

Conserving the Planet Without Hurting Low-Income Families:
***Options for Fair Energy-Efficiency Programs for Low-Income
Households***

A report for the Energy Poverty Initiative of the Climate Justice Project
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Abbreviations

AEE = Agence de l'efficacite energetique due Quebec (the Quebec Energy Efficiency Office)

AMFP = (New York) Assisted Multifamily Program

AMP = (New England) Appliance Management Program

BC SEA = British Columbia Sustainable Energy Association

BCUC = British Columbia Utilities Commission

CERT = (U.K.) Carbon Emissions Reduction Target

CESP = (U.K.) Community Energy Saving Programme

CFL = Compact Fluorescent Lamp

CMHC = Canadian Mortgage and Housing Corporation

CPUC = California Public Utilities Commission

DECC = (U.K.) Department of Energy & Climate Change

DHP = (U.K.) Decent Homes Programme

DOE = (U.S.) Department of Energy

DSM = Demand-Side Management

DSMR = (2008 B.C.) Demand-Side Measures Regulation

ECAP = (BC Hydro) Energy Conservation Assistance Program

EEC = (Terasen Gas) Energy Efficiency and Conservation (program)

EMA = (California) Energy Management Assistance (program)

GEA = (Ontario) Green Energy Act

HEEP = Household Energy Efficiency Program

kWh = Kilowatt-hours

LICs = Low-Income (Energy) Consumers

LICO = Low-Income Cut-Off

LIEEP = Low-Income Energy Efficiency Program

LIEN = (Ontario) Low Income Energy Network

LIHs = Low-Income Households

LIHEAP = (U.S.) Low-Income Home Energy Assistance Program

LISF = (Vermont) Low-Income Single Family Service

LSLIP = LiveSmart (B.C.) Low-Income Program

NYSERDA = New York State Energy, Research, and Development Authority

OEB = Ontario Energy Board

OPA = Ontario Power Authority

REAP = (Nova Scotia) Residential Energy Affordability Program

SBC = System Benefits Charge

SCE = Southern California Edison

SHRRP = (Ontario) Social Housing Renovation and Retrofit Program

UCA = (1996 B.C.) *Utilities Commission Act*

WAP = (U.S.) Weatherization Assistance Program

WHO = World Health Organization

Executive Summary

Energy Poverty, often defined as when a household must spend 10% or more of its after-tax income on home energy, affects approximately 17% (297,000) of British Columbia homes. It contributes to respiratory, cardiovascular, and other health problems, as well as excess winter deaths. Energy Poverty forces vulnerable British Columbians to choose between daily necessities, such as foregoing heat so that they can afford groceries. Many jurisdictions have rightly recognized Energy Poverty as a serious problem demanding concerted treatment. For example, the United Kingdom has committed to eradicating Energy Poverty by 2018.

Energy Poverty is prevalent among certain types of households, including: those with single residents, seniors, children or young adults, and a female primary bill-payer; households in the Lower Mainland; and renters. Persons in such households are also more likely to live in drafty homes with single-paned windows and no low-flow showerheads.

There are three aspects to the problem of Energy Poverty: household energy efficiency, fuel prices, and household income. This paper addresses household energy efficiency. Not only will improving energy efficiency in low-income households (LIHs) reduce Energy Poverty by lowering energy consumption and bills, it will also decrease greenhouse gas emissions and mitigate climate change. Low-income energy efficiency programs (LIEEPs) also generate numerous other benefits, including reduced healthcare and energy-infrastructure costs, and more job opportunities. Given the problems pertaining to Energy Poverty and the benefits of addressing it, it is not surprising that LIEEPs have become increasingly important in Canada and abroad.

British Columbia incorporates general household energy efficiency programs (HEEPs) into its overall conservation strategy. However, such undifferentiated programs can deepen Energy Poverty, if not tempered by provisions that address LIHs. Yet, the province and its utilities still lack

comprehensive LIEEPs. These targeted programs are needed to overcome barriers to low-income peoples' participation in energy efficiency programs, such as the affordability, awareness, and acceptance of programs, as well as incompatible living arrangements (for example, many renters are not eligible for existing programs). Targeted programs can help overcome LIHs' weak participation in traditional, incentive-driven energy efficiency programs.¹ Critically, LIEEPs also avoid the injustice of low-income people funding mainstream HEEPs through their rate payments, when they themselves cannot afford to take advantage of such energy efficiency programs.

There are numerous examples of average and exemplary LIEEPs across Canada and in other jurisdictions, including the United States and the United Kingdom. These are discussed in the main body of this paper. A review of these programs and related literature on low-income programs yields the following best practices for low-income energy efficiency programs:

- A central energy-efficiency body should oversee, fund, and monitor household energy efficiency programs and low-income energy efficiency programs.
- LIEEPs should be comprehensive, addressing all savings opportunities, including household behaviours, and serving all fuel types. LIEEPs should also have mechanisms in place to provide basic health and safety upgrades where needed as well.
- All housing types, including rental and mixed-occupancy/mixed-use buildings, should be eligible for LIEEPs.
- LIEEP elements should be consistent with target populations, such as renters and minority groups.

¹ Such traditional incentive programs include, for example, time-of-use rate schemes.

