed for Econologis Program

Water-saving measure	Water Use	Average existing fixture water use[3]	Number of measures	Annual Water Savings*
low-flow faucet aerator	8.3 L/min	13.5 L/min	4289	244,215,660 L
Shut-off switch for shower head	7.5 L/min	15 L/min	435	36,518,250 L
Shower head with shut-off switch	4.75 L/min	15 L/min	749	92,857,825 L
Low-flow shower head without shut-off switch	9.5 L/min	15 L/min	3537	142,010,550 L
Advice: Take a five-minute shower	47.5 L/ shower	15 L x 7.5 min[4]= 112.5 L/shower	174 x .733[5]= 127.5	9,074,812 L
			TOTAL WATER SAVINGS:	524,677,098 L = $372,520.74 CAD

*Water savings is calculated assuming the following:

	Use per day[6]	Days of use per year	Water cost[7]
Faucet	20 min	260 days	$0.71 CAD/1000 liters
Showerhead	30 min	365 days	$0.71 CAD/1000 liters

[3] Taken from *Environment Canada* government website: http://www.ec.gc.ca/water/en/info/pubs/FS/e_FSA6.htm
[4] Most surveys find an overall average shower time between 5 and 10 minutes.
[5] 73% of phone interview participants who had been advised to take 5-minute showers (n=125) told interviewers that they heeded this advice.
[6] Taken from the US DOE Energy Cost Calculator for Faucets and Showerheads: http://www1.eere.energy.gov/femp/procurement/printable_versions/eep_faucets_showerheads_calc.html
[7] Taken from *Environment Canada* Municipal water pricing database: http://www.ec.gc.ca/water/en/manage/use/e_data.htm

Of those participants who participated in a phone interview with evaluators (n=704), 85% received one of these water savings measures. 75% of these participants felt that the measures had been effective in helping them to save water (Figure 5). We found that total water savings were quite large, while the corresponding reduction in the water bill per participant was rather small - $30.22 CAD per year per household with water-saving measures installed. Because the price of water is so low in Quebec, water savings are primarily benefiting society in this case, rather than program participants. However, saving an extra few dollars per month can make a difference in some households.

The Econologis program could have saved even more water by installing more efficient fixtures; low-flow showerheads and faucets are on the Canadian market at flows as low as 6 L/min (1.5 gal/min).[8] Low-flow showerheads with a maximum of 9.5 L/min (2.5 gal/min) may become the standard in the near future; in fact, the US standard is 2.5 gal/min for shower heads and 2.2 gal/min (8.3 L/min) for faucets.

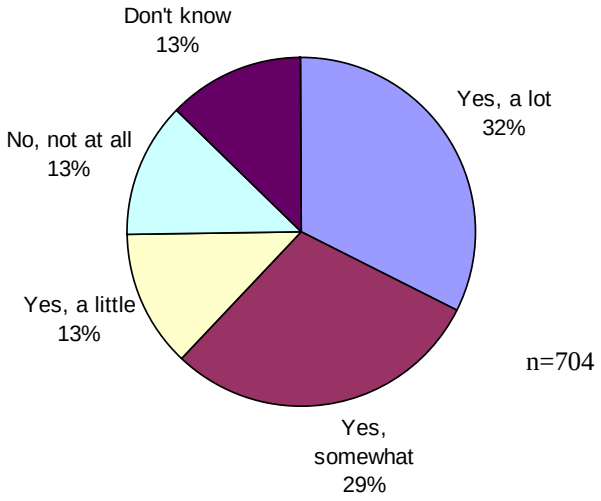

Figure 5. Participant Perception of Water Savings as a Result of Water-Efficient Fixtures Installed

Increased Property Value

In addition to installing standard temporary weatherization measures such as door sweeps, weatherization contractors sometimes install permanent measures such as new windows and HVAC equipment, or perform carpentry repairs. These permanent improvements can increase the property value of the weatherized home, or can increase the durability or lifespan of the home, preventing costly repairs at a later date.

According to ORNL, estimates of property value NEBs associated with home weatherization range from $0 to $5500 USD, although most estimates cluster around the low end of this range, proportional to the cost of the measures or repairs completed at the home (ORNL 2006). Translating this methodology to the Econologis program, the only permanent measure installed as part of this program was the programmable thermostats installed in stage 2.While survey results indicated that participants were much more likely to feel that their property value has improved if they had participated in both sub-program 1 and 2 rather than sub-program 1 only (Figure 6), it is highly unlikely that the presence of a programmable thermostat actually increased the value of these homes, and we did not estimate a monetary value for this NEB.

[8] 1 gallon = 3.8 liters.

