Encouraging Energy Efficiency in Existing Homes

CHBA Task Group on Encouraging Energy Efficiency in Existing Homes – – Synthesis Report –

Canadian Home Builders' Association

1. Introduction

This paper reports on the special meeting of a Canadian Home Builders' Association Task Group, held Tuesday, October 5, 2010, 8:30 a.m. – 4:30 p.m. at the Crowne Plaza Hotel in Ottawa, Ontario.

1.1 Task Group meeting: Purpose

The CHBA's Task Group meeting was held to garner the experience of professional renovators in identifying the full range of ways for government to encourage and support homeowner investment in energy efficiency upgrades in existing homes. The focus was on what works and what doesn't, and what this industry thinks an effective, cost efficient, coordinated, 'SMART government' approach should contain – including how to engage the capacities of the renovation sector to accomplish the goals.

1.2 Focus on Energy Efficiency in Existing Homes

Approximately 15% of Canada's energy is used in homes.

The residential sector has taken huge steps over recent decades to improve the energy performance of both new and existing homes.

In relation to new homes, a number of voluntary, market-driven initiatives including R-2000, ENERGY STAR, Built Green, GreenHouse and others are used by new home builders and developers in their projects.

In relation to existing homes, energy retrofit activities, and improved product and equipment performance have resulted in a steady improvement in the energy efficiency of existing stock since the 1990s.

The combined impact of these trends meant that the residential sector was one of the few sectors of the economy which, by 2005, actually achieved the Kyoto targets for reductions in greenhouse gas emissions.

While improvements in the energy performance of existing homes have been ongoing, the process has been gradual, and there is considerable additional efficiency potential yet untapped. Various marketing, consumer education and incentive programs have had a positive impact, and owners often include some energy upgrades now when they are renovating. More recently, the ecoENERGY Retrofit – Homes program has created considerable energy retrofit momentum in the marketplace.

Improving the thermal performance of existing homes has been identified as a key priority by most governments across the country. Moving forward, the challenge will be to maintain and build on the current market momentum.

1.3 Impact of the ecoENERGY Retrofit – Homes program

The federal government's ecoENERGY Retrofit - Homes program, introduced in 2006 and considerably expanded after the international economic crisis hit, has had a huge impact in building "energy literacy" and spurring energy retrofit actions amongst owners of existing homes. A recent evaluation for Natural

Resources Canada (NRCan) calculates that one in every 20 houses in Canada has taken part in the program, with a very low level of 'free ridership'[1].

The program offered homeowners incentives for upgrading energy efficiency(EE) in their homes. To qualify, they had to obtain an EnerGuide Rating System (ERS) evaluation of their home prior to undertaking retrofit measures. The evaluations were based on site inspections which includes measurement of the home's air leakage rate using a blower door test, performed by NRCan-certified energy advisors (CEAs).

The CEAs provided homeowners with a customized report for their home, including a checklist of recommended retrofits to improve its energy performance. Grants were available, depending on which retrofit measures the homeowner completed, with the amount of the grant varying by retrofit measure. There were several options for various types of retrofit, such as air sealing the home to improve air tightness, replacing existing heating, cooling, ventilation or water heating equipment with high efficiency alternatives, upgrading insulation in ceilings, exterior walls, exposed floors and basements/crawl spaces, upgrading to ENERGY STAR doors and windows, and replacing existing toilets with low flow units.

A second, post-retrofit evaluation had to be performed after the work was completed to verify upgrade results and support the homeowner grant application.

Initially, the ecoENERGY Retrofit – Homes program had a budget of $160 million over four years, and was expected to reach 140,000 households. Following the international economic crisis, ecoENERGY was incorporated into the federal government's Economic Action Plan, and the program received three significant budget increases, bringing total funding to $745 million. The target for participation grew to 520,000 households.

Many provinces also introduced complementary grant incentives based largely on the ecoENERGY Retrofit – Homes program criteria. In addition, both utilities and retailers introduced incentives and service initiatives that built on the program. And for some time these programs dovetailed with the Home Renovation Tax Credit (HRTC), which was receiving lots of visibility from advertising by stores and contractors.

