HEALTHY RETROFITS:

The Case for Better Integration of Children's Environmental Health Protection into Energy Efficiency Programs

Executive Summary

March 2011

CANADIAN ENVIRONMENTAL LAW ASSOCIATION

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Foreword

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More than a decade ago, the partner organizations of the Canadian Partnership for Children's Health and Environment (CPCHE) came together to collectively advance efforts to reduce the known and suspected risks to children's health associated with environmental exposures to toxic chemicals and pollutants. We are convinced that a healthy environment — including the indoor environments where children in Canada spend up to 90% of their time — is essential to enabling children to take their first steps towards lifelong health. We recognize that children living in low-income and disadvantaged circumstances typically bear the greatest burden of environmental health exposures and risks.

Over the past year, with the generous support of the Ontario Trillium Foundation, CPCHE has been working to gain an in-depth understanding of the specific indoor environmental health risks associated with renovation and retrofit projects aimed at increasing home energy efficiency. This research has revealed that there is much work to be done — together with much interest and commitment among stakeholders — to ensure that, as we invest in making homes more energy efficient, we seize the opportunity to also make homes healthier and safer for their occupants.

The central theme of CPCHE's work in this area is to strive for a "win–win." We strongly support efforts to promote increased energy efficiency in residential settings as a key element in combating climate change. Within these vital efforts, our goal is to work with others to achieve a greater integration between energy efficiency improvements and indoor environmental health protection measures.

We welcome the publication of this report prepared by the Canadian Environmental Law Association (CELA). CELA is serving as the lead CPCHE partner for this two-year initiative and brings to the project a longstanding focus on the needs of low-income and disadvantaged communities, a wealth of expertise on children's environmental health, and a direct liaison with the Low-Income Energy Network (LIEN) as an active and founding member of both CPCHE and LIEN.

This report provides a baseline assessment of the current situation and an outline of possible opportunities for improvement. As such, it provides a solid foundation for next steps. Drawing upon the findings of this research and the rich input received from stakeholders, CELA has compiled a forward-looking list of recommendations (Chapter 8) that CPCHE partners and others can consider for further work in this area.

The review of energy efficiency programs in Ontario and at the federal level, described in Chapter 6, reveals that these programs, although effective at promoting energy efficiency, largely do not address the potential for increased exposures to toxic substances, such as lead, when existing materials in older homes are disturbed during renovation activities or when new materials containing toxic chemicals are

introduced. Results of our online survey suggest that awareness of indoor environmental health issues among homeowners, landlords and residents is generally low, and that there is an appetite for training and education on these issues among energy efficiency auditors and other building professionals.

Our aim in 2011 is to work with interested stakeholders to increase awareness about the what, why and how of addressing indoor environmental health risks within energy efficiency upgrade projects. We are motivated by our knowledge that preventive measures — such as properly handling leaded paint found in older homes, selecting low-VOC building materials and ensuring adequate air exchange once the building envelope is tightened — are particularly important for protecting the developing fetus and child, given their greater exposure and vulnerability to environmental toxicants.

We look forward to a day when every renovation or retrofit project is embraced as an opportunity to create healthier environments for children and their families. We invite you to join us in these efforts.

CPCHE PARTNERS

Canadian Association of Physicians for the Environment

Canadian Child Care Federation

Canadian Environmental Law Association

Learning Disabilities Association of Canada

Environmental Health Clinic – Women's College Hospital

Environmental Health Institute of Canada

Ontario College of Family Physicians

Ontario Public Health Association

Pollution Probe

South Riverdale Community Health Centre

Toronto Public Health

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Executive Summary

This report is a key milestone within a two-year Ontario-focused project of the Canadian Partnership for Children's Health and Environment (CPCHE) that aims to raise awareness of the risks to fetal and child health from potential exposures to environmental contaminants during and after energy efficiency retrofits. The project also aims to increase awareness among multiple players about measures that can be taken to help reduce these risks.

This report, prepared by the Canadian Environmental Law Association (CELA) as a contribution to the broader project, provides a review and analysis of key issues, programs, educational and policy tools, and gaps. It describes multiple opportunities where greater integration between the field of children's environmental health and energy efficiency initiatives can and should occur, and offers specific recommendations for improvement in education, training and policy.

