Department of Energy, Mines & Resources
Energy Solutions Centre

Retrofit Rebates

An Analysis of Current Rebate Programs

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Yukon
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Executive Summary

This paper provides information and analysis on residential energy efficient retrofitting rebate programs and recommendations for a similar program in Yukon. To serve this purpose, programs in jurisdictions across Canada and some American states were researched, compared, and analyzed. Relevant topics pertaining to retrofits are presented and final recommendations for a Yukon retrofit program are made based on this research and analysis.

Reasoning

Within the past 10 years the price of heating has doubled for Yukon households with 60.3% of these households heating with fossil fuels (not including propane). Based on the federal ecoEnergy program statistics, residential retrofitting for energy efficiency has the potential to decrease this fossil fuel usage for heating by on average 20% and saving homeowners a similar percentage in heating expenses. The Good Energy incentive program offered by the Energy Solutions Centre has been successfully offering rebates since 2007 for household appliances and heating and ventilation equipment. With the cost of heating homes through Yukon winters continuing to rise, it makes sense to add a residential retrofitting element to Good Energy's portfolio of financial incentives.

Key Observations

- All provinces have (or had) a retrofit rebate program. The maximum allowable rebate varied from $1500 to $6000 per household. (Appendix 1)
- All programs used a residential energy efficiency rating system known as the energuide rating system which the federal ecoEnergy program is also based on(Section 2.3)
- The Yukon was the second to lowest in percent of housing stock penetration through the federal ecoEnergy retrofit program. In jurisdictions with local retrofit programs as well as the federal program, the household penetration was upwards of 10 times greater than the Yukon's. (Section 2.2)

Key recommendations

- To address energy shortcomings in Yukon residences, rising energy prices and greenhouse gas emissions from heating with fossil fuel and to promote improving energy efficiency in Yukon houses, the Yukon should implement a retrofit rebate program based on the federal ecoEnergy program. The character of such a program can be found in section 4.5
- To increase the Yukon's construction industry capacity for development in these areas, retrofit work and the skill and knowledge base should be fostered to develop locally. (Section 3.2, 4.1)
- Strong principles of community engagement (credibility, commitment, face-to-face communication) should be used in program deliverance. (Section 3.3, 4.4)
- Innovative financing and/or support options such as payment through utility bills or property taxes should be considered. (Section 3.4, 4.3)

Conclusion

The majority of Yukon households heat with fossil fuels and the price of these fuels will continue to rise. If the price of heating doubles again within 10 years, many Yukoners will have great trouble in affording to heat their homes through our long winters. A properly researched and enabled retrofit program can create resilient households able to weather changing economic circumstances.

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1 Introduction

The Energy Solutions Centre (ESC) is committed to promoting energy efficiency improvements and the Good Energy rebate program is an example of this. It offers rebates on energy efficient household appliances, heating units and a variety of other energy efficient household products. This has been a successful program since 2008 and the ESC is considering expanding it to include residential retrofitting options. To further this goal a review and analysis of retrofit rebate programs was conducted for jurisdictions throughout North America. This report concludes with program recommendations for this jurisdiction.

1.1 Objectives

- **To assess and compare retro-fit rebates for homes programs in other jurisdictions.**
- **To discuss findings and conduct relevant research surrounding house retrofitting.**
- **To develop initial research-based recommendations for the creation of a retro-fit rebate for homes program suited to Yukon.**

1.2 Background

Within the past 10 years the price of home heating fuel-oil in Yukon has doubled (See figure 1). This trend will only continue as conventional global supplies of oil dwindle and more expensive alternatives enter and start to dominate the market. Yet there are still many ways for people to save energy costs by reducing energy consumption. One of those ways is by increasing a building's efficiency.

Improving building efficiencies is a goal within the Yukon, Canada and the world and has been for decades. From the Conservation and Renewable Energy Demonstration Agreement (CREDA) initiatives of the 1980's to R-2000 of the 1990's and to the current retrofit rebate programs taking root all over Canada and around the world.

The Canadian Mortgage and Housing Corporation (CMHC) explains why retrofit rebate programs are necessary in any Canadian jurisdiction: "It is easier to build a new home to stringent energy specifications than it is to retrofit an existing house, yet new construction accounts for only two per cent of the housing stock annually. With residential uses accounting for 17 per cent of Canada's energy requirements and 16 per cent of our greenhouse gas (GHG) emissions, cost-effective ways to retrofit the millions of existing houses to meet net-zero energy targets are key elements to energy security and climate change mitigation."[1]

These ideas support one of the conclusions reached by the International Panel on Climate Change in their 2007 report where they claim reducing carbon emissions from buildings is one of the most cost effective ways to reduce GHG's. Along similar lines, the International Energy Agency (IEA) explains how energy efficient housing and retrofits can be one of the keys to achieving energy security and greenhouse gas mitigation. [24] The same IEA report goes on to say: "Policies such as…financial incentives are needed over the next ten years to address market barriers…(to energy efficient housing)." [25]

Supporting energy retrofits will assist Yukoners in controlling and reducing expenses associated with heating in this severe climate and will lead to more efficient housing stock and cost-effective GHG reductions for Yukoners. Adding a Retro-fit rebate to the Good Energy program will help in delivering this support

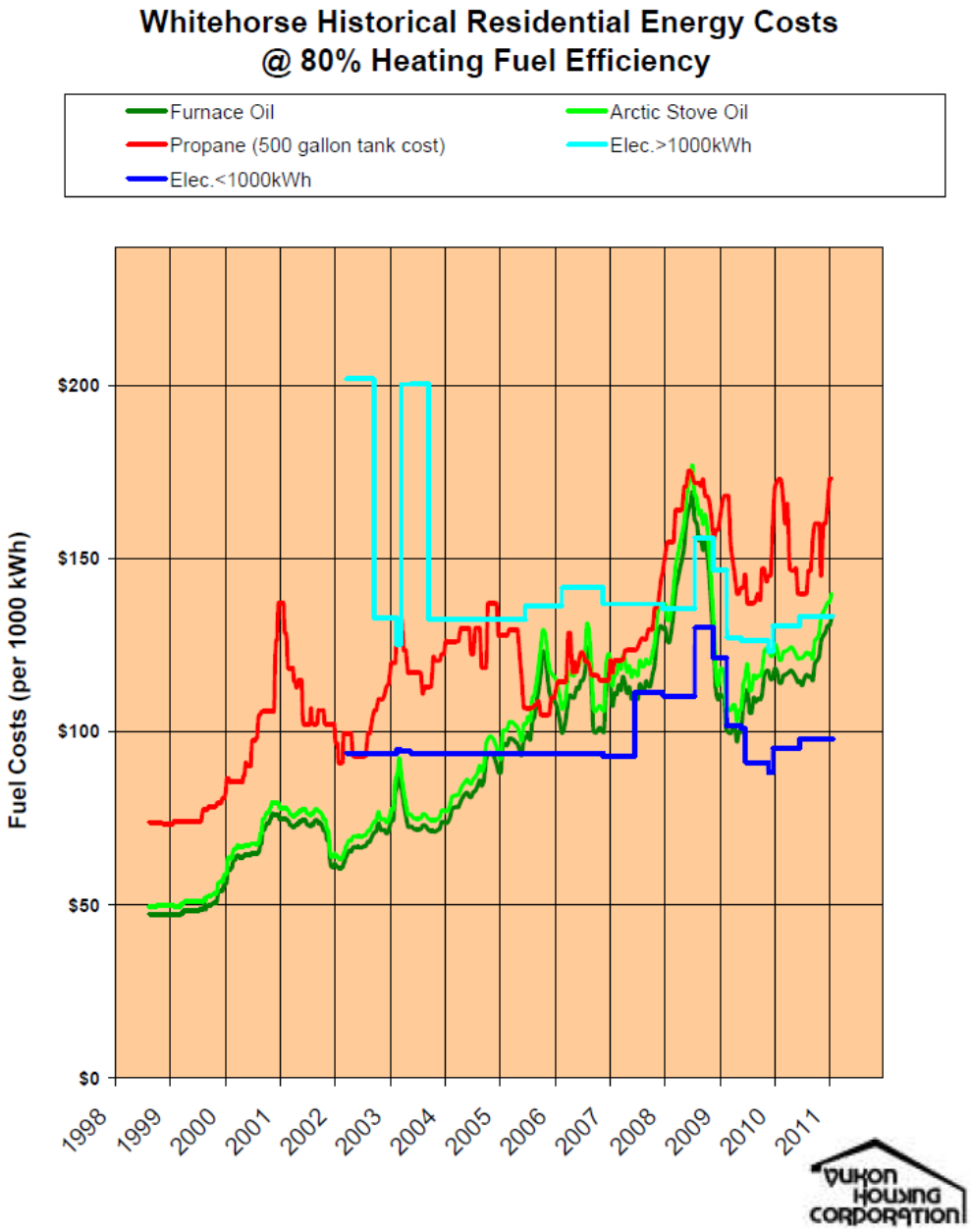

Figure 1 [3]

The Good Energy program puts the Energy Solutions Center at the heart of this transformation. ESC has also been involved in many reports and projects providing the knowledge and skills to retrofit houses for energy efficiency. Publications on adding insulation to existing walls and basements are available through the ESC and one of its current projects is testing vacuum insulation panels in a Whitehorse building.

The potential is here, in the Yukon and Canada, to help people achieve cost-effective retrofits which can reduce energy usage by approximately 20%. This can have a significant impact on liquid fuel usage in the Yukon where over 60%[39] of household heating comes from fossil fuels (not including propane).

1.3 Current Yukon and Federal Programs

There are several programs offered throughout the Yukon and through the federal government that help homeowners repair their houses, reduce energy consumption or perform energy efficient renovations. These programs are offered through the federal or territorial governments, crown corporations, utilities and their subsidiaries or agents. A short summary of these programs are offered here. Other provinces and programs are reviewed in detail in Section 2 and Appendix 1.

Demand Side Management - A Partnership between the Yukon Government, Yukon Energy Corporation and the Yukon Electrical Company Limited working on reducing energy usage through consumer targeted programs. The DSM program is currently working on an energy conservation plan, which is expected to be released by the end of 2011. (accessed June 24, 2011).

Home Repair Program – This is a Yukon Housing Corporation (YHC) initiative that offers homeowners a low interest loan of up to $35,000 to repair their residence. (accessed June 24, 2011).

Homeowner Residential Rehabilitation Assistance Program - Offered through the crown corporation CMHC (Canada Mortgage and Housing Corporation), this program offers financial assistance to low-income homeowners for mandatory home repairs. (accessed June 24, 2011).

ecoEnergy Retrofit - Homes – This residential aspect of the federal program offers grants for home energy efficiency upgrades. It has been part of the federal government in one form or another since 1998. Some organizations estimate $2 in tax revenue is generated for every $1 paid in incentives.[41] The ecoEnergy Retrofit program recently received 400 million dollars in funding for the 2011-2012 fiscal year. (accessed June 24, 2011). The program is expected to terminate March 31st, 2012.

1.4 History of retrofitting in the Yukon

Energy efficiency became popular sometime after the 1970's oil crisis when many developed countries were forced to reassess energy supply and demand. It was then that action began by many early adopters looking at many aspects of energy alternative approaches from utilising energy efficiency

to reduce energy requirements to making use of renewable (then called alternative) energy resources such as the wind, sun and earth. This movement advanced through the 1980s but was then stalled mainly due to low fossil fuel prices before again coming to the forefront after climate change, energy security and rising prices again caused developed nations to reflect on energy issues.