- Income criteria for participation in LIEEPs should be simple and consistent with other low-income programs. For example, eligibility for an existing income-tested program (such as the GST rebate) should automatically qualify eligibility for a LIEEP.
- Where possible, LIEEPs should be designed as a “one-stop shop”: they should offer fully facilitated services for customers, as opposed to being participant-driven.
- LIEEPs should be provided at little-to-no cost to low-income households. Where improvements are to be paid off through energy savings, program providers should still cover the upfront costs through mechanisms such as loans, and should match loan payments to the amount of energy saved.
- When dealing with rental building owners, LIEEPs should impose few or no costs on landlords, and be of no cost to low-income tenants. Tenant-protection measures, such as agreements to limit rent increases or pass savings on to tenants, should also be included.
- Challenges specific to rental units should be addressed. Measures could include better financial incentives, financing options, information on energy efficiency investments, and outreach and education.
- LIEEPs should be delivered by and in partnership with trusted nonprofits and community organizations to improve outreach, participation, and delivery.
- Develop partnerships with other governments and organizations to leverage funds and services, and where possible, pool resources and minimize delivery costs.
- Develop and support a household energy efficiency workforce. Construction, retrofit, and auditing skills are needed. LIEEPs can provide further benefits by training and employing low-income consumers (LICs) from target neighbourhoods.
- Include a significant education and awareness component in the LIEEP.

- Use advanced analytical and tracking approaches.
- Set hard targets for LIEEP goals.
- Integrate quality assurance into program design through monitoring, certification, reporting, auditing, and/or disincentives for noncompliance with program requirements.
- Incorporate formal impact and process evaluations, to identify opportunities for improvement and validate performance. A harmonized calculation system should be developed for assessing energy savings, along with harmonized evaluation protocols.

From these LIEEP best practices, specific recommendations can be derived for policy, program, and legal reforms in B.C. These recommendations are explained in greater detail commencing on page 86 of this paper, and include the following:

- Set energy-poverty-alleviation targets by a certain date, and legislate LIEEP commitment and funding requirements for utilities.
- Create a package of measures involving all relevant provincial government ministries.
- Dedicate more funding to combat Energy Poverty.
- Provide better financing options and financial incentives, including more progressive tax policies for rental buildings.
- Develop LIEEPs for specific housing and consumer types.
- Engage energy utilities in an education and awareness campaign.
- Collaborate with governments, utilities, banks, nonprofits, and other organizations to improve financing, and piggyback with other energy efficiency programs.
- Partner with local nonprofits and trusted community-based organizations to market and deliver LIEEPs in target communities.

- Take steps to address the other two branches of Energy Poverty: high energy costs and low incomes.
- Create a central energy efficiency body, with LIEEPs as part of its mandate.
- Harmonize program evaluations and calculations of energy and costs savings. Incorporate incentives into calculations by giving higher values to high-savings measures.
- Assess, develop, and manage workforce capacity. Train and employ persons from low-income households to provide LIEEP services where possible.
- Develop and expand HEEPs and LIEEPs provided by utilities.
- Create opportunities to facilitate health and safety repairs, and install other energy efficiency measures (e.g., solar water heating) where applicable.
- Draw on innovative features from programs in other jurisdictions, including networking to connect LIHs to other services, benefit entitlement checks, cost-savings estimates, innovative funding, whole building approaches, prioritization of retrofits by projected savings, bulk purchasing, and engagement with developers and contractors during the construction phase.
- Form a province-wide best practices group for low-income energy efficiency programs.
- Legislate the protection of LIHs from energy-utility-rate increases and the adverse impacts of HEEPs. Require the equitable distribution of HEEP benefits.
- Establish a Low-Income Energy Board to ensure regulatory oversight and fulfillment of LIHs' energy needs.
- Mandate energy efficiency ratings or labelling for all residential homes offered for sale or lease.

The rationales for and details of these best practices and recommended reforms are discussed below. By providing a critical overview of Energy Poverty, and the various ways in which it can be addressed, this paper aims to provide a useful tool for government, industry, community organizations and others to better address Energy Poverty in B.C.

Introduction

The Climate Justice Project and the Energy Poverty Initiative

This independently researched discussion paper contributes to the *Energy Poverty Initiative* of the *Climate Justice Project*. This is a five-year partnership between the Canadian Centre for Policy Alternatives (British Columbia Branch) and the University of British Columbia School of Community and Regional Planning. The *Climate Justice Project* is examining the relationship between climate change policies and social justice, in order to advocate policy and regulatory reforms to enhance their relationship. The *Energy Poverty Initiative* is studying the critical environmental policy issue of Energy Poverty in B.C. The opinions in this report, and any errors, are those of the authors, and do not necessarily reflect the views of the Canadian Centre for Policy Alternatives or the Climate Justice Project.

Context to Energy Poverty & Low-Income Energy Efficiency Programs

Energy Poverty, which is frequently defined as when a household must spend 10% or more of its after-tax income on home energy, is determined by three factors: 1) the energy efficiency of the home; 2) household energy costs; and 3) household income.² In B.C., almost 18% of families—over 270,000 families—have been estimated to spend an average of over 17% of after-tax income on energy.³ Energy Poverty is a serious concern because it threatens wellbeing. When families must spend such a disproportionate amount on energy, they may not be able to afford to heat their

² Liz Kelly, *Affordably Energy - Diversifying DSM Programs in BC: A Discussion Paper* (March 2007) [unpublished, consultant report prepared for the B.C. Ministry of Energy, Mines, and Petroleum Resources] at 9.