Children are at greatest risk from toxic exposures; renovation activities can significantly increase this risk

Overall inspiration for this work is concern for children's health due to the multiple toxic contaminants and other health risks that can arise from renovation activities in general, including those done for the sake of improving energy efficiency. More positive inspiration comes from the fact that a "win–win" opportunity is available in which the work done to achieve gains in energy efficiency, if done with a view to improving indoor environmental health, would not only lower greenhouse gas emissions and energy costs, but would also make homes healthier for children and their families. The benefits of such integration would likely be most significant for low-income families who typically bear disproportionate exposures to and health risks from environmental health hazards.

Solid evidence confirms that, compared with adults, children are at greater risk from exposure to environmental contaminants, particularly those that occur indoors where children spend most of their time. Numerous factors, including children's higher respiratory and metabolic rates, their behaviours such as hand-to-mouth activity and the vulnerability of their developing brains and other organ systems, contribute to this greater risk. As well, the developing fetus is especially vulnerable, highlighting the need to limit maternal exposure to contaminants.

Particulate matter in indoor air and contaminants in house dust are priority concerns. There is a lack of both awareness and policy guidance to address these and other key issues, most notably the still very current problem of lead in old paint. These day-to-day risks are known to be even more acute for children living in low-income circumstances due to sub-standard housing conditions, proximity of housing to traffic and industry, and other factors.

Renovation activities including energy retrofits, if not done carefully, can greatly increase indoor contaminant exposures. Renovations may disturb toxic contaminants such as lead, asbestos or polychlorinated biphenyls (PCBs) that are legacies of past product uses and practices. Air sealing or tightening a building can reduce the frequency of air exchange and potentially lead to higher radon levels in indoor air, as well as moisture and mould problems. A tighter building envelope may also allow for more concentrated levels of indoor pollutants, a problem that can be made more acute by the choice of building and renovation materials as well as ongoing consumer product choices after retrofits are completed. Where there is a lack of awareness of these issues and ways they can be addressed both during and after renovations and retrofits projects, health risks can arise, with children and developing fetuses at greatest risk. Conversely, well-executed renovations and energy efficiency retrofits can reduce environmental contaminants, prevent moisture and condensation problems, improve ventilation and comfort, and generally create a healthier indoor environment, in addition to providing the benefits of reducing both greenhouse gas emissions and energy costs.

Analysis of energy efficiency programs reveals insufficient attention to indoor environmental health concerns

Various government-sponsored energy efficiency programs are reviewed in this report, including those provided by the federal and Ontario governments as well as activity at the municipal level. These programs offer grants and incentives to homeowners and businesses to undertake energy efficiency improvements. The federal ecoENERGY Retrofit programs have established the framework for most energy efficiency incentive programs in Canada. Implementation revolves around an initial audit conducted by an energy auditor certified by Natural Resources Canada (NRCan) who assesses the energy characteristics of a home or building and provides recommendations for energy conservation measures.

An important aspect of program success has been the assistance provided to homeowners and businesses by non-governmental or community-based organizations such as Green Communities Canada. Similarly, much progress on larger commercial and/or urban renewal retrofit projects has occurred through the efforts of Leadership in Energy and Environmental Design (LEED) Canada, an industry-sponsored collaboration organized by the Canada Green Building Council.

The federal government estimates that under the ecoENERGY Retrofit — Homes program and its federal forerunners, almost 1 million homes across Canada have been rated for energy efficiency and 400,000 homes have benefited from improved energy efficiency. Between the two main federal programs (ecoENERGY Retrofit — Homes and ecoENERGY Retrofit — Small and Medium Organizations) it is projected that there will be a reduction in greenhouse gas emissions of 0.4 megatonnes. As well, a wide range of educational materials has been created and is available online from these and other provincially based programs.

Many of the energy efficiency programs available in Ontario are in transition; many finished at the end of 2010 while others will end during 2011. Federal programs are being phased out or are ending in 2011. The Ontario Home Energy Savings Program is continuing to offer grants for homeowners despite the phase-out of the federal ecoENERGY Retrofit — Homes program to which it was linked.

While Ontario's utility-based programs, sponsored by Enbridge Gas, Union Gas and the Ontario Power Authority, are also ending, new programs are under development to replace them. Several of these new programs are specifically intended to assist low-income households. At the municipal level, Toronto is the only municipality in Ontario with unique energy efficiency grant programs for both homeowners and multi-unit residential buildings. Other municipalities simply facilitate access to the provincial or federal programs and are often served by non-governmental organizations, such as Green Communities Canada or GreenSaver.