Listed here is a recent history of Yukon programs intended to support moving towards greater energy efficiency:

2007 – Project Porchlight – A partnership between ESC and the Project Porchlight organization that distributed 10,000 CFLs throughout the Yukon. Estimated to have saved the Yukon $300,000 over the lifetime of the bulbs.
2006 – 2007 Washer Rebate Program – This was an ESC initiative that gave rebates to approximately 1% of the Yukon housing stock. The washer upgrades incentivized saved the Yukon $30,000 in electrical costs and 30 million litres in water per year.
2002 - Commercial Energy Management Program – Provided energy audits, general information and financial incentives to businesses, municipalities and First Nations [4]
1997 - 2002 Residential Energy Management Program (1997-2002) – Provided low-interest loans to replace electric heating with alternative systems. Had 200 participants and estimated to have reduced GHG by 2,500 tonnes. [5]
2001 - House Calls Energy Efficiency Program (Ended August 2001) – Partnership between ESC, NRCan, and others. House calls was run by the Yukon Conservation Society, installed free energy-saving products in over 1600 homes in 18 communities. 15-20% of housing stock visited. Annual average savings forecasted at $216, diesel generation was projected to have decreased 7%. Utility cost reductions estimated at $295,000 per year and 1,845 reduction in GHG.[6]
2001 - Green Mortgage Program (2001) – Through Yukon Housing Corporation, encouraged EE construction and local labour/building materials. Offered preferred mortgage rates.[7]
2000 – YHC Census - found 33% of all Yukon houses needed major repairs, 26% of all Whitehorse houses.[22]
1998 – Energy Audits - completed for most City of Whitehorse facilitates. [8]
1992 – PowerSmart - By Yukon Energy Corp. , Yukon Elec. Company, in cooperation with Department of Economic Dev. Provided EE information and products such as low flow showerheads.
1988 - **Energy Audit Program** – 'Made available to homeowners at a subsidized cost' [10]
1984 – 1989 --Conservation and Renewable Energy Demonstration Project - Funded and initiated a residential retrofit demonstration project in the north that involved a training and thermal retention retrofits.
1983-1984 - Yukon Housing Home Study - 600 houses looked at for energy shortcomings. [11]
1983 - Conservation and Renewable Energy Demonstration Agreement (CREDA) - Training for 20 Yukon builders in EE and financed retrofitting of 80 homes. [12]

2 Observations

The main source for these observations came from government and retrofit program websites. Some of the information came from correspondence with those involved with retrofit programs but the majority can be found online. (See references or appendix 1 for sources or greater detail)

2. 1 Retrofit Programs From Other Jurisdictions– Observations

Most Canadian and American retrofit incentive programs follow the same formula:

1. A pre-retrofit evaluation is performed by a certified Energy Advisor.
2. The retrofit is performed
3. A post-retrofit evaluation is performed within a given time, ranging from 6-18 months. Generally 18 months.
4. Based on evaluation and work done a rebate is given.

A good archetype of a basic retrofit program is the federal 'ecoEnergy retrofit – for homes' program which ran from April 1, 2007 to March 31, 2011. It just received $400 million in funding for the 2011-2012 fiscal year. On average 1 in 20 Canadian homeowners took part in it and received $1,300 in grants from the program. Every house that took part on average reduced their energy use by 20% and their GHG emissions by 3.2 tonnes a year.[21]

The average Canadian household participation in the ecoEnergy program was 5.9%. Saskatchewan households took part the most at 10.1% while Ontario households followed at 9.8% (fig. 4). The Yukon had the second lowest penetration of housing stock (1%) for ecoEnergy retrofits, second to Nunavut (fig. 4). Over the course of the ecoEnergy program 1.785 million tonnes of GHG per year were averted and 24.9 million GJ of energy per year were saved through the retrofits carried out nationally.[13]

Most retrofitting programs varied little in their basic structure. (For a more comprehensive summary of rebate programs see Appendix 1). In Quebec to qualify for rebates you must raise your energuide rating by at least 2. In BC the energy auditors handle program eligibility paperwork. In NWT the federal program is administered by the Arctic Energy Alliance and any incentives received from federal sources are matched by them. In PEI there is a 15% rebate based on total cost of the eligible upgrade completed. In New Brunswick different rebate percentage brackets (see Appendix 3) are offered based on the type and amount of energy improvements done.

In Alberta the provincial program at Climate Change Central has an interactive website which is easily navigable, presenting rebate information in accessible ways. For example, the ease of each energy efficiency (EE) improvement is shown along with the ability to calculate your rebate amount for certain items ie. clothes washers and furnaces. The city of Medicine Hat in Alberta required rebate participants to attend a 2 hour seminar on energy efficiency. In the same city, all information on rebates available, from the city to provincial to federal level is presented so people know what rebates are available to them from each source.

The Medicine Hat seminar was a recording of an energy efficiency contractor presenting several different home energy efficiency topics over the course of 2 hours. The five main points covered were: fundamentals, building envelopes, heating, domestic hot water/lighting/ventilation, other factors/grants/priorities/next steps. This seminar was concise and informative, pointing out many potential pitfalls and 'things to be aware of' when conducting energy efficient upgrades to your home.

Of all Canadian provincial programs reviewed, the New Brunswick program seemed to be the best thought out. Their program is divided into two sections: the basic house retrofit and the whole

house retrofit. If participants perform retrofits to 3 out of 4 main categories (central heating systems, ceiling insulation, main wall insulation, or basement insulation) they obtain increased incentive amounts and greater maximum rebate availability. Also, if net zero measures are met the homeowner receives a $7,500 bonus. This program also works with contractors, banking institutes, and performs marketing to increase its reach and accessibility.

For the Canadian programs reviewed the maximum amount available for rebates varied from $1,500 to $6,000 (not including the Net Zero Energy bonus for NB). The average rebate amount given through the federal program was $1,300. Those who carried out retrofits decreased their energy consumption on average by 20%. Based on various sources the average spent to achieve these reductions ranged from $4,500 to $7,000. [40] Also, the province of Alberta, the city of Medicine Hat, New Brunswick, and Nova Scotia offered incentives for purchasing EE new homes.

Five out of the 13 Canadian programs reviewed had low-income components in their retrofit rebates. These components usually included a free energy assessment, free air sealing and free thermostats. The provinces offering low-income components were: Manitoba, Quebec, Prince Edward Island, Nova Scotia, and Newfoundland/Labrador.

The USA rebate-retrofit programs have a similar structure as well (post/pre evaluations) but have varying ways of determining the amount of incentives an individual receives. In Alaska you receive a set rebate amount that depends on how many points you earn between the post and pre evaluations. The points are determined by an energuide-like system.[26] In California the rebate was based on meeting criteria in two separate rebate packages.[37] Meeting the basic package earned a certain amount, while reaching the advanced package earned more. These packages included safety elements such as CO and smoke detectors. The Utah system was based on total energy savings calculated between pre and post evaluations.[38]

2.2 ecoEnergy Data

Below are graphs showing various statistics from the federal ecoEnergy retrofit – for homes program which was run from 2007 to 2011. This data is useful in showing its success. The federal retrofitting program was extended with 400 million dollars of new funding for the 2011 to 2012 fiscal year.

The number of Yukon ecoEnergy grants given, shown in Fig. 2, highlights the fact that program uptake may be small to begin but will increase in later years. The percent of house retrofit penetrations is presented (fig. 3) to compare the Yukon to other districts, as is the percent that completed both a pre and post retrofit evaluation (fig. 4). The greater penetration rates in Ontario and Saskatchewan are likely due to better marketing or programs with more resources and/or complimentary rebates offered in those jurisdictions.

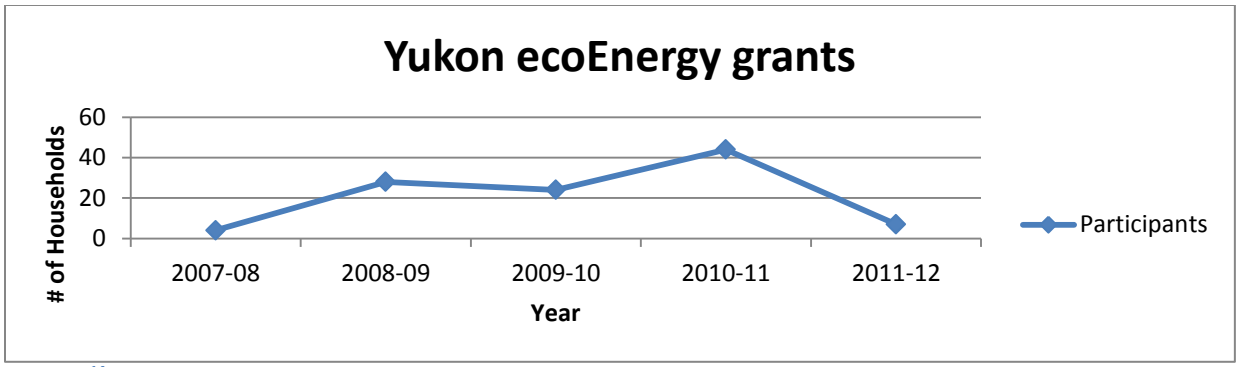

Figure 2 [14]

Figure 2 shows the amount of grants issued by the federal government to Yukon houses which preformed energy efficient renovations.

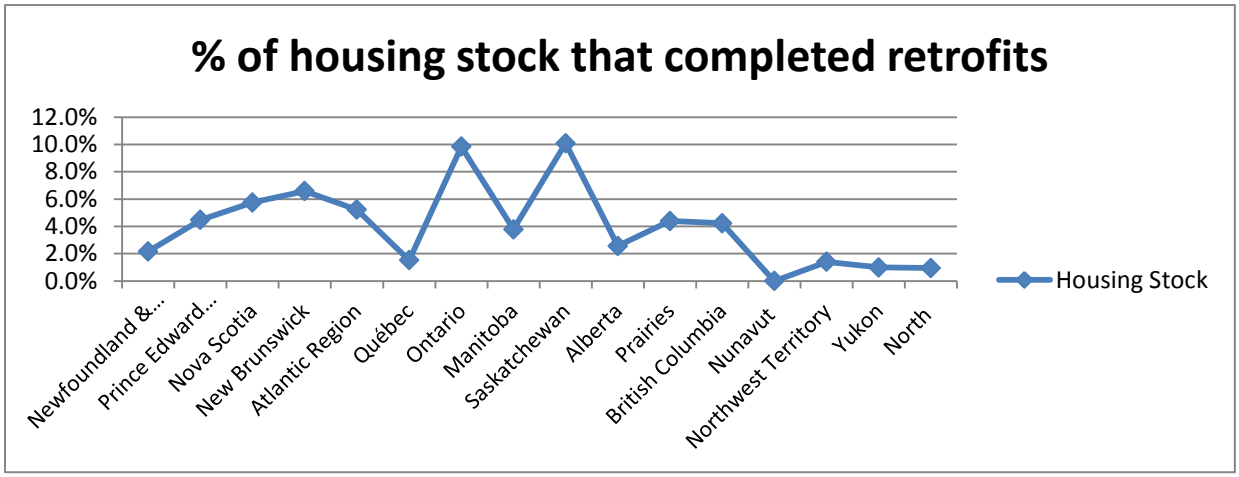

Figure 3 [15]

Figure 3 shows the percent of houses in each province and territory that completed retrofits and received federal grants.

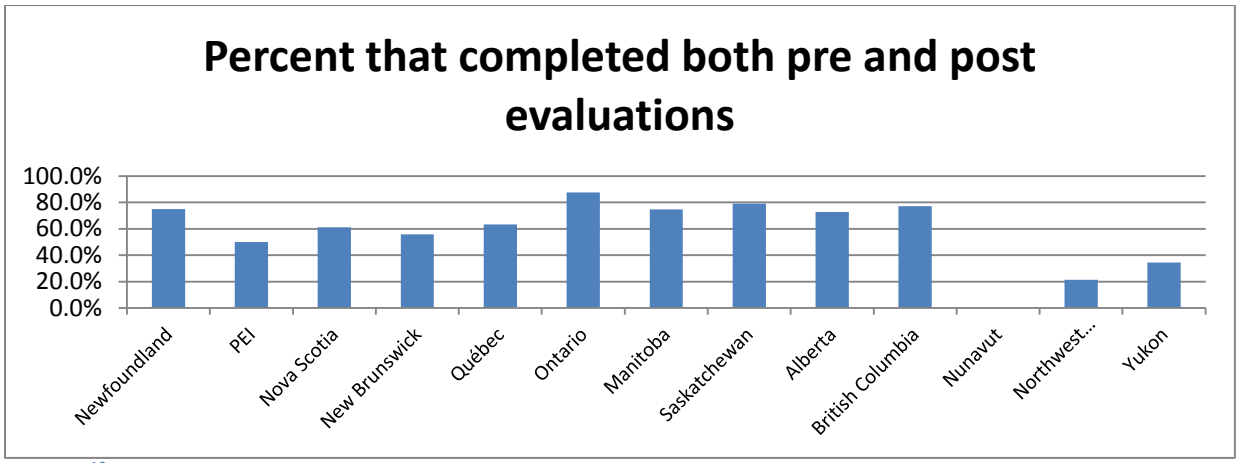

Figure 4 [16]

Figure 4 shows the percent of households in each province and territory that completed both a pre and post evaluation. Where the percent is low, few houses followed through with options recommended by their energuide contractors.