As a result of these factors, consumer demand for the ecoENERGY Retrofit - Homes Program far outstripped expectations, aptly demonstrating that a high level of marketplace momentum had been achieved. As a result of this demand, NRCan stopped accepting new bookings for pre-retrofit evaluations on March 31, 2010 in order to stay within its budget allocation for the program.

1.4 Federal review of Energy Efficiency Programs

Federal government funding for all of the various ecoENERGY grants and incentives ends on March 31, 2011, with the completion of the current program's five-year plan. In its 2010 federal budget, the government indicated that it would review its EE programs. It is hoped that a 'next generation' of ecoENERGY initiatives will be introduced by the federal government, but the scope and nature of such initiatives is not yet known.

[1] 'Free ridership' is the term used for situations where people obtain government incentives for work they would have done anyway.

It is understood that Natural Resources Canada (NRCan) is currently examining various options for future programming, including measures for the home retrofit market. It is anticipated that the federal government will evaluate these options in determining the future scope and nature of its EE programs aimed at existing housing. There is a consensus among interested parties that there is a need for the continued development and availability of the EnerGuide Rating System, as it provides the "backbone" for any home energy retrofit activity. It has also been noted by many interested parties that there remains a need to maintain some level of consumer incentives in order that current market momentum is not lost.

NRCan is also currently involved in three "next generation" initiatives to update the EnerGuide Rating System, the R-2000 Initiative and the ENERGY STAR for Homes program. These activities are underway and involve a broad range of interested parties in an open, consensus-based process.

2. Experience to Date

The Task Group discussions started with a review of renovators' experience with the existing ecoENERGY Retrofit – Homes program and related initiatives. Participants identified a number of strengths and some weaknesses. They can be broadly grouped under three headings: Consumer education and marketing, 'Fit' with the market and industry, and Focus on additional energy efficiency.

2.1 Consumer education and marketing

What worked	What didn't
• Overall, consumer energy literacy increased. • Convergence of various programs and incentives created a high degree of awareness and considerable momentum in the marketplace. • Although NRCan does not do much advertising, work done by its partners, provinces and utilities, industry and retailers all combined to create a strong marketing effort. • The size of the various incentives offered under this and complementary programs – especially the HRTC with its fairly short deadline – attracted significant consumer and industry interest. • The ERS energy evaluations themselves helped increase knowledge about energy efficiency in existing homes, and options for increasing performance. • There was effective use of information materials from CHBA, CMHC and others.	• It was difficult to keep track of the status of various government and utility programs, and how they interacted, and to navigate the processes. • There was no central clearinghouse for program information covering all levels of government and utilities – it was difficult for renovators and homeowners to determine what incentives were available. • While the checklists and ratings were relatively simple, the level of complexity in other information made it too confusing. • There appeared to be a lack of focus, with programs trying to tackle multiple objectives.

• Many homeowners did their own research as well, and used the on-line resources available from governments and industry. • There is more, and better, consumer information on energy efficiency available as a result of ecoENERGY. • EE became 'top of mind' – which spilled over into the new home market as well.	