³ *Ibid.* at 2.

homes sufficiently, or provide other essentials, such as shelter, food, and clothing. For many, it is literally a choice between heating or eating.⁴

Energy Poverty is also problematic because it indirectly generates social, economic, and environmental costs. These include: the range of costs borne by utilities and ratepayers when low-LICs default on utility payments; increased expenditures of public funds on healthcare for low-income communities; increased unemployment; increased homelessness; and opportunity costs of constrained economic development in low-income areas.⁵

Governments across the developed world have responded to the problem of Energy Poverty to varying degrees and in different ways. In the United States, for example, the federal and state governments tend to collaborate in framing and financing low-income energy efficiency programs (LIEEPs) to alleviate Energy Poverty, while public/private utilities plan and deliver them, often in partnership with local non-profit organizations and community action agencies. Although LIEEPs have existed in the U.S. for decades—the U.S. Department of Energy’s Weatherization Assistance Program has provided weatherization services to more than 6.2 million low-income families since 1976⁶—they are more recent to both Canada and B.C.

Household Energy Efficiency Programs: Background & Deficiencies

Rising energy prices have made energy conservation and Energy Poverty reduction in B.C. more urgent, especially given diminishing affordable housing and rising homelessness.⁷ This has steered political and policy attention to demand-side management (DSM) programs, and their subset, household energy efficiency programs.

⁴ *Ibid.*

⁵ John Howat & Jerrold Oppenheim, *Analysis of Low-Income Benefits in Determining Cost-Effectiveness of Energy Efficiency Programs* (April 14, 1999, National Consumer Law Center) at 2-22.

⁶ U.S. Department of Energy, “About the Weatherization Assistance Program” online: Weatherization & Intergovernmental Program <http://apps1.eere.energy.gov/weatherization/> [“About WAP”].

⁷ Kelly, *supra* note 2 at 8.

HEEPs are called for in the 2007 *BC Energy Plan*, which establishes policies for energy efficiency and conservation. These policies include: the goal that BC Hydro meet 50% of its forecast energy needs through conservation by 2020; increased coordination of energy efficiency and DSM programs among utilities; motivating utilities to pursue a variety of cost-effective DSM and conservation programs, including programs accessible to all income levels; and energy efficiency standards for buildings by 2010.⁸ HEEP s are also necessary to meet the province’s 2007 *Climate Action Plan* goals of ensuring that new and old buildings are as energy-efficient as possible – through setting standards, providing support and incentives for retrofits, and encouraging the use of more efficient furnaces and other appliances.⁹

Although HEEP s are an essential part of the province’s overall energy conservation strategy, they may actually deepen the Energy Poverty of LIHs. For example, the costs for utility-DSM-incentive programs are recovered through utility rates paid by *all* ratepayers, despite low-income ratepayers’ inability to participate in the programs. A program may offer a \$300 rebate on a new, efficient, \$1000 fridge, but few LICs have \$1000 of disposable income in the first place, and therefore can make no use of that rebate. This creates the perverse situation whereby low-income ratepayers subsidize the energy efficiency upgrades of their higher-income counterparts, a problem known as the “Funding Anomaly.”

Other factors such as time-of-use rates and two-tiered pricing programs may further deprive low-income populations of HEEP benefits.¹⁰ Landlord-tenant relationships can also generate

⁸ B.C. Ministry of Energy, Mines, and Petroleum Resources, *The BC Energy Plan: A Vision for Clean Energy Leadership* (2009), online: The BC Energy Plan http://www.energyplan.gov.bc.ca/PDF/BC_Energy_Plan.pdf, at 5-6 [BC Energy Plan].

⁹ B.C. Ministry of Environment, *Climate Action Plan* (2009), online: LiveSmart BC http://www.livesmartbc.ca/attachments/climateaction_plan_web.pdf, at 36.

¹⁰ *Time-of-use rates* are rates designed to address peak loads by encouraging consumers to conduct energy intensive activities outside of peak load times. Low-income consumers may be adversely affected because they are typically less flexible in their schedules and/or they possess more limited technology (e.g., timers for appliances). If

barriers to landlord participation in HEEPs.¹¹ Where tenants pay energy bills, landlords lack the incentive pay money to curb those costs; where landlords pay energy bills, tenants have no incentive to conserve, which may undermine retrofit investments. This is referred to as the problem of split incentives. Other barriers for rental properties include payback periods that are too long, a lack of clear and independent information on the viability of retrofit investments (which creates reluctance to invest), a lack of clarity and accessibility of existing programs (including eligibility requirements that exclude apartment buildings, and punitive tax policies),¹² prohibitive costs of energy audits (particularly for apartment buildings), and a lack of market incentives. Market disincentives for landlord participation in HEEPs include: restrictions on rent increases which could cover the costs of retrofits, low vacancy rates causing little difficulty in renting properties, and the improbability that prospective tenants can or will shop around based on energy performance. Given that 30% of B.C.'s households are tenant-occupied,¹³ and 64% of B.C. rental units were built before 1980 (and therefore will have lower energy efficiency), these barriers are significant concerns.¹⁴

Finally, low-income consumers face a number of particular obstacles to participating in conventional household energy efficiency programs:¹⁵

- **Affordability:** Many LICs cannot afford investments in energy efficiency products.

so, LICs may be subjected to higher rates because they are unable to avoid peak load times. *Two-tiered pricing* is used by BC Hydro and applies one rate for a consumer's first block of energy use, and an increased rate for subsequent use. LICs often inhabit older, energy-inefficient homes, and may therefore be disproportionately subjected to higher, second-tier rates. Meanwhile, affluent consumers in newer, energy-efficient homes are more likely to avoid the second-tier pricing. As such, two-tier pricing may inadvertently prejudice LICs.

¹¹ The information in this paragraph on landlord and tenant barriers is derived from Jamie Abbott, Guy Dauncey & Blaine Juchau, *Green Landlords: Solving the Rubik's Cube of Energy Efficiency in Rental Housing* BC Sustainable Energy Association (3 April 2009), online: BC SEA <http://www.bcsea.org/greelandlords>, at 18-20.