Across all these government or utility-sponsored programs, although ventilation and air exchange evaluations are integrated into energy efficiency programs, other potential indoor air and/or environmental health concerns are not systematically identified. Asbestos and mould may be identified and noted during the energy audit/energy assessment process, but other concerns such as lead, PCBs and radon are usually not mentioned. There is little information available or emphasis on the choice of materials used for energy efficiency retrofits or their potential impact on environmental health. Cautionary advice on the use of chemicals or pesticides in the home after renovations have tightened the building envelope is almost never included in energy efficiency programs.

Research reveals a lack of training, awareness among energy efficiency auditors and other building professionals

Energy efficiency auditors play a key role in energy efficiency program delivery as they are the main point of contact for the homeowners, building owners and managers who are their clients. An online survey conducted as part of the research for this report reveals that existing knowledge on indoor environmental health issues among energy efficiency professionals is generally limited to ventilation issues often coupled with an understanding of moisture-related mould problems and asbestos risks. Knowledge of many other indoor environmental health risks is low, particularly when it comes to lead and other toxic substances. Despite this, these professionals report seeing opportunities to integrate more environmental health information into their work. They recommend the program design stage as the most appropriate place to accommodate such integration.

Survey respondents also noted concerns for liability and lack of authorization to discuss additional environmental health issues in clients' homes beyond those specified in the programs they serve. Other constraints include lack of relevant training and/or lack of authoritative information and guidance, e.g., from the Canada Mortgage and Housing Corporation (CMHC), the source most professionals indicated they rely upon for information about indoor environmental health issues. Concerns raised included issues of information overload, cost and workload increases, and training requirements that would be necessary to integrate a broader range of indoor environmental health issues into their work with clients on energy efficiency improvements.

Current opportunities for improvement

With the phase-out of federal energy efficiency incentive programs, an opportunity exists to assess progress and recommend changes for the future. While this report recommends that these federal programs be renewed and indeed expanded, nevertheless, Ontario-based programs are adjusting to the shrinking federal role and moving forward to implement new requirements flowing from Ontario's *Green Energy Act*. Important progress can occur in Ontario's utility-operated programs since they will expand province-wide and will include a suite of deeper measures, particularly with respect to insulation, of low-income residences.

This evolving situation represents an opportunity to look at the entire approach to encouraging and supporting the adoption of energy efficiency measures. Overall, this report concludes that greater integration of indoor environmental health issues into energy efficiency programs can and should occur. Moreover, there is a need to properly address legacy contaminants, such as lead, during *any* renovation activities.

The greater risks faced by children from exposure to environmental contaminants on a daily basis, and the potential for increased exposures to arise from renovation activities such as energy efficiency retrofits, underscore the need for greater awareness and policy guidance in several areas. The solutions are reasonably straightforward and a "win–win" proposition. Moreover, this research reveals a growing surge of interest in linking these two streams of effort in the interest of improving the health and living circumstances of families in Canada while taking meaningful action on climate change.

Opportunities for improvement are identified in five areas — program design, auditor training, program coverage, educational activity, and supporting policy — with a series of recommendations made to address these issues. More detailed advice from stakeholders about future educational efforts and policy and program implementation is captured in Chapter 8 in support of the specific recommendations.

Recommendations

The following recommendations derive from the research and stakeholder consultation conducted for this report. The overall objective of these recommendations is to seek the integration of the two broad issue areas discussed in this report – indoor environmental health and energy efficiency retrofits - by identifying specific opportunities for improvement.

The recommendations are directed to the following diverse groups or individuals as they engage in energy efficiency issues and activities:

- government agencies, energy companies/ utilities and others responsible for the design of energy efficiency programs
- energy efficiency auditors and other energy efficiency professionals
- energy efficiency program delivery agents
- builders, contractors, renovators and interior designers, including their industry or trade associations
- educators involved in vocational training and apprenticeship programs for builders, contractors, renovators and interior designers
- retailers supplying the home building and renovation industry
- home inspectors, real estate agents and loan/ financial institutions involved in real estate transactions
- landlords, building owners and managers
- municipal public health and waste management departments
- non-governmental organizations

Design of Energy Efficiency Programs:

1. Government agencies, energy companies and others responsible for the design of energy efficiency programs should make indoor environmental health an integral part of program objectives and deliverables.