2.2 Fit with the market and industry

What worked	What didn't
Supply and demand • The program fit well with market trends – there are a growing number of people doing renovations who can improve their energy efficiency at the same time. • As discussed above, the programs and incentives created a high degree of consumer awareness, knowledge and demand. • Clients who took advantage of ecoENERGY ranged from established couples to first-time buyers purchasing a lower-cost home to renovate before moving in. • Government reporting requirements, such as requiring invoices under the HRTC and ecoENERGY, helped to discourage 'cash' under-the-table deals. Fit with industry processes • It also fit well with the renovation process – significant EE can be added to many renovation projects early in the design. • A number of clients had their ERS evaluations done before talking to a renovator, and were already interested in upgrading energy efficiency and equipment; where clients had not had the ERS evaluations, renovators could recommend them. • The audits were a useful pre-design tool. • Government support of the audit program also opened doors for renovators to discuss	• Problems with getting information (identified above) also affected the industry – it became difficult for renovators to advise their clients on grant availability. • Renovators often led by recommending energy audits, but only homeowners could get them done. • A checklist approach can undermine the 'house-as-a-system' approach; e.g., air sealing an older home and removing its naturally aspirating furnace in favour of a direct draft unit can create moisture problems. • Smaller projects are often done by 'Do-It-Yourselfers' and small 'Handyman' contractors, who are less likely to understand 'house-as-a-system' issues. • The quick increase in demand for ERS evaluations created a short-term shortage of qualified evaluators. • The quality of evaluation advice provided to homeowners by CEAs was varied, suggesting that more rigourous training and accreditation standards for CEAs was needed.

larger renovations or a staged program of renovations. Changing client perspectives • The program was successful in getting consumers to consider the idea of upgrading major energy systems, such as furnaces, sooner in order to achieve energy savings. • The 'checklist' approach was relatively simple and easy to understand, which helped to grow the market. Training and jobs • The program helped to create and build considerable capacity in a new profession (retrofit energy consultants and evaluators). • It saved or created a lot of other jobs in the renovation and building materials industry.	

2.3 Focus on additional energy efficiency

What worked	What didn't
• Because of the awareness and incentives, people decided to do more than they had originally intended – this was especially evident with equipment like furnaces. • The measures with the biggest impact on energy efficiency were generally the ones eligible for the most incentives (i.e., furnaces). • There weren't too many 'free riders'; in fact, many homeowners did the EE upgrading without applying for incentives, or did more, or decided to upgrade ineligible homes as well (e.g., cottages). • The program did not promote use of untried technologies with questionable pay back and long-term reliability.	• The simple checklist approach can result in inefficient measures (for example, people could get incentives for putting in a higher efficiency furnace without doing all the air sealing that would make it work best). • The incentive structure, which focused on individual measures, could lead to lack of proper consideration of 'house-as-a-system' interactions, with some risk of unintended consequences, such as increased indoor moisture levels.

3. Essential Elements for Future Programs

After discussing their experience with the federal ecoENERGY Retrofit – Homes program, Task Group participants agreed that they would not confine themselves to making recommendations for a successor to that specific program. Instead, they would try to define what an ideal program for encouraging energy efficiency in existing homes should contain, and how it might work.

These discussions did not produce formal recommendations; rather, they suggested features which should be considered.

There appeared to be strong support of a coordinated approach whereby governments could work with the residential construction industry and partners such as energy utilities, manufacturers, realtors, etc. The key goal would be to create an environment that continues to motivate consumers to upgrade their homes through the use of effective market- and science-based programs and tools. In the short-term, continued prudent provision of homeowner incentives is likely essential if momentum is to be maintained. In the longer-term, the goal must be to achieve a level of market transformation that makes incentives unnecessary.

Two important tools in this effort are the EnerGuide Rating System (ERS) and the CEAs who deliver this service. ERS is a critical tool for achieving continued improvement in the energy performance of existing homes, and ongoing management of the ERS by the federal government ensures that it will remain independent, credible, and objective.

Suggestions came together around five key themes: Education and Training, Communications and Marketing, Technical Issues, Monetary Considerations and Processes.

3.1 Education and Training

An ideal program would include a credible, continuous, national education and training program with these elements:

1. Consumer information:
    - web-based access to information on how upgrades can improve their homes, different technical options and approaches, factors for making decisions, why and how to find trained experts, and the availability and criteria for government and utility incentives.

2. Renovator and Trades training:
    - more formal training programs for certain trades and renovators including in-class sessions, focused on technical details of upgrading existing homes' energy efficiency and new approaches, along with relevant 'house-as-a-system' building science; leading to a form of recognition such as a certificate; delivered through a credible agency such as NRCan.