¹² Current taxation rules allow landlords to write off 100% of building maintenance costs against rental profits. However, energy efficiency retrofits are considered capital investments and landlords can therefore only write off 5% of these costs (*Ibid.* at 20).

¹³ This 30% figure includes government, nonprofit, and private rental properties. See *ibid.* at 14.

¹⁴ *Ibid.*

¹⁵ Margo Longland, *Power Smart for Low-Income Households Business Case* (June 13, 2008) [unpublished, internal planning document prepared for BC Hydro] at 12-13.

- **Availability:** Energy efficiency upgrades are less “available” to LICs, as they generally have less knowledge about them, more restricted mobility and access to retail outlets, and are more uncertain of what upgrades to pursue and how to go about obtaining them.
- **Awareness:** Experience in various jurisdictions has shown that LICs are generally “hard to reach,” even when programs offer free products and services. LICs may have trouble getting information about energy efficiency programs; for example, they may confront a language or literacy barrier, or they may not access typical communications media. In most cases, LICs likely have more pressing needs to manage, such as food, clothing, and shelter.
- **Acceptance:** As with all income groups, a portion of LICs may be ill-disposed toward conservation or, as mentioned above, may prioritize other necessities before energy conservation, especially when it involves capital expenditure.
- **Adoption:** Even when LICs are informed about energy efficiency measures and are interested in adopting them, they may be prevented by: 1) their greater likelihood of being renters (limiting the type and extent of modifications they can make, and invoking split incentives and other barriers described above); 2) their lack of time to investigate and the inconvenience associated with undertaking energy efficiency upgrades; and 3) their tendency to move more often (limiting their desire and ability to invest in improvements that are tied to a dwelling or that have longer-term payoffs).
- **Advocacy:** LICs have fewer resources to empower them as energy efficiency advocates in their communities.

The Rationale for LIEEPs & the Research Context

The fact is that low-income energy efficiency programs are fundamental to both reducing residential energy consumption and alleviating Energy Poverty. LIEEPS are “low-hanging fruit” that

can yield relatively greater energy savings than mainstream energy efficiency programs. This is because LIHs tend to: 1) consume more electricity per unit area of the home and use older, less-energy-efficient appliances than the average household;¹⁶ and 2) carry a lower risk of free-rider and rebound factors.¹⁷

In addition to being an essential part of a comprehensive strategy to reduce greenhouse gas emissions, LIEEPs have also been proven to yield an array of other important benefits. These include: improving the health of low-income populations; creating jobs; raising property values; relieving homelessness; and reducing the credit and collection, bad debt, and termination and reconnection costs incurred by utilities and ratepayers due to LIHs' inability to pay their utility bills.¹⁸ Unfortunately, there remains a dearth of effective and accessible LIEEPs in B.C., and the province has no targets for reducing Energy Poverty.

Therefore the *Energy Poverty Initiative* has undertaken to study the challenges facing households living in Energy Poverty in B.C., evaluate current policies and programs for addressing Energy Poverty, and propose program, policy, and regulatory reforms for reducing Energy Poverty by making HEEPs and LIEEPs more effective and equitable.

Within this context, this discussion paper will explore:

- 1) Energy Poverty's impacts on human health;
- 2) Energy Poverty in B.C.;

¹⁶ *Ibid.* at 18.

¹⁷ "Free-Riders" are consumers who use a DSM incentive program who would have made the switch without the incentive. LICs are the least likely to be free-riders. "Rebound" refers to customers using the savings from DSM measures to consume more energy (i.e., by buying another computer). LICs are less likely to do this because they are more likely to spend any savings on necessities. See Kelly, *supra* note 2 at 7.

¹⁸ Clifford Maynes, "Time for Action: Background Paper" (Background paper provided to delegates at the conference Time for Action: Tackling Energy Poverty in Canada Through Energy Efficiency, Toronto, 29 September – 1 October 2008) [unpublished] at 5-6. In the U.S., one study based on an extensive literature review found that it is "reasonable and appropriate" to add 50% to the value of direct energy benefits to account for the non-energy benefits of LIEEPs. Another study found that every dollar spent on LIEEPs generates \$1.88 in non-energy benefits. See Maynes, *ibid.* at 3.

- 3) The regulatory framework for household energy efficiency policies and programs in B.C.;
- 4) Other jurisdictions' strategies to reduce Energy Poverty;
- 5) A summary of best practices for LIEEPs; and
- 6) Options for public policy, program, and legislative reforms to alleviate Energy Poverty in B.C.

Although Energy Poverty is a tripartite problem, this paper focuses on one of the three issues: household energy efficiency. The other two issues—high energy costs and low household incomes—are undoubtedly significant. However, they are beyond the scope of this paper.

Health Impacts of Energy Poverty

Living in Energy Poverty poses a range of health risks. A World Health Organization (WHO) Health Evidence Network study found that:

Housing improvements that ensure the provision of affordable warmth may have the greatest potential to reduce the adverse effects of poor housing. Optimal temperature is an essential component of domestic heating provision and may also affect levels of dampness and allergen growth. Energy efficiency improvements have led to improvements in general health and respiratory health among asthmatic children. The elderly and very young are particularly at risk from both low and high indoor temperatures.¹⁹

Living in Energy Poverty often results in temperatures within the home being outside WHO's range for healthy living (21°C for the main living space and 18°C for other rooms in the home). There is a growing body of work to identify causal links between poverty, older homes that are poorly insulated and heated, unfavourable indoor temperatures, increases in temperature-related sicknesses, and excess winter deaths.²⁰

¹⁹ Health Evidence Network for the WHO European Region, "Is Housing Improvement a Potential Health Strategy?" (Copenhagen: WHO, February 2005), online: WHO Regional Office for Europe <http://www.euro.who.int/document/E85725.pdf>, at 4.