Through figures 2 to 4 it is shown that the jurisdictions (the territories) without a dedicated retrofit program performed poorly compared to those that did have a dedicated program. The amount of participation in jurisdictions with dedicated grant programs in some cases was nearly 10 times greater when looking at percentage of housing stock that took part. This shows the importance and value of providing complementary retrofit rebates and marketing programs.

For all these evaluations the EnerGuide system was used as a base. Yet, there are several other ways to rate a house for energy efficiency.

2.3 Effective Building Standards

The EnerGuide system for rating a building's energy efficiency is the most widely used in Canada. In this system, buildings are given a rating from 1-100 and as the amount of energy required to operate the houses HVAC (heating, ventilation, and air-conditioning) systems goes down, the EnerGuide rating goes up. Houses with a rating of 80 or greater are considered energy efficient (85 or more is exceptional). Houses with a rating of 100 are considered *net-zero houses*. This is the system currently used by all Canadian retrofit programs.

Yukon Housing Corporation (YHC) has its own standard for rating houses for energy efficiency, the GreenHome and Super GreenHome standards. The GreenHome standard is equivalent to an EnerGuide rating of 80 or greater. The Super GreenHome standard is equivalent to an EnerGuide rating of 85 or higher. Both were developed by the YHC to create an energy efficient housing system suitable for the North and for the Yukon energy scenario (which is primarily oil heat and hydro-electricity and a long and severe heating season).

Not all energy rating standards are suitable for northern climates. Leadership in Energy and Environmental Design (LEED) is a system that rates houses according to a variety of criteria including health factors and environmental impact. However, according to Joseph Lstiburek of buildingscience.com, with the LEED rating system you may achieve its rating while not actually saving energy compared to traditional buildings. [17] Furthermore LEED does not consider air tightness as an energy saving component [18], yet this is considered a crucial component in northern houses. Nonetheless, LEED does consider many things that other rating systems do not, such as site placement and embodied energy. It is certainly worthwhile considering these things that some other rating systems may not.

One building standard currently on the rise is PassivHaus (known as Passive House in North America and not to be confused with passive solar design). The standard was developed in the late 1980s and early 1990s and is steadily becoming more popular. Passivhaus's basic requirements are an air tightness of 0.6 *air changes per hour* (AC/H) @ 50 Pascals and no more than 15 kWh of energy consumption per square meter of floor area per year for heating and no more than 120 kwh/ sq m/year for primary (source) electrical load. These are very frugal energy standards that may offer excellent energy solutions I the north if they are achievable here.

Some other certifications worth mentioning are the R-2000 certification developed in Canada nearly 30 years ago. The Built Green certification which was developed in Canada in 2003 and the Energy Star certification developed in the USA in 1992. Currently the Whitehorse building code achieves roughly R-2000 or about EnerGuide 80.

2.4 Knowledge base in the North

The Yukon already has a large knowledge base available to it to preform energy efficiency retrofits to houses. The ESC has been involved in numerous studies to this effect (such as reports on adding insulation to walls and basements. Also, Yukon Housing Corporation constructs all new social housing units under its control to SuperGreenhome (EnerGuide 85 or equivalent) standards.

Of course, Northern EE housing construction is not limited to the Yukon. Recent conferences such as the Northern Energy Solutions Conference (held from February 15th to 19th 2010) had many presentations from people throughout Canada who focused on energy efficient housing construction in harsh climates from across Canada. The Cold Climate Housing Research Centre in Alaska also demonstrates interest and expertise in this area while a recent paper in Siberia analyzed the potential for 'positive-net-energy residential buildings in Serbian conditions'.[27] Scandanavia and much of Europe also leads the way in EE design and research from PassivHaus and other systems.

2.5 Summary

There is a great deal of work going on throughout Canada to promote the retrofitting of houses to achieve greater energy efficiency. These efforts exist at every level of government, from municipal (Medicine Hat), to provincial, to federal. The ESC has been running a successful rebate program for energy efficient heating and household appliances which already includes much of what most rebate programs offer. The only major difference between the ESC program and other rebate programs being insulation rebates.

Of the programs reviewed nearly all were either expanding access to retrofitters or continuing with the program as it was. Ontario had one of the more successful Canadian retrofit programs which ran from 2007 to 2011. During this time it helped reduce GHG emissions by 500,000 tonnes a year and helped generate and sustain over 10,000 jobs. [23] Many benefits such as greater energy security, reduced energy expenses, job creation and climate change adaptation would be achieved through the implementation of a retrofit program for Yukon (and other territories of the North).

Many different topics were explored and ideas formed in the course of this research. The principles of community based marketing, green multiple service listings (MLS), creative financing options and use of social media are all avenues of research that were touched upon. Each topic can be important considerations when constructing a Yukon retrofit program. They all will be discussed further in the Discussion section.

Overall, the indicators overwhelmingly show that in a northern setting that is increasingly becoming more aware of energy efficient development and the effects of climate change, it is not only logical, but crucial to help people decrease their 'energy footprint'.

3 Discussion of research

The discussion below expands on observations made during the course of researching Canadian retrofit programs.

3.1 Eligibility and Accessibility

Various retrofit programs limit grant eligibility to the age of the house, yet a more appropriate criterion would be to limit eligibility to the EnerGuide rating of the house. Where funds are limited the target should focus on achieving the greatest improvement for the least expense. In many ways a retrofit program should not only aim to reduce energy usage in houses but to help people survive in an era of increasing expenses while also educating the public on energy supply, demand, consumption and conservation.

Good planning and knowledge is essential to implementing effective programs and solutions. Knowing the best options available for performing retrofits can pay dividends for decades to come. One retrofit program in the City of Medicine Hat required people to attend a two-hour seminar on energy efficiency as a requirement to earning a rebate. This criteria was eliminated in the second phase of the program since it became too difficult to track down people to confirm they had viewed the video seminar. Also, 3 in 10 households in Medicine Hat had watched it by this point.

Informing homeowners about retrofitting is essential to a program delivering good results and there has been no easier time to gain access to information on any subject. Such social mediums as Facebook, YouTube, and online forums are all places where people may share experiences and ideas and learn in a variety of ways. These can be valuable tools in ensuring retrofit clients are well-informed and supported by peers.

Many of the retrofit programs reviewed had low-income rebate programs as well as regular rebate programs. This is an important consideration when developing retrofit grants. Low-income persons are the hardest hit as the cost of energy rises. Yukon Housing Corporation recognises this and currently manages the government social housing programs and constructs all new YHC housing projects to SuperGreen standards. A four part video series surrounding one of the most recent housing projects “Phoenix Rising” was released and is accessible through YHC’s website (http://www.housing.yk.ca/sg_video.html).

3.2 Local Resources

It is important to keep retrofit programs as local as possible. The knowledge base and benefits in labour and purchased material need to stay in the North in order to help create a ‘green’ economy and build capacity and experience. Local businesses, tradespersons, and homeowners will all benefit from a retrofit program geared for the Yukon. One example of this for low-priced items is to offer an instant rebate program (of low budget items such as CFLs) where participating businesses could both increase sales and program recognition.

Alternatively, businesses can voluntarily submit price quotes on required items to a knowledge base (website or forum) on a defined time-period.

Another major consideration is the availability of experienced contractors within Yukon. Without proper construction methods for retrofits, even the best-intentioned efforts can become serious and expensive problems for the homeowners. Quality of workmanship, attention to detail, and careful construction are all required components in proper house retrofits. It is very easy to inadvertently damage air or vapour barriers and severely reduce the efficiency of an HVAC system and even establish a problem that may take years to show (as energy losses accrue, moisture accumulates and/or damage occurs to the structure). To promote well-advised retrofit measures a homeowner must ensure that they, or the contractors, know what they are doing and are doing it correctly. A contractor certification and/or training program could pay back greatly over time.

To facilitate contract work and purchases staying within the Yukon a similar initiative to the Arctic Energy Alliance can be used where if a purchase is made for a rebatable item outside of the territory only 50% of the rebate is received. Another option would be to ensure the resources needed to retrofit northern houses are available and easily found within the Yukon. This can be facilitated by hosting energy efficient retrofitting training courses to increase contractor capacity and also by pointing people in the right direction when they are looking for contractors or information on retrofitting their houses.

3.3 Financing retrofits

According to the Canadian Mortgage and Housing Corporation (CMHC) it only makes sense for energy conservation to be part and parcel of any major retrofitting:
"…energy conservation retrofits in the $30,000 to $50,000 range were cost effective when refinancing a mortgage. In many cases, the monthly energy savings outweighed the incremental increase in a mortgage payment." [2] In other words, those who upgrade their homes for energy efficiency come out ahead. It is the goal of retrofit grant programs to make it easier for people to take that first step (or continue down the path) into energy efficient houses.

In many districts the retrofit program was in partnership with a major utility or even run by a utility. This, along with involving the business community is an invaluable asset in the development or financing of effective retrofit programs. For example, recent amendments to BC's Clean Energy Act require utilities to offer loans for home EE upgrades. [19] These loans are paid through the houses utility bill.

Another financing option would be to have the loan used to upgrade the house repaid through property taxes. The loan would be financed by a government and then repaid with low interest rates through the houses property tax.

A group formed by the Colorado government called the 'Residential Retrofit Working Group' ran into some troubles when trying to reduce financial barriers to energy retrofits. Eventually they came to realize that "[f]inancing requires willing lenders, lenders require appraisals to underwrite their loans, and appraisers need market data to support their valuation estimates. Residential appraisers look to local market and Multiple Listing Services (MLSs) for that data."[39] Currently, EE upgrades and elements

in a many markets do not result in increased property values that correspond to the amount invested (and the resulting returns). Advancing this (integrating the value of energy efficient improvements into the value of the home) can be an invaluable tool in promoting energy efficient retrofits.

3.4 Community Engagement

This section shows that when launching any program, community engagement is a key component. It is important for the message to be heard and for people to accept that message. The principles discussed here are proven methods to create programs that are not just heard but may also promote a change in people's behaviour.

Some of the main principles of community engagement are: credibility, commitment, and face-to-face communication.[28] When these principles of motivation are followed in program implementation, history has found that real results follow. Knowing the observations from this field can be invaluable in helping people to reduce energy usage. The Messaging of any program and its method of delivery are key. One study where utilities subsidized 93% of the cost of energy efficient improvements found annual consumer participation varied from 1% to 20% depending on how the program was communicated.