3. Energy Evaluator training:
    - expanded and more structured training, including relevant 'house-as-a-system' building science, analysis/prioritizing of options and problem avoidance; ideally, this should lead to professional designation of CEAs as an occupational group.

There would need to be an umbrella structure to oversee the education and training, and monitor results. Consumers would be aware that there are programs, certificates, lists of experts or similar 'evidence' they can ask for and trust, showing that renovators, trades, and evaluators can actually do what they say they can do. People taking the training could expect good, ongoing career opportunities.

Getting there:

An action plan for this type of education and training approach would include:

1. Internet-based Consumer and Industry education and information centre:
    - collection of existing information
    - partnerships to feed in new information on a timely basis
    - tools to make the information more useful: comparisons, checklists, reports, database
    - log-in sections where people could access their own ERS house evaluation data and explore their options

2. Renovator/trades training:
    - linkages with effective training organizations and programs like R-2000 training
    - creation of relevant curriculum and content (mix of classroom and web)
    - appropriate evidence of training/expertise (completion certificates, accreditation, or similar, with appropriate system for testing/grandfathering those with required expertise)

3. Energy evaluator training:
    - review of updated EnerGuide Rating System to identify skills required
    - creation of relevant curriculum and content
    - appropriate evidence of training/expertise (completion certificates, independent examination, accreditation, or similar, with appropriate system for testing/grandfathering those with required expertise)

4. Marketing element:
    - training and education would be closely tied to and supported by communications and marketing efforts

3.2 Communications and Marketing

An ideal program would include a broad and coordinated communications and marketing initiative producing these results:

1. Increased energy literacy in the general population:
    - people know about and are able to discuss the value and key elements of energy efficiency for existing homes

2. Wide knowledge and acceptance of the program(s) by consumers and industry:
    - clear understanding of program(s) value, elements, and processes

3. Cooperative action by governments, industry, partners:
    - cohesive structures, no conflicting messages

Getting there:

An action plan for this type of communications and marketing approach would include:

1. Structure:
    - identify and bring on board the key participants and partners with identified roles in communications and marketing
    - coordinate program details and messaging
    - include systems and information that industry can use in their own marketing
    - target smaller markets as well as larger ones
    - explore different delivery vehicles (utility bills, etc.)
    - evaluate results

2. Messaging:
    - identify the successes of the existing programs and incorporate them into the new program
    - develop key simple/basic messages on the value of energy efficiency; e.g., tighter building envelope, proper ventilation, appliances sized properly
    - develop more detailed messages on how to pursue it (e.g., awareness of training programs/trained experts and how to contact them, importance of R-2000-type certification and third-party validation, database of products and approaches)
    - produce a major marketing campaign, in consultation with all parties, that will reinforce and build on the momentum already in the marketplace in relation to home energy efficiency
    - include clear information on all aspects of the retrofit initiatives, from all partners
    - refer people to the internet-based information centre, recommended in Education and Training, above

3.3 Technical

An ideal program would support ongoing technical information, research and development including these elements:

1. Research and Development:
    • partnerships and a long-term commitment to R&D that can deliver/verify new and innovative technology for retrofit energy efficiency

2. Information Source:
    • easy-to-use database of testing information, demonstrations of systems, products, etc., with tools to compare

3. Flexible, science-based program requirements:
    • practical, efficient and accommodates innovation without introducing unacceptable risk

4. More formalized auditing process and system of delivery:
    • possible R-2000-type of program for retrofit; expanded requirements/training for energy evaluators, with professional designation

Getting there:

An action plan for this type of technical support would include:

1. Research and Development:
    - form partnerships with industry, government, partners and research/educational institutes to identify avenues of R&D, prioritize and undertake R & D projects
    - communicate results

2. Information Source:
    - develop internet-based resources as discussed under Information Centre, in Education and Training, above
    - make sure information is updated regularly in consultation with program partners