²⁰ See for example WHO Regional Office for Europe, "Housing, Energy and Thermal Comfort: A review of 10 countries within the WHO European Region" (Copenhagen: WHO, 2007), online: WHO Regional Office for Europe <http://www.euro.who.int/document/e89887.pdf>.

Specific problems caused by energy inefficiency—as exists in poorly-insulated and -heated homes—include increases in winter mortality rates from afflictions like pneumonia and the flu, as well as cardiovascular and respiratory problems.²¹ For example, one U.K. report shows that at an indoor temperature of 16°C, resistance to respiratory disease declines; at 12°C, blood pressure and the risk of cardiovascular problems rise; and at 5°C, there is a serious risk of hypothermia.²² In Canada there are about 10,000 winter deaths per year, with 16% of those deaths in B.C.²³

Energy inefficiency and poverty can cause cardiovascular and respiratory health problems by contributing to a poor indoor environment in which condensation, dampness, and moulds flourish.²⁴ In one study of 30 Canadian communities, which surveyed 13,495 children to examine the effects of indoor environment on health, 37.8% of homes reported mould or moisture, and respiratory illnesses were repeatedly higher in such homes.²⁵ Lower respiratory symptoms such as asthma, bronchitis, and coughs were 50% higher in homes reporting dampness. Upper-respiratory and non-respiratory symptoms were 25% higher in these homes as well.²⁶ The study concluded that the reported presence of indoor moulds and dampness may cause adverse health effects in Canadian children,²⁷ and noted that this was similar to findings in other jurisdictions. Another Canadian study found that exposure to dampness and fungi in indoor air brings on or exacerbates asthma and other respiratory complaints.²⁸

²¹ Kelly, *supra* note 2 at 3.

²² *Ibid.* at 20.

²³ *Ibid.* at 3.

²⁴ John D. Healy and J. Peter Clinch, “Quantifying the severity of fuel poverty, its relationship with poor housing and reasons for non-investment in energy-saving measures in Ireland” (2004) 32:2 *Energy Policy* 207 [no page numbers available in online format viewed] (UVic Library – Google Scholar).

²⁵ Dales et al., “Respiratory Health Effects of Home Dampness and Molds among Canadian Children” (1991) 134:2 *American Journal of Epidemiology* 196 at 196.

²⁶ *Ibid.* at 199.

²⁷ *Ibid.* at 201.

²⁸ Norman King and Pierre Auger, “Indoor air quality, fungi, and health: How do we stand?” (2002) 48 *Canadian Family Physician* 298 at 298.

Energy Poverty can also cause households to turn to unsafe heating practices. For example, when LIHs cannot afford their gas utility bills and are cut off from service, they may in desperation turn to heating their home with an open oven door or faulty electric heater. Supplemental heaters cause 120,000 residential fires and 600 deaths annually in the U.S.²⁹

Risks also arise when Energy Poverty drives households to use inefficiently burning solid fuels such as biomass, coal, or even furniture to meet their heating needs. Such households are consequently exposed to a dangerous cocktail of pollutants, including carbon monoxide, particulate matter, nitrogen oxides, benzene, butadiene, formaldehyde, and polyaromatic hydrocarbons.³⁰ Where coal is used, additional contaminants such as sulphur, arsenic, and fluorine may also be present.³¹ Fine particles with a diameter of up to 2.5 microns (PM_{2.5}) are especially threatening as they can penetrate deeply into the lungs, causing inflammation of the airways and lungs and impairing immunity.³²

WHO recently summarized the results of epidemiological studies on the health impacts of exposure to indoor air pollution. Inhaling indoor smoke doubles the risk of pneumonia and other acute infections of the lower respiratory tract among children under five years of age.³³ Indoor air pollution also tends to increase the risk of chronic obstructive pulmonary disease, lung cancer, asthma, cataracts, and tuberculosis.³⁴ Although these epidemiological studies appear to have focused on developing countries, similar types, if not degrees, of health risks may affect those LIHs in developed countries that are poorly ventilated and use solid fuels to meet their domestic needs.

²⁹ Canadian Housing and Rental Association, *Affordable & Efficient: Towards a National Energy Efficiency Strategy for Low-Income Canadians* (February 2005), online: CHRA [http://www.chra-achru.ca/CMFiles/Affordable & Efficient - symposium background paper170CI-11192009-3571.pdf23](http://www.chra-achru.ca/CMFiles/Affordable%20&%20Efficient%20-%20symposium%20background%20paper170CI-11192009-3571.pdf23), at 6.

³⁰ World Health Organization, *Fuel for Life: Household Energy and Health* (2009), online: WHO <http://www.who.int/indoorair/publications/fuelforlife.pdf>, at 8.

³¹ *Ibid.*

³² *Ibid.* at 10.

³³ *Ibid.*

³⁴ *Ibid.*

Energy Poverty in British Columbia

Estimates of Energy Poverty in B.C. – How Big is the Problem?

The extent of Energy Poverty in B.C. is significant. Kelly estimated the extent of Energy Poverty in B.C. based on data in the 2005 Statistics Canada Survey of Household Spending. According to the 2005 Survey, the lowest income quintile in B.C. on average had an annual post-tax income of \$14,064, and spent \$2,477 per year on electricity, gas, and other fuel, thus spending 17.61% of disposable income on meeting energy needs.³⁵

Kelly “conservatively” estimated that 60% of households in the lowest income quintile, or 195,000 households, were living in Energy Poverty. The 2nd quintile on average had an annual post-tax income of \$30,839, and spent \$2,544 per year on electricity, gas, and other fuel, thus spending 8.25% of disposable income on household energy.³⁶ Kelly estimated that 30% of households in the 2nd quintile, or 97,000 households, could be living in Energy Poverty, thus implying that, in 2005, there may have been around 292,000 households in Energy Poverty.³⁷

As a liberal estimate,³⁸ based on the 2007 Survey data on median energy expenditures as a proportion of after-tax income, we might assume that 80% of households in the lowest income

³⁵ Kelly, *supra* note 2 at 17.