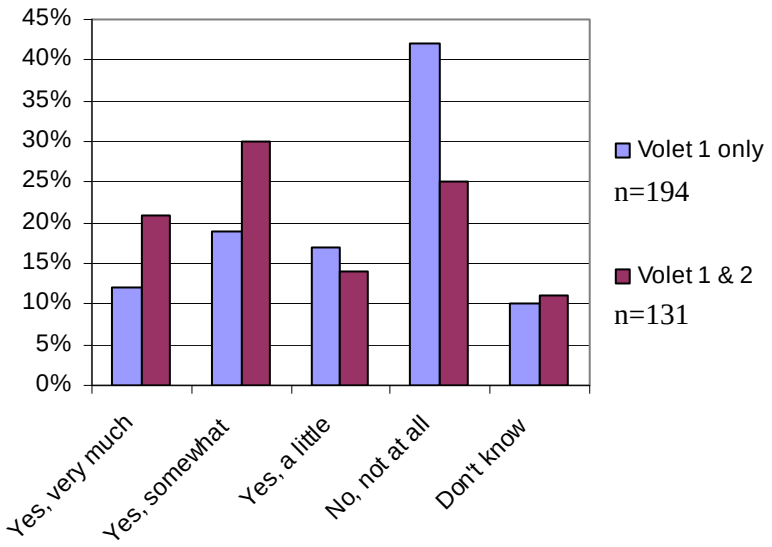

Figure 6. Participant Perception of Positive Change in Property Value after Program Participation (sub-program 1 only vs. sub-program 1 & 2 participants)

Conclusions and Recommendations: Incorporating Non-Energy Benefits into Program Savings

Table 4 provides a summary of non-energy benefits that we have covered in this analysis, and the associated monetary benefits attributed to those NEBs. By using the ORNL meta-study combined with data from our participant survey and billing analysis of Econologis participants, we were able to quantify only two NEBs For this program: water savings and local economic impact. Alleviation of hardships and reduced arrearages were found to be beyond the financial reach of this program, and the positive effect on utility image is a social benefit that inherently cannot be quantified. Comfort/well-being and increased property value are certainly positive benefits but are subjective and generally associated with permanently installed measures rather than temporary measures installed for the Econologis program. Therefore, these benefits were not quantified for this program.

We consider total savings attributable to NEBs for this program to be $2,111,076. This is a large savings for a small scope program such as Econologis, and illustrates the importance of attempting to calculate these water savings and local economic impact NEBs at a minimum as a measure of success for all similar small-scale weatherization programs.

AEE ultimately did not to include any of these non-energy benefits in the official monetary savings attributed to this program. However, it was helpful to program implementers to understand the types of non-energy benefits that could be reasonably quantified for this program based on current research. This type of non-energy benefit analysis may be helpful to other small scale low-income weatherization programs as a tool to argue for increased program scope. In the case of the Econologis program, there were already two representatives from a community organizations coming to each home to provide advice and install weatherization measures. Given the high program cost to hire and train local workers and transport them to the sites, energy savings would need to be higher to justify a continuation of the program with its current scope. It would make more sense to increase the scope of the program so that these community organization representatives could spend more time on site and install measures capable of generating large, measurable savings.

Table 4. 2004-2006 Non-Energy Benefits from the Econologis Program

Non-Energy Benefit	Survey Response	Quantifiable? (Yes/No)	Accurate?	NEB Per Participant (CAD)	Total NEB Estimate 04-06 (CAD)
Positive effect on Hydro Quebec's image	60% (yes)	N	n/a	n/a	n/a
Alleviation of hardships	55% (easier to pay bill)	Y	n/a	$0	$0
Reduced arrearages	n/a	Y	Y	$0	$0
Comfort/Well-being	90% (improved comfort) 72% (improved health)	Y	N	n/a	n/a
Increased Property Value	58% (yes)	Y	N	n/a	n/a
Local economic support	n/a	Y	Y	$135	$1,738,536
Water savings	75% (yes)	Y	Y	$29.91	$372,540
TOTAL QUANTIFIED SAVINGS:				**$164.91**	**$2,111,076**

Evaluators recommended that program staff consider creating a sub-program 3 centered on home renovation, including work on the thermal envelope, home insulation, and replacement of electric space heaters, for instance. An increased budget per home would greatly increase program energy savings, and would also increase the variety and permanence of weatherization benefits for participating households. However, there would be an added program cost associated with training community organizations to be able to perform whole house audits and install measures such as insulation. In fact, it might not be possible for community organizations to supply staff with the proper qualifications to do this work. These audits and installations would ideally be completed by specialized home performance contractors, which would unfortunately remove the program NEB of providing jobs to local minimum wage workers.

During the time since KEMA completed this program evaluation, AEE has launched a pilot project with a larger investment of permanently installed measures per home. AEE is administering this pilot in two regions of Quebec, with two delivery mechanisms. In one region, a community organization is hiring and training auditors to deliver the program; in another region, auditors work independently with households and report directly to AEE. Administrators plan to be able to accurately measure NEBs for this pilot program and attribute monetary savings calculated for these non-energy benefits to the overall success of the program.

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