Two examples show the importance of delivering programs with community engagement. The first example was a study with two parts. The first part only gave information to participants on efficient water-lawn usage, which increased their overall consumption by 15%. But, when that same information was presented in an in-home visit with an asked for commitment (three quarters committed) to reduce water-usage, total overall consumption was reduced by 50%. [29] The second example is from a voluntary weatherizing program which had less than 10% of residents sign up. The utility running this program decided to use the help of local residents, citizen advisory councils, door-to-door visitors, and speakers at schools, churches, and community events. Within 2 years the program had enrolled 85% of residents and by the end of the program 95%. [30]

When first advertising a program, it is important to deliver information from a credible source in a concrete, vivid, emotionally arousing, and personally relevant way. Knowing the general concerns of the recipients and tailoring the message to those concerns or needs helps promote an effective message. There is evidence that focusing on losses avoided can be more persuasive than stressing gains from improvements.[31] Such losses avoided should be presented in amount of energy consumption that is reduced (or money saved/lost) per year and/or presented through devices that make home heat loss visible. Visibility of energy usage and losses is key as many people are not consciously aware of using energy. A study that had households receiving frequent (ideally daily) reports of energy usage found they saved up to 20% more than those with less frequent updates. [32]

Getting commitments from individuals to reduce energy usage can be a very effective way of getting them to do so. One study found homeowners who signed a written commitment achieved more energy conservation than those who did not commit, including those who were offered financial incentives to conserve energy. Once these commitments are had though it must be easy to act on them as highlighted in this quote: "A study of Northeast utility customers demonstrates the importance of initial convenience and ease of compliance. The program offered free energy audits, assistance with financing, referral to a certified contractor, and inspection of improvements."

Because the program was financed by a surcharge on the work performed by certified companies, it did not offer customers any cost savings over work done by other contractors. Nonetheless, 2000 households, about a quarter of those who requested audits, made the improvements. Although the participants ended up recouping four times their initial investment through reduced energy bills, the most frequent reasons for participating in the program were non-financial. The key factors were that the program relieved consumers of the effort and worry they might otherwise have had to expend in finding a reliable company, in determining what work really needed to be done, and making sure that the work was done properly (Stern, Black, and Elliot, 1982; Stern and Aronson, 1984, 58). [33]

Making energy efficiency the norm is also very important. In the USA's Petrified National Forest the most effective message discouraged visitors from taking wood was being told other visitors were leaving it.[7] Likewise, one hotel found that the best way to get guests to reuse towels was telling them other guests were doing so.[8] "When it comes to residential improvements, people are most persuaded by seeing what friends and neighbours have done, finding out exactly what was involved in doing it, and hearing them recount the benefits and sources of satisfaction they derived from the experience." [34]The communications, marketing and messaging of these programs is very important and should be taken into account in creating, modifying and delivering future programs of this sort.

4 Recommendations based on research

Based on the research carried out a series of recommendations for a Yukon program are offered. These recommendations range from what a good rebate program should contain to what could be done to make it more effective.

4.1 Yukon Specific

- EnerGuide ratings should be used as the determiner for energy efficiency requirements. This will ease coordination with the federal program. If possible, incentives should be offered for reaching other marks (PassiveHaus, LEED, SuperGreenHomes). It should be noted that the current Whitehorse building codes meet an EnerGuide rating of 80.
- The retrofit rebate program should be kept as local as possible. The remoteness of the Yukon lends itself to the need for being more self-sufficient, as such; increasing local capacity for energy efficient construction lends itself to a more self-sustaining North.
- Collection of data for before and after energy consumption comparisons in retrofitted homes should be acquired.
- An easily accessible program that can tie into existing federal rebates should be promoted. The need for education of homeowners and contractors about proper renovation techniques must be balanced with this.

4.2 Available resources

- A large body of knowledge is available on best management practices in Northern retrofitting: such as ESC publications on adding insulation to existing houses and Yukon Housings extensive

work in building and designing GreenHomes and SuperGreenHomes. There is also a publication by CMHC called '*The North: A Selected Bibliography Covering Housing, Building and Planning in Cold Climates'* published in 2008 that has a list of 100's of potential resources. Resources such as these can be consolidated and made available for people wishing to retrofit.

- Proper resources and planning tools for homeowners and contractors should be available at every step of the way. Support networks such as online forums create a community of like-minded individuals who can support one another and offer a place for experts to answer questions at their leisure. Other resources could include: social networks, online videos, resource libraries (online and physical).

- A wealth of websites and books and other resources also exist and some examples should be given including CMHC, buildingscience.com, etc..

4.3 Who to involve

- Partnerships with relevant organizations should be explored and established where possible. A more effective program can be created with greater resources and contributions from other agencies:
  - Utilities such as Yukon Energy Corporation and Yukon Electrical Company can offer unique opportunities and information. Smart metering and displaying energy usage is a proven way to create energy awareness and get people to conserve energy, a process made easier with utility involvement. New resources such as Microsoft Holm allow for greater access and better presentation of smart metering data.
  - NGO's such as the Yukon Conservation Society, Habitat for Humanity, the Yukon Anti-Poverty Coalition and others, can all be valuable sources of information and support. Retrofitting homes for energy efficiency reduces consumption of non-renewables, reduces heating bills that are becoming more untenable with each passing year, and creates a more affordable atmosphere for Yukoners overall.
  - Businesses that deal with retrofitting products and services will benefit from a local retrofit grant program. One can look at programs such as ecoEnergy as subsidizing the 'green' industry and promoting the growth of houses that will last longer, be more efficient, and stay affordable. Subsequent building and purchasing has the benefit of increasing sales for local businesses.
  - Different levels of government (federal, territorial, first nations, and municipal) all have different resources that can be used to finance, deploy, or create a better retrofit program.

- Yukon Housing Corp. serves as the Service Organization for the ecoEnergy retrofit – homes program, and should be involved in the development of any territorial retrofit program. This will allow for more stream-lining and regional applicability of the two rebates homeowners can acquire.

- Principles of community engagement should be used in order to create real change in energy consumption and provide general outreach to people who may not be aware of the benefits of energy efficient housing. In the *A Home For Everyone: A Housing Action Plan For Whitehorse* [8]

one of the recommended actions to alleviate the housing crisis is to inform landlords of current funding and measures available for energy conservation renovations.

4.4 Miscellaneous

- Retrofitting is a good time to inspect other house components for safety (smoke and CO detectors) or add them. As noted in past Yukon programs: "Areas to investigate for possible deterioration include electrical wiring, insulation, vapour barrier details, dry rot (indicating moisture problems), and other material degradation. Examples of degradation or unsafe conditions can be used to illustrate the importance of energy conserving construction techniques during the retrofit process" [20]

- A low-income component should be considered for implementation. Five of 13 programs reviewed had low-income components. Those earning less are challenged the most when energy prices rise. Components such as free energy assessments, free air sealing and free thermostats can be offered to facilitate this.

- Rural customers may need different rebate levels. As they may be charged more for transportation costs and travel times which should be accounted for in rebate levels. Rural customers also predominantly use diesel fuel. Any impact on their energy consumption will decrease the Yukon's fossil fuel usage.

- Realtors and Multiple Listing Services should be encouraged to assess and present the value of energy efficiency in houses bought and sold in the Yukon. These are real concerns in the North where the heating season lasts for the majority of the year and as the cost of heating will only continue to rise.

- Innovative financing options should be sought out. In the Yukon where heating takes place at least eight months of the year, the savings from house HVAC upgrades can pay for the cost of many financing options. BC's utility loan program is an excellent example of this. Another example would be repaying the loan through property taxes.

4.5 A retrofit program for the Yukon

The Yukon would benefit from a retrofit rebate program to educate and assist people on improving residential energy efficiency. Such a program would lead to greater energy awareness for the Yukon by making people more aware of the energy consumption in their houses and of methods to reduce the consumption.

Eligibility: The retrofit program should be open to all residential homeowners; even new home purchases are no guarantee of energy efficiency. Multi-unit residential buildings (MURB's) should be included as well, an excellent categorization of MURB's can be found in Appendix 3.

Eligible Upgrades: The grant table for the federal program (Appendix 1) should be assessed for Yukon suitability. Items that are relevant for the Yukon should be kept and if necessary modified, others may be removed. From this a Yukon grant table can be formulated.

Criteria: A certain amount of work and materials should be required to be purchased locally. To help with this, contractor training and certification courses can be held and known 'certified contractors' can be listed so they are easily located by interested parties. The energuide rating system should also be used, along with the pre and post audit system.

Other important considerations: Proper program deliverance could payback greatly as shown in section 3.4. The more knowledgeable the client is of energy efficient retrofits the more effective those retrofits will be. A required or incentivized quiz or seminar (which you complete before retrofits but receive an arbitrary amount for once retrofits are complete) should be considered.

Budget: From the estimates below, the cost to add retrofit incentives to ESC's portfolio could cost between, on average, $63,000 and $280,000. This cost does not include marketing, or planning but only the actual incentives given out.

Based on the information gained during the course of research, a very basic budget based on the ecoEnergy retrofit – for homes data was formulated. This budget is based on a similar program taking root in the Yukon without any components such as targeted low-income and MURB retrofit programs.

All calculations are based on the federal ecoEnergy retrofit – for homes program statistics. The first budget estimate is based on a low participation estimate and the second is based on a high participation estimate.

Based on Yukon ecoEnergy Participation	
Yukon Housing Stock	10,800
Minimum Participants	8
Maximum Participants	88
Average Rebate Amount	$1,300
Total (Min)	$10,400
Total (Max)	$114,400
Total (Median)	$62,400

Minimum Yukon Participants in the ecoEnergy retrofit – for homes program was 4 and maximum was 44, but in jurisdictions with own rebate program participation at least doubles.

Based on Province with Highest ecoEnergy Participation	
Yukon Housing Stock	10,800
Minimum Participants	52
Maximum Participants	378
Average Rebate Amount ($)	$1,300
Total (Min) (all in $)	$67,392
Total (Max)	$491,400
Total (Median)	$279,396

Saskatchewan was Province with most participants per capita

Minimum participation per year was 0.48% of Saskatchewan housing stock and maximum participation was 3.5% of housing stock

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Appendix 1: A Summary of Programs Reviewed

Program	Quick Facts	How it works
Federal: ecoEnergy Retrofit Program *Office of Energy Efficiency* 1-800-622-6232	-Launched April 1 2007, finished March 31, 2011 -Extended again in 2011 budget -1 in 20 Canadians took part -Small/medium business section not used much? -Has MRUB multiplier component (which also increases the max. rebate amount from $5,000 to $500,000) **Claims** -Avg.$ 1300 of max $5000 of grant used -Avg. reduction of 20% of energy usage and 3 tonnes GHG per house	1. Pre-retrofit evaluation -Preformed by Energy Advisor certified through NRCan 2. Retrofitting based on recommended improvements. Grant table offers idea of how much money back. 3. Post-retrofit evaluation within 18 months of pre-retrofit eval. Application is submitted and rebate issued *Note: All rebate programs work in this fashion unless otherwise mentioned. *See Appendix 1to view grant table, archetypal of all others.
NWT: Artic Energy Alliance 1-877-755-5855 info@aea.net.ca *Non-Profit Society* http://www.aea.nt.ca/	Administers and matches any grants received through the federal ecoEnergy program.	Same as ecoEnergy retrofit program.
Alberta: Climate Change Central 1-888-537-7202 myrebates@climatechangecentral.com *Non-Profit Public/Private Organization* http://climatechangecentral.com/my-rebates/home_evaluatio	-Provincial -Offer 75% of what fed. Insulation rebate would have been -Interactive website -No MRUB consideration **Claims** -Avg. $1000 rebates saving 600$ in eng. 60GJ of natural gas and 3T GHG -Those who take all recommendations by Eng. Advisor save 4T GHG/year	Offer rebates on: -New home rebate based on EnerGuide Ratings: 80-81 $1,500; 82-85 $3,000; >86 $10,000. -No home evaluation required for rebates: Furnaces, boilers, and hot water tanks -Evaluation required for rebates: ceiling insulation (max.