³⁶ *Ibid.*

³⁷ *Ibid.* at 18.

³⁸ This updated estimate of the extent of Energy Poverty in B.C., based on the Statistics Canada *Survey of Household Spending in 2007*, was calculated as follows. Table 1 reveals the average annual income, income tax, and energy expenditures of households reporting in B.C., according to income quintile:

Income Quintile	Pre-Tax Income (\$)	2007 Income Tax (\$)	Post-Tax Income³⁸ (\$)	Electricity Expenditure (\$)	Gas Expenditure (\$)	Other Fuel Expenditure (\$)	Total Energy Bill (\$)	Energy Bill as % of Disposable Income
All	72,618	15,236	57,382	903	1300	374	2577	4.49
Lowest	16,487	737	15,750	656	941	534	2131	13.53
2 nd	37,251	4114	33,137	738	1122	530	2390	7.21
3 rd	58,810	9025	49,785	892	1275	387	2554	5.13

quintile, and 20% of households in the 2nd quintile, were energy poor (spent 10% or more of disposable income on energy). If so, out of the 2007 Survey's predicted 1,740,970 total households in B.C., some 279,000 households in the lowest income quintile, and about 70,000 households in the 2nd income quintile could have been in Energy Poverty. That would make potentially as many as

4 th	86,781	15,433	71,348	1006	1409	269	2684	3.76
Highest	163,760	36,145	127,615	1159	1460	316	2935	2.30

Table 1: Mean 2007 household energy expenditures of households reporting as a % of mean post-tax income in B.C., according to income quintiles. (Statistics Canada, Survey of Household Spending in 2007 (2008). Accessed using University of Victoria Libraries Data Acquisitions Service (distributor), see: <https://datacollections.uvic.ca/cgi-bin/WebObjects/data.woa/wa/list?dept=1>. One data file, 3.4 MB uncompressed: <http://www.statcan.gc.ca/dli-ild/data-donnees/ftp/shs-edm/shs-edm2007-eng.htm> (accessed November 14, 2009). This public-use microdata file may be accessible for free at other [Depository Services libraries](#). These data are available at no additional charge to Canadian educational institutions participating in the [Data Liberation Initiative](#).

The 2007 data imply a lower degree of Energy Poverty in B.C. than the 2005 data imply: most notably, average household income appears to have increased by 12% in the lowest quintile, and by 7.5% in the 2nd quintile, while average energy expenditures decreased by 13.7% in the lowest quintile, and by 6.4% in the 2nd quintile. Between 2005 and 2007, the lowest quintile experienced the greatest absolute (\$346) and relative (23.2%) reduction in energy costs as a proportion of disposable income during that time.

According to the 2007 Survey, households in the lowest quintile spend on average 13.53% of their disposable income on energy, while households in the 2nd income quintile on average spend 7.21% of their disposable income on energy. Comparing these calculations with the data for median household incomes and energy expenditures may yield a clearer picture of the distribution of incomes and energy expenditures within respective quintiles. Given the lowest quintile's median post-tax household income (\$15,828) and energy expenditure (\$1800, or 11.4% of disposable income), it appears that half of lowest quintile households reporting spend roughly 11.4% or less of disposable income on energy, while half spend more than that. (Note that "median post-tax household income" had to be approximated by subtracting "median income tax on reference year income per household reporting" from "median household income before tax per household reporting" because the *Survey of Household Spending in 2007* does not feature "median post-tax household income.") This implies that there are a relatively small number of outliers, which spend much more than 11.4% of disposable income on energy, consequently pulling the mean energy-as-a-proportion-of-disposable-income value up to 13.53%. Given the 2nd quintile's median post-tax household income (\$33,114) and energy expenditure (\$1950, or 5.9% of disposable income), it appears that half of 2nd quintile households reporting spend 5.9% or less of disposable income on energy, while half spend more than that.

It can be reasonably assumed that a rough energy-expenditure-as-a-percentage-of-disposable-income boundary exists, subject to the exception of outliers, between each quintile. Relative to the median-derived energy-expenditure-as-a-percentage-of-disposable-income estimates, this flexible boundary between the lowest and the 2nd quintiles would lie somewhere around 9% of disposable income spent on energy. Therefore, the great majority of lowest quintile households likely spend more than 9% of disposable income on energy, while the great majority of 2nd quintile households likely spend less than 9% of disposable income on energy. One can now make liberal and conservative calculations of how many households in B.C. were likely suffering Energy Poverty in 2007.

349,000 households in British Columbia that were unable to meet their energy needs without compromising their access to other essentials in 2007.

As a conservative estimate, based on the 2007 Survey data on median energy expenditures as a proportion of after-tax income, we might assume that 60% of households (210,000) in the lowest income quintile, and 10% of households (35,000) in the 2nd quintile, were energy poor. If so, there would be some 245,000 British Columbian households in Energy Poverty as of 2007. Resolving these high and low estimates yields that there were roughly 297,000 households (17% of total households) likely in Energy Poverty in B.C. as of 2007. As of spring 2010, the number still in Energy Poverty should be comparable to what it was in 2007, given the relatively short elapse of time.