3. Technical Requirements:
    - ensure that homeowners receive more guidance from the experts before setting their retrofit priorities
    - create a single building science platform for both new construction and renovation initiatives
    - have CEAs do more in the way setting out priorities, based on cost-effectiveness, for retrofits for the individual home or recommending a series of projects over the longer term
    - ensure that all rating systems and programs and labels applicable to retrofits meet criteria and standards to ensure credibility and avoid consumer confusion
    - use 'Smart Regulation' principles to encourage innovation
    - integrate initiatives with a computer-based building model capable of flagging timing/logic and risk issues (i.e., depressurization and indoor moisture issues)
    - create documentation over time

4. Auditing Process and System of Delivery:
    - explore opportunities for appropriate linkages between new construction and renovation around energy efficiency programs; e.g., 'R-2000 for Renovation'
    - develop a revised and updated training and policy manual for all auditors that takes into account elements of building science that might not be formally part of a program

3.4 Monetary Considerations (financials, business case, outcomes)

In the short-term (5 years), the continued availability of homeowner incentives will be necessary in order to maintain current marketplace momentum towards energy efficiency. For the longer-term, the goal must be to have energy upgrading in existing homes become a "standard" renovation consideration, reinforced by measures such as mandatory energy rating of a home as a resale disclosure. Reflecting this, the program would consist of:

1. Continued government support to consumers for home energy retrofit measures:
    - continued availability of financial incentives similar in scope to those in the ecoENERGY Retrofit- Homes Program.

2. Government investment and support for "energy efficiency infrastructure":
    • availability of the "next generation" ERS and more professional CEAs, support for consumer and renovator education and training programs, communications and marketing, research, development and demonstration

Getting there:

An action plan to move towards this ideal program would include:

1. Continued incentives offered by government to homeowners:
    - to get consumers interested in making the investment, and overcome low energy prices
    - encouraging 'green financing' options where energy savings can pay for capital costs
    - monitor progress, growth in market demand, etc.

2. Information on the business case for energy retrofits:
    - examples of home improvement options showing savings and impacts on function

3. Interim investments in processes, technical, marketing/communications, and education/training:
    - to build capacity, attract new entrants to green careers, encourage demand and help ensure quality and integrity of services
    - identify 'core elements' of program and provide funding on a more stable, longer-term basis
    - monitor progress, growth in market supply, etc.

3.5 Processes

An ideal program would be run through processes based on these principles:

1. Easy access to information
2. Simple procedures, that fit with the market
3. Support for retrofit approaches that reflect sound building science
4. "Smart Regulation" principles applied, where regulation is a 'last resort'
5. Minimal discrepancy among building code requirements across the country
6. Intergovernmental co-ordination
7. Partnership and cooperation between government and all beneficiaries, including industry, manufacturers, utilities, realtors, municipalities, etc.
8. Reliable funding for core elements
9. Evaluation of progress and objectives, with updating or phasing out of elements as appropriate

Getting there:

An action plan to move towards this ideal program would include:

1. Create partnerships among all beneficiaries to ensure coordination and cooperation:
    - review existing memoranda of understanding between governments to identify weaknesses and address
    - investigate ways to avoid the appearance of chaos caused when requirements for budget secrecy mean participants get no warning of program changes or ending
    - identify those beneficiaries who have not been included to date and bring them on board (i.e., municipalities in relation to water-conservation)

2. Apply 'Smart Regulation' principles:
    - review all program proposals through a 'Smart Regulation' lens (See CHBA Report *Smart Policy Decisions: Implementing Smart Government in the Housing Sector*, updated August 2010, which calls for all proposals for regulation to have to go through a series of steps:
        - prequalify and prioritize issues (make sure there is a real problem and opportunity; assess whether government should take any action; if action is appropriate, confirm that it will reinforce marketplace effectiveness; perform 'triage' to stream proposals by risk level)
        - properly analyze causes and potential solutions (define the issues properly; assemble and provide knowledge; involve the right people; identify and assess options; check whether the market can handle the issue without intervention; if not, look at risk-appropriate actions that support market response; treat laws and regulations as a 'last resort'; make sure cost analysis is useful), and
        - implement effectively (use the least intrusive, cost effective options; ensure accountability)