n		$562.50), exterior wall insulation (max. $1406.25), exposed floor insulation (max. $142.50), Basement insulation (max. 937.50), basement header insulation (max. 93.75), crawl space insulation (max. $750) or floor above crawls space insulation ($187.50). -Both the pre and post evaluations are rebated $100 each and the max. combined rebate amount is $3,150.
Alberta: City Of Medicine Hat – HATsmart II 1-403-525-8823 conserve@medicinehat.ca *Environmental Program* http://www.hatsmart.ca/	-City program -Before any rebates must attend 2 hour seminar (in-person or online) *Note on June 01, 2011 this was no longer required. Due to out-dated video, having reached 1 in 10 houses with the video and there were difficulties making people watch the video, slowing down application process. -All rebates are on-top of provincial. -lists "Funds Available" under each rebate category. **Claims** -Please follow this link, Statistics, for complete list of program successes and uptake. -To date have saved 2,677.93T of GHG, 35,284.08GJ of Natural Gas, 609.08 MWh of Electricity, and 140,522.10 m3 of water.	-New home rebate based on EnerGuide Ratings: 80-81 $1,500; 82-85 $3,000; >86 $10,000. -400$ rebate for either furnace, hot water heater or insulation (pre/post evaluation required) upgrade -Can get $2,000 for achieving one of these certifications (x) is required energuide rating: Built Green Platinum(82), Energy Star(80), LEED(80), R-2000(80), Passive House(80). -$1,000 for a solar electric or hot water system. -$5,000 to commercial clients that participate in conservation (building envelope/equipment) or install solar electric or solar hot water in their building.
BC: LiveSmartBC 1-604-660-2421 enquiry@gov.bc.ca http://www.livesmartbc.ca/homes/h_rebates.html	- >$7000 in rebates available -Provincial in partnership with BC Hydro and FortisBC -Similar to federal program -Like most, energy auditors must be NRCan certified. -Auditors handle paperwork to ensure	-Follow this link for a comprehensive list of rebates. -Have different rebate amounts depending on if you live in Interior/Northern BC or South Coastal BC.

	eligibility. -Multi-Unit-Residential-Buildings not eligible.	-If you preform five upgrades identified by a star on the rebate list you get a bonus amount ($400-$500)
Saskachewan: **Saskachewan Energuide for Houses** 1-800-567-8899 Saskenergy: Crown corp. working on behalf of Ministry of Environment http://www.saskenergy.com/Saving_Energy/energuide.asp	-Shares program admin. With NRCan **Claims** -38,000 participants, reducing GHG by 112,000 tonnes (20,350 cars)	-Similar rebate system to federal -Add small section on $45 rebate on installing Energy Star rated light fixtures. - "$1,000 for the purchase of a home that is ENERGY STAR qualified, R-2000 certified or has an EnerGuide for New Homes rating of 80 or above, plus" -Max. 5000 rebate amount.
Manitoba: PowerSmart Manitoba Hydro: Crown Corp. 1-888-624-9376 powersmartexpert@hydro.mb.ca http://www.hydro.mb.ca/savings_rebates_loans.shtml?WT.mc_id=2014	-Offer rebates on insulation -Offer loans for EE -Offer free EE upgrades and loans for low-income families -Low-income component with free evaluation, select free insulation upgrades and low monthly payments for a gas furnace.	The following rebates are available for adding insulation to meet Power Smart recommended levels: • Attic insulation: $0.02/R/square foot • Uninsulated wall cavities: $0.04/R/square foot • Walls, re-siding: $0.10/R/square foot • Basement walls: $0.02/R/square foot • Crawlspaces: $0.08/R/square foot for walls; $0.06/R/square foot for horizontal skirt requirement (note: both requirements must be met in order to qualify for a rebate) Rebates will be calculated based upon the difference between the insulation levels

		required by the applicable building codes(s) in effect at the time of construction of the home, or addition to the home, and Power Smart levels. Rebate amounts cannot exceed the material cost of the insulation measure(s) installed.
Ontario: Home Energy Audit Program 1-888-668-4636 energyaudits@ontario.ca Ministry of Energy http://www.mei.gov.on.ca/en/energy/conservation/ohesp/	-Closed, was similar to federal program, started 2009 -City of Toronto had $1000 incentive for insulation on top of provincial one, closed with federal program -both offered grants with federal rebate formula.	-
Quebec: Rénoclimat 1-866-266-0008 aee@aee.gouv.qc.ca Agence de l'efficacité énergétique http://www.aee.gouv.qc.ca/en/my-home/renoclimat/	-Wood-heated homes not eligible? -Must raise energuide rating by 2 to qualify for rebates -Have novoclimat initiative giving incentives for buying novoclimat certified houses ($2000) (See appendix 4 for novoclimat checklist -Has low-income Econologis program which offers free energy evaluations to low-income owners and tenants and free electronic thermostats.	-There are less eligible rebates for natural gas clients opposed to electric, propane or fuel oil clients. -No stipulated maximum rebate amount.
PEI: EE Grant or Loan Program 1-877-734-6336 or (902) 620-3690 Office of Energy Efficiency http://www.gov.pe.ca/oee/	-An oil marketers coalition gives addition rebates for high-efficiency oil-heat purchases. -Offers interest-free loans to low-income households to preform EE upgrades. -Those who are low-income and apply for loan or use EE grants are eligible for free air sealing. -Have a commercial targeted system as well	-Max 1500 or 15% total amount paid (See appendix X for PEI grant table. Is different from most others)
New Brunswick: Existing Homes Energy Efficiency Upgrades Program Efficiency NB 1-866-643-8833 or 1-506-643-7826	-List of success stories on their website. Very informative, many positive experiences and massive jumps in energy efficiency. -Have incentives for commercial and industrial buildings increasing EE. -Lists contractors who have taken the	-See appendix 3 -New homes that are energuide 83 or greater receive $1,500, $2,500 for a solar domestic hot water installation, $5,000 for a geothermal installation, and $7,500 if they meet net zero

http://www.efficiencynb.ca/residential/existinghomes.html	energy efficiency training workshops developed by Natural Resources Canada. Workshops sponsored by efficiency NB.	requirements. -Current max is $5,000 for doing basic upgrades and $6,000 for doing more complete upgrades. -Program before April 1, 2011 offered 20% rebate of eligible costs to max. $2000. OR up to $10,000 loan interest free repayable over a max. 6 year term.
Nova Scotia: EnerGuide for existing homes 1-877-999-6035 (program advisor) 1877-6786807 info@efficiencyns.ca Efficiency Energy Corp.: independent of gov't or utilities http://www.efficiencyns.ca/	-Appliance retirement and replacement programs. -Pilot fuel substitution program (grants to change to more 'friendly' heating such as pellets or natural gas). -Offer an instant discount program at participating stores. (on items such as CFL's, refrigerators, thermostats.. etc.) -Have low-income component which offers free energy assessment and provides a service manager who manages energy upgrades.	-New home rebates based on EnerGuide ratings: 83-84 - $3,000, 85-87 - $5,000, >87 - $7,000. Ends June 30, 2011 and capped at 1,200 homes. -Rebate program similar to federal and many others.
Newfoundland/Labrador: Energuide for Houses or REEP 1-866-440-4044 Dept. of Natural Resources http://www.nr.gov.nl.ca/nr/energy/efficiency/energuide_houses.html	-have low-income component that gives free assessment and a $3,000 grant for people on Newfoundland island and $4,000 grant for people on Labrador.	-Pay for evaluator transportation costs to help rural customers -Max. $1,500 in incentives -Rebate program similar to federal and many others.

Appendix 2: ecoEnergy Retrofit – For Homes. Grant Table

CANADA'S ECONOMIC ACTION PLAN

ecoENERGY
an ecoACTION initiative

Effective November 30, 2009

IMPORTANT NOTICE

Only homeowners who booked a pre-retrofit evaluation by March 31, 2010, can receive an ecoENERGY Retrofit - Homes grant. Call 1 800 O-Canada or visit ecoaction.gc.ca/homes for more information.

Grant Table for ecoENERGY Retrofit – Homes

Thinking of ways to make your home more energy-efficient? Under ecoENERGY Retrofit – Homes, you can qualify for federal grants for home improvements that lower energy costs, improve comfort and reduce impacts on the environment.

Eligible Homeowners

Owners of single-family, detached and semi-detached homes are eligible. Owners of most low-rise multi-unit residential buildings (MURBs) that are no more than 3 storeys high and some mixed-use buildings with at least 50 percent permanent residential space are also eligible.

Application Process

Before you start your energy upgrades, hire a local service organization licensed by Natural Resources Canada (NRCan), and they will send a certified energy advisor to perform a detailed, on-site evaluation of your home's energy use from the attic down to the foundation. You will receive a personalized report, including a checklist of recommended retrofits to improve the energy efficiency of your home or MURB and, in some cases, reduce water consumption. You must complete your energy retrofits and receive your post-retrofit evaluation by March 31, 2011, or within 18 months from the date of your pre-retrofit evaluation report, whichever comes first.

Measures and Amounts

On the following pages, you will find a list of improvements and retrofits that are eligible under the ecoENERGY Retrofit – Homes program and the corresponding grant amounts. The maximum grant you can receive for a home is $5,000. In the case of MURBs, the maximum grant receivable is $5,000 per dwelling unit. The maximum grant for property owners with multiple properties is $500,000. Incentives are calculated by using the grant amounts and eligibility requirements that are in effect at the time of the post-retrofit evaluation and are subject to available funding.

Canada

Eligible Improvements / Retrofits — Grant Amounts

When replacing ANY of the equipment listed in this brochure, the new equipment must have an efficiency rating higher than that of the original equipment. The second system must be of the same type and efficiency.

HEATING SYSTEM	SINGLE-FAMILY HOME		MURB
	1st system	2nd system	
Replace your heating system with • an ENERGY STAR® qualified gas furnace that has a 92.0 percent annual fuel utilization efficiency (AFUE) or higher	$375	$190	
• an ENERGY STAR qualified gas furnace that has a 92.0 percent AFUE or higher and a brushless DC motor	$625	$315	
• an ENERGY STAR qualified gas furnace or oil furnace that has a 94.0 percent AFUE or higher and a brushless DC motor	$650	$350	
• an ENERGY STAR qualified gas furnace or oil furnace that has a 94.0 percent AFUE or higher and a brushless DC motor (when installing a condensing furnace for the first time)	$790	$400	
• an ENERGY STAR qualified condensing gas boiler that has a 90.0 percent AFUE or higher	$750	$375	SAME AS SINGLE-FAMILY HOME
• an ENERGY STAR qualified oil boiler that has an 85.0 percent AFUE or higher	$750	$375	
• an ENERGY STAR qualified oil furnace that has an 85.0 percent AFUE or higher	$375	$190	
• an ENERGY STAR qualified oil furnace that has an 85.0 percent AFUE or higher and a brushless DC motor	$625	$315	
In the case of mobile homes (only) • where a zero-clearance furnace is being replaced, an ENERGY STAR qualified zero-clearance gas furnace that has a 90.0 percent AFUE or higher	$375	N/A	
Install an earth-energy system (ground or water source) that is compliant with CAN/CSA-C448 and certified by the Canadian GeoExchange Coalition (www.geo-exchange.ca) – applies to a new system or a complete replacement.	$4,375	N/A	
Replace a heat pump unit of an existing earth-energy system (ground or water source). The system must be compliant with CAN/CSA-C448 and certified by the Canadian GeoExchange Coalition (www.geo-exchange.ca). (*per equipment replaced)	$1,750	N/A	*$1,750
Replace your existing space and domestic water heating equipment with an integrated mechanical system (IMS) that has an overall thermal performance factor of 0.90 or higher. The system must be compliant with the CSA P.10-07 standard and meet or exceed the standard's *premium* performance requirements. (*per equipment replaced)	$1,625	N/A	*$1,625

N/A = Not applicable

NOTE: New installations are not eligible in cases where improvements listed state "Replace." Natural Resources Canada (NRCan) reserves the right to revise the grant amounts. The payment of grants is subject to the availability of funds. NRCan does not endorse the services of any contractor or any specific product and accepts no liability in the selection of materials, products, contractors or performance or workmanship.

Eligible Improvements / Retrofits **Grant Amounts**

When replacing ANY of the equipment listed in this brochure, the new equipment must have an efficiency rating higher than that of the original equipment. The second system must be of the same type and efficiency.