In summary, the above analysis of 2005 and 2007 Statistics Canada data suggests that 292,000 B.C. households lived in Energy Poverty, defined as spending 10% or more of after-tax income on home energy, in 2005. Although the data show that incomes increased and the percentage of income spent on home energy decreased in 2007, approximately 297,000 households still lived in Energy Poverty that year.

Energy Poverty rates have therefore been fairly stable, particularly given that the 2005 estimate was conservative, while the 2007 estimate was obtained by resolving liberal and conservative estimates. Assuming this same figure applies generally today, about 16.7% of British Columbians are living in Energy Poverty, based on B.C.'s July 2009 population of 4,455,207 and an average household size of 2.51 persons.³⁹ Finally, according to Kelly's statistics, 1600 persons perish

³⁹ BC Stats, *British Columbia Quarterly Population Estimates, 1951-2009* (2009) online: BC States <http://www.bcstats.gov.bc.ca/DATA/pop/pop/BCQrtPop.asp> (accessed on November 18, 2009). Average household size was determined by dividing the July 2009 B.C. population projection (4,455,207) by the projected number of B.C. households at that time (1,778,118). The percentage of 16.7% was obtained by taking the estimated number of households living in Energy Poverty (297,000), multiplying it by the average household size (2.51 persons), and dividing the result by the total projected population (4,455,207).

from excess winter deaths every year; presumably, many are residents of these 297,000 or so households living in Energy Poverty.⁴⁰

Who Are the “Energy Poor”?

The above method has furnished estimates of the total number living in Energy Poverty across B.C., but further research should be undertaken to clarify specific dimensions of Energy Poverty. Energy Poverty should be mapped against the variables of tenure type (whether a domicile is rented or owned), family composition, household language, and dwelling type (apartment/duplex/trailer, etc.), at regional, municipal, and possibly neighbourhood scales.

Such mapping could enable LIEEP providers to tailor program marketing to the many different types of low-income households and thereby maximize participation. This could profoundly benefit both energy conservation and LIHs’ energy budgets, as one of the main impediments to the success of LIEEPs is low program-participation rates. A review of U.S. LIEEPs reveals that annual participation in them averages only 2%.⁴¹ Such data will also help LIEEP providers address the particular challenges and opportunities posed by different subgroups within the low-income population.

Though to our knowledge it has not yet been mapped, data on these specific dimensions of Energy Poverty is available from BC Hydro, a crown corporation and the largest electric utility in the province, based on customer responses to the 2006 Residential End Use Study.⁴² This information should illustrate the specific dimensions of Energy Poverty province-wide, as BC Hydro serves the

⁴⁰ Kelly, *supra* note 2 at 3.

⁴¹ Longland, *supra* note 15 at 18.

⁴² All REUS data was provided courtesy of Margo Longland, Program Manager, Power Smart Residential Marketing, BC Hydro.

vast majority of B.C.⁴³ According to the study, 256,500 households, or 17.1% of BC Hydro's 1.5 million customers, were low-income.⁴⁴ If the same proportion of customers is low-income in 2009, then out of BC Hydro's 1,606,156 customers, 274,700 households were low-income.⁴⁵ These numbers are consistent with the Energy Poverty estimates (17% in 2007 and 16.7% in 2009) above.

The Residential End Use Study also reveals key trends in the low-income sector. LICs are more likely than higher-income customers to:⁴⁶

- Rent their homes (33% for LICs vs. 19% for non-LICs);
- Heat their homes with electricity (43% vs. 35%);
- Live in the Lower Mainland (63% vs. 58%);
- Have a female primary bill-payer (63% vs. 49%);
- Have a senior (65+) primary bill-payer (37% vs. 28%);
- Live alone (44% vs. 26%);
- Have children under 12 in the home (25% vs. 17%);

⁴³ In 2006, BC Hydro serviced 87.8% of provincial households. This was calculated by dividing BC Hydro's 1.5 million customers in 2006 (Longland, *supra* note 15 at 11) by the total number of households reported for B.C. in the Statistics Canada *Survey of Household Spending in 2006*: Statistics Canada, *Survey of Household Spending in 2006* (2008). Accessed using University of Victoria Libraries Data Acquisitions Service (distributor), see: <https://datacollections.uvic.ca/cgi-bin/WebObjects/data.woa/wa/list?dept=1>. One data file, 2.1 MB uncompressed: <http://www.statcan.gc.ca/dli-ild/data-donnees/ftp/shs-edm/shs-edm2006-eng.htm> (accessed November 16, 2009). This public-use microdata file may be accessible for free at other [Depository Services libraries](#). These data are available at no additional charge to Canadian educational institutions participating in the [Data Liberation Initiative](#).

⁴⁴ Longland, *ibid.* at 11. "Low-income" is defined according to Statistics Canada's Low-Income Cut-Offs [LICOs], which define household income thresholds below which a family will likely devote significantly more (at least 20% more) of its income than the average family on food, shelter, and clothing. The LICOs vary with family and community size in order to account for family support (cost-sharing) and disparities in living costs between urban and rural areas. To determine whether a person is low-income, the appropriate LICO (based on family and community size) is compared to the income of that person's economic family (all persons living in the same dwelling and related by blood, marriage, common law, or adoption). If the economic family income is below the LICO, all individuals in that family are considered "low-income."

⁴⁵ BC Hydro, "Quick Facts for the Year Ended March 31, 2009" (2009), online: BC Hydro http://www.bchydro.com/etc/medialib/internet/documents/about/company_information/quick_facts.Par.0001.File.quick_facts.pdf, at 2.