2. Program design improvements should include

   - expansion of the "whole building" or "building as a system" concept in energy audits to more comprehensively address energy, safety and environmental health concerns
   - allowance for a portion of energy efficiency program funding to be applied to health and safety hazards encountered during audits, particularly within programs designed for low-income housing.

3. The federal government should renew and expand the scope of its ecoENERGY programs by integrating the multiple indoor environmental health issues raised in this report, and developing national sectoral targets, for example, reaching a level of 15% of all Canadian homes retrofitted by 2015, including 130,000 low-income households, by investing $1.25 billion over five years, as recommended by the Green Budget Coalition.[1]

4. The Ontario Energy Board, the Ontario Power Authority, and Ontario's utilities should ensure that program design currently underway for a province-wide weatherization program for low-income families integrates the multiple indoor environmental health issues raised in this report.

Auditor Training:

5. The federal government's NRCan training module for energy efficiency auditors is a trusted resource for energy auditors that should be expanded to include the following:

   - A module explaining the greater vulnerability and exposure of children to environmental contaminants, particularly indoors, with an emphasis on indoor

particulate matter and dust as primary exposure media for children. The module should emphasize the potentially dangerous exposures that can arise from renovation and retrofit activities.

- A module explaining the potential sources, indoor exposure pathways and prevention/control options for indoor environmental health concerns beyond those already addressed in NRCan training, including lead in paint, PCBs in old caulking, radon, and VOCs in new building materials.

Effectively Reaching Diverse Audiences:

6. A national focal point for healthy and energy efficient housing should be designated. A key role for this entity would be to integrate and make accessible to building professionals and the public all existing government information, guidance and regulations pertaining to indoor environmental health concerns as well as energy efficiency measures. The national focal point could be within a federal department (e.g., CMHC) or a designated, federally supported non-governmental entity.

7. A consolidated set of protocols, encompassing both regulations and guidance, should be developed for Canada, similar to the US Environmental Protection Agency's draft Healthy Indoor Environment Protocols for Home Energy Upgrades.

Improved Training, Guidance and Requirements for Specific Contaminants:

Lead Paint Remediation:

8. Drawing on elements of the US Renovation, Repair and Painting Rule, and in collaboration with the Provinces and Territories, mandatory requirements should be established across Canada for the training, certification and conduct of lead paint remediation activity, with these requirements applicable to all renovation activities, including but not limited to energy efficiency retrofits.

9. Diverse federal government educational materials addressing lead in paint should be reviewed and updated to provide a single and unambiguous message about the danger of lead in any paint applied prior to 1978, accompanied by educational materials about safe lead remediation practices that draw upon excellent resources already available in the US and from CMHC.

10. The federal government should immediately lower the blood-lead intervention level to recognize current scientific consensus that there is no safe level of lead exposure for fetuses and young children.

Mould Remediation:

11. CMHC should expand its Indoor Air Quality training program to provide certification for contractors so homeowners have a more reliable means of evaluating the credentials of those offering indoor air quality or mould remediation services.

Handling of Caulking Material Likely to Contain PCBs:

12. To control exposure to PCBs, Canada should issue guidance, similar to that of the US Environmental Protection Agency, on the proper maintenance, removal, and disposal of caulking materials likely to have been installed prior to 1978.

Radon Safety:

13. Canada should integrate into energy efficiency training and programs educational outreach activities about home radon testing and corrective measures.

14. Retailers should make cost-effective radon testing kits more widely available and use Health Canada's educational materials to promote them at point of sale.

Raising Awareness and Improving Labelling Requirements for Products Containing Toxic Substances:

15. The federal government should revise the *Hazardous Products Act*, or its replacement provisions contained in the *Canada Consumer Product Safety Act*, once that law is in force, to expand the information required on product labels to include listing of substances known to be associated with chronic toxicity, including cancer and developmental and reproductive harm.

16. In addition to improved labelling, government, manufacturers and retailers all have roles to play in enabling contractors, builders and do-it-yourself homeowners/residents to make more informed choices, including choosing safer alternatives, when purchasing surface coatings, adhesives and other building/renovation materials. Point-of-sale information on product hazards, information sessions for contractors and do-it-yourselfers, and product rating schemes are among the possible measures that would support informed purchasing and use of building/renovation materials.

Endnotes

1 Green Budget Coalition (2010) *Recommendations for Budget 2011*. http://www.greenbudget.ca/2011/main.html

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