HEATING SYSTEM (Cont'd)	SINGLE-FAMILY HOME		MURB
	1st system	2nd system	
Replace your wood-burning appliance with a model that meets either CSA-B415.1-M92 or the U.S. Environmental Protection Agency (EPA) (40 CFR Part 60) wood-burning appliance standard; an indoor wood pellet-burning appliance (includes stoves, furnaces and boilers that burn corn, grain or cherry pits); or a masonry heater. (*per equipment replaced)	$375	$190	*$375
Replace your solid fuel-fired outdoor boiler with a model that meets CAN/CSA-B415.1 or the U.S. EPA Outdoor Wood-fired Hydronic Heater (OWHH Method 28) Program, Phase 1 or 2. The capacity of the new boiler must be equal to or smaller than the capacity of the boiler being replaced.	$375	N/A	$375 (per building)
Install a minimum of 5 electronic thermostats for electric baseboard heaters. Electric baseboard heating must be the primary space heating system. (*for each set of 5 electronic thermostats)	$40/5	N/A	*$40
Install an ENERGY STAR qualified air-source heat pump for both heating and cooling that has a seasonal energy efficiency ratio (SEER) of 14.5 or higher and a minimum heating capacity of 12 000 Btu/hour. See "Important Information about Air-Source Heat Pumps and Central Air Conditioners." (*per equipment installed)	$500	N/A	*$500

Important Information about Air-Source Heat Pumps and Central Air Conditioners

In the case of **air-source heat pumps and central air conditioners**, a manufacturer's new ENERGY STAR qualified matched condenser coil (outdoor unit comprising a condenser coil, compressor and cooling fan) and indoor evaporator coil (typically located with the furnace) must have a SEER of 14.5 or higher. Under no circumstances will the replacement of only one of these coils entitle the homeowner to a grant, just as components that are not certified by the manufacturer as being matched (i.e. tested together) will not be accepted. Currently, some manufacturers match their low SEER air conditioner/air-source heat pump coil packages with one of their brushless DC motor-equipped furnaces (i.e. blowers) as a method to reduce the power consumption requirement for ENERGY STAR compliance and labelling. This arrangement is accepted under the ecoENERGY Retrofit – Homes program.

To be ENERGY STAR qualified in Canada, in addition to the minimum requirement of SEER 14.5, **air-source heat pumps** must also have a minimum heating seasonal performance factor (HSPF) of 7.1 for Region V, which is more reflective of the Canadian climate. If the heat pump is only rated for Region IV, which is used in the United States, it must have a minimum HSPF of 8.2.

Mini-split (ductless) air-source heat pumps must have at least one head per floor, excluding the basement, to qualify for a grant.

In the case of **mini-split (ductless) air conditioners** that do not have at least one head per floor, excluding the basement, each head will be considered a room air conditioner and the grant amount will be reflected as such.

When having your new central air conditioner or air-source heat pump installed, ask the contractor to indicate on your invoice the manufacturer's name (not the model name) of the condenser coil and the model numbers of both the new condenser and evaporator coils. The Air-Conditioning, Heating and Refrigeration Institute (AHRI, also known as ARI) reference number must also be referenced on the invoice. The energy advisor will request to see this information when performing the post-retrofit evaluation of your home.

NOTE: New installations are not eligible in cases where improvements listed state "Replace." Natural Resources Canada (NRCan) reserves the right to revise the grant amounts. The payment of grants is subject to the availability of funds. NRCan does not endorse the services of any contractor or any specific product and accepts no liability in the selection of materials, products, contractors or performance or workmanship.

Eligible Improvements / Retrofits — Grant Amounts

When replacing ANY of the equipment listed in this brochure, the new equipment must have an efficiency rating higher than that of the original equipment. The second system must be of the same type and efficiency.

COOLING SYSTEM (Replacement Only)	SINGLE-FAMILY HOME 1st system	SINGLE-FAMILY HOME 2nd system	MURB
Replace your central air-conditioning system with an ENERGY STAR qualified system that has a SEER of 14.5 or higher (complete system replacement, including indoor coil and outdoor components). See "Important Information about Air-Source Heat Pumps and Central Air Conditioners."	$250	N/A	$250 (per building)
Replace your window air conditioner(s) with an ENERGY STAR qualified unit(s). See "Important Information about Air-Source Heat Pumps and Central Air Conditioners."	$25 (per unit replaced; maximum of 5 units)	N/A	$25 (maximum of 2 units per dwelling unit)

VENTILATION SYSTEM (New installation or replacement)			
Install a ventilation system that is certified by the Home Ventilating Institute (HVI) as a heat- or energy-recovery ventilator. The HVI Product Directory is available at www.hvi.org. Click "Consumers" and "Certified Products Directory." (*per equipment installed)	$375	N/A	*$375

DOMESTIC HOT WATER EQUIPMENT	SINGLE-FAMILY HOME 1st system	SINGLE-FAMILY HOME 2nd system	MURB
Install a solar domestic hot water system that includes solar collectors that meet the CAN/CSA F378.87 standard **AND** that provides a minimum energy contribution of 6 gigajoules per year (GJ/yr). For additional details regarding specific eligibility requirements, and for lists of eligible collectors and certified systems, visit the solar domestic hot water systems Web page: oee.nrcan.gc.ca/retrofit/homes/solar	$1,250	N/A	Refer to the Web link to the left
Replace your domestic hot water heater with an ENERGY STAR qualified instantaneous, gas-fired water heater that has an energy factor (EF) of 0.82 or higher and is on the related list of eligible domestic hot water equipment: oee.nrcan.gc.ca/retrofit/homes/water (*per equipment replaced)	$315	N/A	*$315
Replace your domestic hot water heater with an ENERGY STAR qualified instantaneous, condensing gas-fired water heater that has an EF of 0.90 or higher and is on the related list of eligible domestic hot water equipment: oee.nrcan.gc.ca/retrofit/homes/water (*per equipment replaced)	$375	N/A	*$375
Replace your domestic hot water heater with a condensing gas storage-type water heater that has a thermal efficiency of 94 percent or higher and is on the related list of eligible domestic hot water equipment: oee.nrcan.gc.ca/retrofit/homes/water (*per equipment replaced)	$375	N/A	*$375
Install a drain-water heat recovery (DWHR) system. Grants are based on the efficiency of the system determined by an independent testing facility. Visit the eligible domestic hot water equipment Web page for a link to the list of eligible systems and their efficiencies: oee.nrcan.gc.ca/retrofit/homes/water (*per equipment installed)			
• efficiency between 30.0 and 41.9 percent	$95	N/A	*$95
• efficiency of 42.0 percent or higher	$165	N/A	*$165

NOTE: New installations are not eligible in cases where improvements listed state "Replace." Natural Resources Canada (NRCan) reserves the right to revise the grant amounts. The payment of grants is subject to the availability of funds. NRCan does not endorse the services of any contractor or any specific product and accepts no liability in the selection of materials, products, contractors or performance or workmanship.

BUILDING ENVELOPE

When adding insulation to the building envelope, pay special attention to the type and the placement of vapour barriers per local building codes.

For a multi-unit residential building, the grant for insulation is multiplied by the MURB MULTIPLIER shown on page 7.

CEILING INSULATION

A minimum of 20 percent of the total ceiling area must be insulated to qualify. When the roof has more than one type (i.e. attic, cathedral ceiling, flat roof), all applicable grants are pro-rated based on the ceiling area that is insulated. The **maximum grant** for any combination of attic, cathedral ceiling and flat roof is $750. Grants listed reflect 100 percent of the ceiling area being of one roof type.

	STARTING POINT		
Increase the insulation value of	**R-12 and less**	**Greater than R-12 and up to R-25**	**Greater than R-25 and up to R-35**
• your attic to achieve a total minimum insulation value of RSI 7 (R-40)	$500	$250	N/A
• your attic to achieve a total minimum insulation value of RSI 8.8 (R-50)	$750	$375	$125
• your flat roof and/or cathedral ceiling to achieve a total minimum insulation value of RSI 5 (R-28)	$750	$250	N/A
Add a minimum insulation value of RSI 1.8 (R-10) to your uninsulated flat roof and/or cathedral ceiling and qualify for a grant of $500.			

EXTERIOR WALL INSULATION

	MINIMUM ADDITIONAL INSULATION		
	Percent area	**R-3.8 to R-9**	**Greater than R-9**
A minimum of 20 percent of the total exterior wall area must be insulated to qualify. The grant is based on the percentage of wall area that is insulated and does not include walls between individual units. See "Important Note about Semi-Detached and Row Houses."	20%	$225	$375
	40%	$450	$750
	60%	$675	$1,125
	80%	$900	$1,500
	100%	$1,125	$1,875

EXPOSED FLOOR INSULATION (overhangs and floors above an unheated space, excluding crawl spaces)

Insulate your entire exposed floor and increase its insulation value by a minimum of RSI 3.5 (R-20). A minimum floor area of 14 square metres (150 square feet) must be insulated to qualify.	$190

NOTE: New installations are not eligible in cases where improvements listed state "Replace." Natural Resources Canada (NRCan) reserves the right to revise the grant amounts. The payment of grants is subject to the availability of funds. NRCan does not endorse the services of any contractor or any specific product and accepts no liability in the selection of materials, products, contractors or performance or workmanship.

FOUNDATION INSULATION

When both a basement and crawl space are present, all applicable grants are pro-rated to a maximum of $1,250 based on the total wall area that is insulated.

BASEMENT INSULATION	MINIMUM ADDITIONAL INSULATION		
	Percent area	**R-10 to R-23**	**Greater than R-23**
A minimum of 20 percent of the foundation's wall area (including basement and crawl space walls, when applicable) must be insulated to qualify. The grant is based on the percentage of wall area that is insulated and does not include walls between individual dwelling units. See "Important Note about Semi-Detached and Row Houses."	20%	$125	$250
	40%	$250	$500
	60%	$375	$750
	80%	$500	$1,000
	100%	$625	$1,250

BASEMENT HEADER INSULATION	MINIMUM ADDITIONAL INSULATION
	R-20
Seal and insulate your entire basement header area, increasing its insulation value by a minimum of RSI 3.5 (R-20)	$125

CRAWL SPACE INSULATION	MINIMUM ADDITIONAL INSULATION	
	R-10 to R-23	**Greater than R-23**
Insulate 100 percent of the crawl space's total exterior wall area, including the header area. See "Important Note about Semi-Detached and Row Houses."	$500	$1,000
Or Insulate 100 percent of the floor above the crawl space to increase its insulation value by a minimum of RSI 4.2 (R-24).	N/A	$250

IMPORTANT NOTE ABOUT SEMI-DETACHED AND ROW HOUSES
In the case of a semi-detached or row house that is an end unit, the grant amount for the insulation of exterior walls, basement or crawl space walls is 75 percent of the amounts shown. In the case of a row house that is a middle unit, the grant amount is 50 percent of the amounts shown.

AIR SEALING	SINGLE-FAMILY HOME	
Perform air sealing to improve the air-tightness of your home to achieve the air change rate indicated in your ecoENERGY Retrofit – Homes report.	$190	
BONUS: If you reach 10 or 20 percent better than the target included in your report, you can obtain an additional grant.	10% 20%	$120 $240

NOTE: New installations are not eligible in cases where improvements listed state "Replace." Natural Resources Canada (NRCan) reserves the right to revise the grant amounts. The payment of grants is subject to the availability of funds. NRCan does not endorse the services of any contractor or any specific product and accepts no liability in the selection of materials, products, contractors or performance or workmanship.

MURB MULTIPLIER

MURB MULTIPLIER (for insulation and air sealing grants)
The appropriate multiplier must be applied to the grant level identified based on the nature of the work done.

Number of dwellings	2–3	4–6	7–9	10–12	13–16	17+
Multiplier	1.0	1.5	2.0	2.5	3.0	4.0

Visit the "Questions and Answers" section of the program Web site for a detailed description of eligible MURBs.

DOORS/WINDOWS/SKYLIGHTS (heated space only)	**SINGLE-FAMILY HOME**	**MURB**
Replace windows and skylights with models that are ENERGY STAR qualified for your climate zone. (*per unit replaced)	*$40	*$40
Grants for windows and skylights are based on the number of rough openings (RO) in which windows or skylights were replaced between the pre- and post-retrofit evaluations. Each RO is counted as one window or skylight. An RO is defined as the structurally stable opening created by the builder for the installation of the window unit (i.e. framing and glazing) or skylight. (Note that a bay window, which may be made up of several windows, is regarded as one RO.)		
Replace your exterior door(s) with an ENERGY STAR qualified model(s) for you climate zone. (*per unit replaced)	*$40	*$40

To be eligible for a grant, proof of ENERGY STAR qualification of windows, doors and skylights is required, such as the presence of an ENERGY STAR label on all of the replacement windows, doors or skylights indicating they are ENERGY STAR qualified for the house's climate zone. If the labels are removed by the installer, you should request them as proof, or request a copy of an invoice indicating

- the brand/product name
- the NRCan model reference number or the manufacturer's model code
- the climate zone for which the windows, doors or skylights are qualified

WATER CONSERVATION	**SINGLE-FAMILY HOME**	**MURB**
Replace your toilet with a low-flush or dual-flush toilet rated at 6 litres per flush or less that meets the Los Angeles Supplementary Purchase Specification (SPS) and has a flush performance of 350 grams or more. (*per unit replaced) A product list is available on the Veritec Consulting Inc. Web site at www.veritec.ca. Click "Reports" and select "ecoENERGY Eligible."	*$65 (maximum of 4 units per home)	*$65 (maximum of 2 units per dwelling unit)

NOTE: New installations are not eligible in cases where improvements listed state "Replace." Natural Resources Canada (NRCan) reserves the right to revise the grant amounts. The payment of grants is subject to the availability of funds. NRCan does not endorse the services of any contractor or any specific product and accepts no liability in the selection of materials, products, contractors or performance or workmanship.

IMPORTANT NOTES

1. Natural Resources Canada reserves the right to revise the information contained in this document, including the grant amounts and the eligibility requirements, without notice. The payment of grants is also subject to the availability of funds. Refer to the Web site indicated below for the most up-to-date information, or contact your local licensed service organization.

2. All upgrades or renovations must meet local codes and by-laws. Before undertaking upgrades or renovations, find out about the appropriate products and installation techniques to ensure that your home's building envelope and indoor air quality will not be compromised.

3. Read carefully the recommendations found in your ecoENERGY Retrofit – Homes report for more information.

4. Renovations that are part of an addition made to a property following the pre-retrofit evaluation are not eligible for a retrofit grant and may reduce the grant amount for the improvement done on the existing portion of the house. Consult your energy advisor.

5. Insulation value in RSI equals the R insulation value divided by 5.678.

6. For more information on ENERGY STAR qualified products, visit energystar.gc.ca. The ENERGY STAR name and the ENERGY STAR symbol are registered trademarks of the United States Environmental Protection Agency and are used with permission.

For more information on this program

or how to book an appointment with an energy advisor certified by NRCan,

visit ecoaction.gc.ca/homes

or call 1-800-O-CANADA (1-800-622-6232). TTY: 1-800-926-9105.

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Appendix 3: New Brunswick Residential Energy Efficiency Program Guidelines and Grant Table

Residential Energy Efficiency Program -Existing Buildings

(Formerly known as Efficiency NB's Existing Homes Energy Efficiency Upgrades Program (Upgrades Program) and Multiple Unit Residential Building Energy Efficiency Upgrades Program (MURB Program))

Program Guidelines

Effective April 1, 2011

1. Objective

Residential Energy Efficiency Program – Existing Buildings is an Upgrades Program designed to help New Brunswickers make their homes and buildings more energy efficient. The objectives of the program are to:

- Provide information to owners on the best practices for increasing Energy Efficiency in residential buildings and encouraging their application, and
- Assist owners to reduce their energy consumption, by focusing incentives on upgrades that have the most impact on Energy Efficiency.

Achieving these two objectives will contribute to the reduction of our lifestyle's impact on the environment and NB's energy needs.

2. The Program

Residential Energy Efficiency Program provides financial incentives to residential owners who make eligible energy efficiency improvements to their homes and buildings as described in this guideline document. Participation in the program requires that a Pre-Upgrade Assessment be completed by one of the Service Providers identified by Efficiency NB. Efficiency NB will partner with building owners on the cost of the energy assessment. See Section 7 of this document for specific amounts. After the upgrades have been completed a Post-Upgrade Assessment will confirm the impact on the building's energy efficiency. Based on the confirmation found in the Post Upgrade Assessment, an incentive will be paid. To qualify for an incentive relating to the specific upgrades, an application form will be completed and submitted to Efficiency NB as part of the Post-Upgrade Assessment process. In addition, other documents may be required. For residential building owners who want to pursue more comprehensive energy retrofits, the **Residential Energy Efficiency Program** includes the **Whole Home Incentive (WHI)**. The WHI is triggered when upgrades undertaken include 3 of the 4 major categories, and it provides approximately 20% more incentive eligibility and increases the maximum available to $6,000. See section 8 of this document for more details about WHI.

This program and guidelines have been developed under authority and direction found in Sections 4(b), 5(1) and 5(2f) of the Energy Efficiency and Conservation Act of New Brunswick.

3. Program Steps

Step 1: Contact a Service Provider and have a Pre-Upgrade Assessment completed. A report and summary will be provided by the Energy Advisor who conducts the assessment .

Step 2: Upgrades are planned based on the information contained in the report. Upgrades must be completed and documented within 18 months of the Pre-Upgrade report. While building owners are encouraged to implement as many of the upgrades as possible, program participation does not require a specific completion level.

Step 3: Contact a Service Provider and schedule a Post Upgrade Assessment. The Service Provider does not have to be the same company as the one who conducted the Pre-Upgrade Assessment. A report and summary will be provided by the Energy Advisor, who conducts the Post-Upgrade Assessment.

Step 4: The Energy Advisor will assist with the completion of the paperwork necessary for application to Residential Energy Efficiency Program. The information will include some detail regarding project costs. The application package will be submitted, with the building owner's consent, to Efficiency NB.

Step 5: The application package will be processed at Efficiency NB and the Residential Energy Efficiency Program incentive cheque will be mailed.

4. Program Notes and definitions

MURBs: Multiple Unit Residential Building. Apartment buildings, triplexes and over/under duplexes are considered MURBs. See Appendix B for examples and drawings.

MUBs: Mixed Use Building. A MUB is any residential building that is also occupied by a commercial, retail other business operation. Such operations must not make use of equipment not typically found in residential buildings. (for example: commercial freezers, laundry equipment or commercial kitchens)

Buildings: Throughout this document, Building is used to describe both single family homes, MURBs and MUB's.

Gas: any reference throughout this document to gas includes both Natural Gas and Propane.

Residential Energy Assessment Service: This refers to the process of evaluating a building by Natural Resource Canada (NRCan) licensed Energy Advisors. This service is performed both before and after the upgrades undertaken on a building. This document refers to the REA as a Pre-Upgrade Assessment and Post-Upgrade Assessment

Energy Advisor: an individual trained, qualified and licensed by NRCan to perform the REA service.

Service Provider: (also referred to as a Service Organization) A private sector company under contract with Efficiency NB to deliver the REA service. A Service Provider employs Energy Advisors.

Net Zero: A series of upgrades that results in a building generating as much or more energy over a year, than it consumes.

Area of Building: All heated floor area including basements, excluding garages.

Large Single Family House: Greater than 4000 Square feet, requires extra payment to SP

Part 9, National Building Code: A building of no more than three stories and a footprint of not more than 600m^2 (6458 square feet)

5. Program Timeline

Upgrades must be completed and a Post-Upgrade assessment scheduled within **18 months** of the date on the Pre-Upgrade report.

There is no expiry date for Residential Energy Efficiency Program. It is intended the program will accept continuous entry of new participants.

Efficiency NB reserves the right create an expiry date or to modify or cancel program entry, subject to resource availability.

6. Eligible Buildings

New Brunswick buildings that are eligible for **Residential Energy Efficiency Program** include:

- Low-rise residential property as defined under Parts 2 and 9 of the National Building Code of Canada (NBCC). Such properties would be no more than three stories high, having a footprint of not more than 600 m^2 (6485 ft^2),
- Low-rise residential buildings including detached, semi-detached, row houses or apartment buildings no more than three stories high, having a footprint of not more than 600 m^2 (6458 ft^2)
- Mobile dwellings on a permanent foundation (as defined under Parts 9 and 2 of the *National Building Code of Canada, 1995*);
- Buildings constructed prior to 2011.
- Buildings that are structurally sound and capable of receiving an energy efficiency evaluation, as determined by a Certified Energy Advisor
- Buildings that previously participated in this program through the Direct Entry – Heating Systems, can still pursue further upgrades, after having a Pre-Upgrade Assessment completed.

New Brunswick buildings that are **NOT** eligible for **Residential Energy Efficiency Program** include:

- Buildings that cannot be defined as Part 2 or Part 9 of the NBCC (i.e. cottages or recreational properties that cannot be used year round)
- Buildings that have received an incentive through the New Homes program and continue to be occupied by the original owner.
- Buildings, continuing to be owned by the same owner, that have already participated in Efficiency NB's Existing Home's program.
- Building owners, who have received funding through the Energy Efficiency Retrofit Program for Low Income Households, cannot submit an application to **Residential Energy Efficiency Program** for the same building.
- Buildings constructed after January 1, 2011.

An owner of an eligible building may apply for funding only **once** for that building.

7. Residential Energy Assessment service cost

Single Family Home	Total Cost	Building Owner Portion	Efficiency NB Portion
Pre-Upgrade assessment	$300	$150	$150
Post-Upgrade assessment	$220	$110	$110
	$520	$260	$260

Large Homes (more than 4000 square feet)	Total Cost	Building Owner Portion	Efficiency NB Portion
Pre-Upgrade assessment	$400	$250	$150
Post-Upgrade assessment	$260	$150	$110
	$660	$400	$260

Multi Unit Residential Buildings

# of units	Total cost	Pre – Upgrade assessment - owner	Pre – Upgrade assessment - ENB	Post – Upgrade assessment - owner	Post – Upgrade assessment - ENB
2-3	$700	$260	$260	$90	$90
4-6	$1000	$375	$375	$125	$125
7-9	$1300	$485	$485	$165	$165
10-12	$1500	$550	$550	$200	$200
13+	$1750	$640	$640	$235	$235

Non Residential, Part 9 NBC up to 6500 square feet	Total Cost	Building Owner Portion	Efficiency NB Portion
Pre-Upgrade assessment	$400	$260	$140
Post-Upgrade assessment	$260	$160	$100
	$660	$420	$240

8. Whole Home Incentive

The Whole Home Incentive is designed to support building owners who are interested in pursuing more significant energy reductions than could be achieved by completing only one or two upgrades.

If a building owner decides to complete upgrades from three of the four major categories, the Whole Home Incentive is triggered. The four major categories are:

1. Central Heating System,
2. Ceiling Insulation (Minimum 60% of ceiling area)
3. Main Wall Insulation (Minimum 60% of wall surface) and
4. Basement Insulation (Minimum 60% of wall surface).

In buildings that implement upgrades to three of the four major categories, it is possible to reduce a building space heating energy consumption by 50%.

Once triggered, WHI allows all upgrades to be incented at a higher rate. (Please see Incentive table found in Section 12). The maximum incentive payable is increased to $6,000 by WHI.

For building owners who took advantage of the Direct Entry-Heating Systems option, this upgrade would count towards initiation of WHI.

9. Multiple Unit Residential Buildings (MURBs)

MURBs (sometimes referred to as apartment buildings) will access Residential Energy Efficiency Program through the same process as single family homes. While the program generally treats the two types of building the same, there are some differences. They include:

- MURBs will have access to a multiplier, based on the number of units, for insulation upgrades. This is intended to recognize that MURBs generally have more surface area to upgrade.
- To trigger the Whole Home Incentive, it is possible to substitute a Mini-Split Heat Pump for a Central Heating System. To access this flexibility, the units must be installed in at least 60% of the units.
- With prior approval from Efficiency NB, building owners can receive an additional incentive for achieving a Net Zero level of upgrades.

The table below outlines the various Residential Energy Efficiency Program maximums and multipliers associated with MURBs.

# of Units	2-3	4-6	7-9	10-12	13+
Maximum Single Measure Incentive	$6,000	$12,000	$18,000	$24,000	$30,000
Maximum Whole Home Incentive	$7,000	$14,000	$21,000	$28,000	$35,000
Net Zero Bonus	$4,000	$8,000	$12,000	$16,000	$20,000
Insulation Multiplier	NA	2	3	4	5

10. Mixed Use Buildings (MUBs)

A Mixed Use Buildings is any residential building that is occupied by both residential, and commercial, retail, and other business operation. Such operations must not make use of equipment not typically found in residential buildings. (For example Commercial freezers, laundry units or kitchens).

For the purposes of participating in Residential Energy Efficiency Program, a MUB is a treated as a MURB. For example, a two story MUB with 4 apartments on the second floor and 2 retail operations on main floor would be treated as if it were a 6 unit MURB.

11. Non Residential, Part 9

Single use buildings constructed under Part 9 of the National Building Code (no more than 3 stories tall, and a footprint of less than 600m^2), that are not used for residential purposes can participate in Residential Energy Efficiency Program. The maximum area of this type of participating building is **6458 square feet**. This opportunity only exists if the occupants are not using non-residential equipment (For example Commercial freezers, laundry units or kitchens). For buildings that exceed the maximum area or have commercial equipment please refer to Efficiency NB's Commercial Sector Programs.

12. Net Zero Retrofits

It is possible for a building owner to upgrade their building so that it produces as much energy as it uses. With prior approval and guidance from Efficiency NB, building owners achieving a Net Zero goal, can receive a bonus in addition to other incentives provided. The bonus varies with the type of building (Single family Home $4,000, and for MURBs and MUBs it is $4,000 to $20,000).
For more information relation to Net Zero retrofits, please contact Efficiency NB at 1-866-643-8833.

13. Direct Entry – Central Heating Systems

Procedures under development - full implementation to follow

For Single Family Home owners who are only interested in upgrading their central heating system, it is possible to access an incentive without undertaking a Pre-Upgrade Assessment. Such applicants are still considered to be program participants and as such, the equipment installed must meet the same eligibility standards.

Paperwork detailing the equipment installed as well as the equipment being replaced must be completed by the Registered Heating Contractor. That confirmation along with a completed application form must then be submitted by the building owner to qualify for an incentive.

Efficiency NB strongly encourages program participants to undertake to the Pre-Upgrade assessment process to determine what other upgrades could be considered. Participation in the Direct Entry option does not preclude a subsequent application to the Residential Energy Efficiency Program for incentives relating to further upgrades, if the appropriate assessment has been completed.

Installation of Geothermal System, where there was none, before continues to require a Residential Energy Assessment. Replacement of a Geothermal system is eligible for Direct Entry. This method is not available to MURBs

14. Incentive Table

Major Upgrades (complete 3 major upgrades - one per category - to qualify for WHI)	**Central Heating**		
	Item	**Single**	**Whole Home Incentive WHI**
	Oil/Gas/Wood/Pellet Furnace	$500	$600
	Oil/Gas/Wood/Pellet Boiler	$750	$900
	Geothermal	**$5,000**	**$5,000**
	Geothermal - replace	$1,500	$1,800
	Integrated Mechanical System	$1,500	$1,800
	Air Source Heat Pump - ducted	$1,500	$1,800
	Basement Insulation (crawlspace is calculated as 50% of basement incentive)		
	Basement: R-10	$1,000	$1,200
	Basement: R-20	$1,500	$1,800
	Ceiling Insulation		
	Ceiling: R-10	$250	$300
	Ceiling: R-20	$500	$600
	Ceiling: R-40	$1,000	$1,200
	Wall Insulation		
	Walls: R-6	$1,000	$1,200
	Walls: R-10	$2,000	$2,400
	Walls: R-20	$3,000	$3,600
Other Upgrades	**Space Heating (1 per Dwelling Unit)**		
	Gas/Wood/Pellet Stove and Inserts	$500	$600
	Air Source Heat Pump – ductless	$500	$600
	Hot Water		
	Condensing/Instantaneous Gas Indirect Oil fired Domestic Hot Water	$500	$600
	Solar Domestic Hot Water	**$2,500**	**$2,500**
	Windows and Doors		
	Windows: Zones B-C	$40	$50
	Windows: Zone D	$60	$80
	Doors: ENERGY STAR	$40	$50
	Other		
	Drain Water Heat Recovery	$200	$240
	Heat Recovery Ventilator	$500	$600
	Heat Recovery Ventilator + Ducts	$1,500	$1,800
	Exposed Floor: R-20	$250	$300
	Basement Floor Header: R-20 Basement Slab: minimum 1” type 1 foam	$150 $250	$180 $300

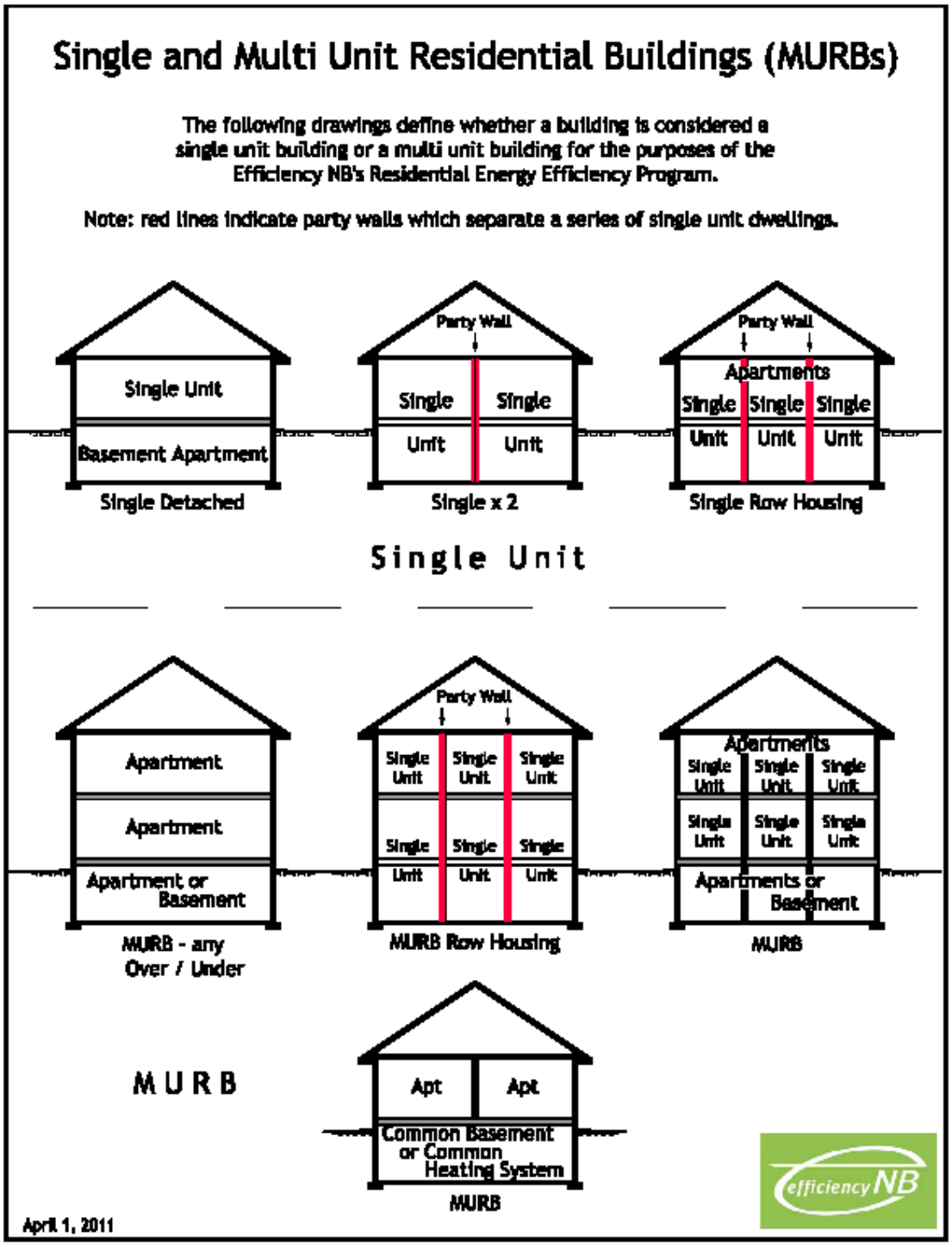
Note: as discussed in Section 9 of this Guideline, MURB’s are subject to a multiplier associated with insulation upgrades.

Appendix A - Residential Energy Efficiency Program –Minimum standards

Upgrade Measure	Fuel	Program Standard
Heating System		
Furnace	Gas	AFUE 94%
	Oil	ENERGY STAR Qualified
	Wood	CSA B415 or EPA, min 75% efficiency ,and max **4.5 g/hr or 0.4g/Mj**
	Pellet	All Qualify
Boiler	Gas	ENERGY STAR Qualified
	Oil	ENERGY STAR Qualified
	Wood	CSA B415 or EPA, min 75% efficiency ,and max **4.5 g/hr or 0.4g/Mj**
	Pellet	All Qualify
Air Source Heat Pump - ducted		ENERGY STAR Qualified
Air Source Heat Pump - ductless		ENERGY STAR Qualified
Geothermal heat Pump		ENERGY STAR Qualified
Stove and fireplace inserts	Wood	CSA B415 or EPA, min 75% efficiency ,and max **4.5 g/hr or 0.137g/Mj**
	Pellet	All Qualify
	Gas	Fuel Efficiency FE 70%
Integrated Mechanical System	Gas	ENERGY STAR Qualified
Hot Water		
Instantaneous	Gas	Energy Factor EF 0.86
Condensing	Gas	Thermal Efficiency of 90%
Indirect	Gas/Oil	with qualifying boiler, min 2" insulation
Desuperheater		with qualifying geothermal system
Solar Thermal		**For Homes**: CSA F379 and 7GJ annual capacity **For MURBs:** CSA F379 and 4GJ per-unit
Drain Water Heat Recovery		40% Recovery Efficiency
Ventilation		
Heat Recovery Ventilator		HVI certified or ENERGY STAR Qualified
Windows + Doors		
Zone B		ENERGY STAR Qualified
Insulation		
Basement, R-10		Add minimum R-10 nominal value, minimum 20%
Basement, R-20		Add minimum R-20 nominal value, minimum 20%
Attic, R-10		Add minimum R-10 nominal value, minimum 20%
Attic, R-20		Add minimum R-20 nominal value, minimum 20%
Attic, R-40		Add minimum R-40 nominal value, minimum 20%
Walls, R-6		Add minimum R-6 nominal value, minimum 20%
Walls, R-10		Add minimum R-10 nominal value, minimum 20%
Wall, R-20		Add minimum R-20 nominal value, minimum 20%
Basement Floor header		Add minimum R-20 nominal value
Exposed Floor		Add minimum R-20 nominal value (min 150 sq ft)

Large MURBs may require heating systems whose size (output capacity) exceeds the scope of the ENERGY STAR program. The use of non-ENERGY STAR systems in large MURBs must be approved by the Energy Advisor prior to installation.

Appendix B


Single and Multi Unit Residential Buildings (MURBs)
The following drawings define whether a building is considered a single unit building or a multi unit building for the purposes of the Efficiency NB's Residential Energy Efficiency Program.
Note: red lines indicate party walls which separate a series of single unit dwellings.
Single Unit
Basement Apartment
Single Detached
Party Wall
Single
Single
Unit
Unit
Single x 2
Party Wall
Apartments
Single
Single
Single
Unit
Unit
Unit
Single Row Housing
Single Unit
Apartment
Apartment
Apartment or Basement
MURB - any Over / Under
Party Wall
Single Unit
Single Unit
Single Unit
Single
Single
Single
Unit
Unit
Unit
MURB Row Housing
Apartments
Single Unit
Single Unit
Single Unit
Single Unit
Single Unit
Single Unit
Apartments or Basement
MURB
MURB
Apt
Apt
Common Basement or Common Heating System
MURB
April 1, 2011
efficiency NB