⁴⁶ Longland, *supra* note 15 at 12, 16.

- Have young adults (13-24 years old) in the home (25% vs. 20%);
- Use electricity more intensively if living in single-family dwellings or duplexes (6.5 vs. 6.1 kWh/ft²/yr);
- Use electricity more intensively if living in Row/Town Houses (7.32 vs. 6.71 kWh/ft²/yr);
- Live in homes with single-pane windows (54% vs. 40%);
- Live in perpetually drafty homes (14% vs. 8%); and
- Not use low-flow showerheads (75% vs. 60%).

LIEEP providers such as BC Hydro can harness this data to tailor program design and delivery according to key household characteristics. For example, it is immediately evident that single-person households and tenants are disproportionately low-income, as are senior- and female-headed households. These diverse low-income subgroups may well differ in their willingness and capacity to adopt various energy efficiency measures.

Another factor that should be considered in planning LIEEPs is that a higher proportion of Aboriginal and immigrant communities are low-income as compared to the rest of the population. According to the 2001 Statistics Canada Census, more than a third (35.1%) of off-reserve Aboriginal households in B.C. were low-income compared to a fifth (20.5%) of non-Aboriginal households.⁴⁷ A “low-income household” was defined as a household that, compared to the average household, spent 20% or more of its total income on food, shelter, and clothing.⁴⁸ In 1996, 21% of immigrant families were in the low-income group (as defined by the 1996 LICOs), compared to only 12% of non-immigrant families.⁴⁹

⁴⁷ BC Stats, “2001 Census Fast Facts: BC Aboriginal Identity Population – Income and Low Income” (2004), online: BC Stats <http://www.bcstats.gov.bc.ca/data/cen01/facts/cff0113.PDF>, at 2.

⁴⁸ *Ibid.*

⁴⁹ BC Stats, “Family and Income Characteristics of BC’s Immigrant Population” (1999), online: BC Stats <http://www.bcstats.gov.bc.ca/pubs/immig/imm983sf.pdf>, at 1.

This diversity has implications on the languages in which LIEEP providers should market their programs, especially in communities that may comprise of relatively homogenous and high-density immigrant populations. For example, Cantonese, Mandarin and Punjabi together comprise the mother tongues of approximately 12% of B.C.'s population.⁵⁰ A comprehensive LIEEP and HEEP strategy must include information and marketing in languages other than English, and program delivery from trusted community resources, where appropriate.

Participation rates from past programs illustrate the importance of proactively recruiting LICs. Data on BC Hydro's Lower Mainland Compact Fluorescent Lamp (CFL) Giveaway program shows that only 5% of participants made less than \$20,000 per year, compared to 9% in the non-participant customer group. LICs were significantly less likely than the average customer to participate in the Household Energy Efficiency Program.

Energy Poverty Initiatives in B.C.

Past Energy Poverty Initiatives

There have been a number of Energy Poverty initiatives in B.C., which featured funding and implementation involving different combinations of federal and provincial governments, utility companies, and customers. Past initiatives include:

- The federal EnerGuide for Low-Income Homes: a planned 5-year, \$500-million program that was abruptly discontinued by the Conservative government in May 2006 soon after starting

⁵⁰ BC Stats, "2006 Census Diversity Profile for British Columbia" (2006), online: WelcomeBC [http://www.welcomebc.ca/shared/docs/diversity/British Columbia.PDF](http://www.welcomebc.ca/shared/docs/diversity/British%20Columbia.PDF). According to the Statistics Canada 2006 Census data on which this source is based, 332,965 individuals (8.1% of B.C.'s 2006 population) reported Chinese (Cantonese or Mandarin) as their mother tongue, and 158,745 individuals (3.9% of B.C.'s 2006 population) reported Punjabi as their mother tongue. Together, these minority languages comprise the mother tongues of about 12% of B.C.'s population.

up. It served 248 single-family homes in B.C., and offered a home energy audit, and up to \$3500 in grants for the purchase and installation of energy-efficient equipment;⁵¹

- A variety of pilot projects funded by the B.C. Ministry of Energy, Mines, and Petroleum Resources and the federal Opportunities Envelope Fund:
 - The Low-Income Energy Savings Plan (April 2006 – March 2007): a partnership with social housing providers that served 60 multi-unit residential buildings and rented rooming houses and offered up to \$23,000 per building for energy efficiency audits and equipment installation.⁵²
 - Pilot projects administered by BC Housing, including: the revision of prescriptions requiring all new social housing to meet an energy performance rating of 25% less than the Model National Energy Code for Buildings or an EnerGuide for New Homes performance rating of 80; and construction of three group home buildings with an EnerGuide for New Homes performance rating of 80.⁵³
- The LiveSmart BC Low-Income Program (LSLIP): LSLIP was announced in December 2008 and intended to invest \$17 million over three years with a target of 9000 retrofits by March 31, 2012.⁵⁴ By March 2009, energy efficiency assessments and installations had been completed in 132 low-income households in Metro Vancouver and Whistler. The program was then abruptly halted in August 2009 along with the broader \$60-million LiveSmart HEEP of which it was part. According to the B.C. government, LiveSmart had already reached its three-year

⁵¹ Kelly, *supra* note 2 at 14.

⁵² *Ibid.* at 11-12.

⁵³ *Ibid.* at 13.

⁵⁴ B.C. Ministry of Energy, Mines, and Petroleum Resources, News Release, 2008EMPR0065-001783, “\$17-million LiveSmart Investment for Low-Income Housing” (1 December 2008), online: BC Government. http://www2.news.gov.bc.ca/news_releases_2005-2009/2008EMPR0065-001783.htm.

target of conducting energy audits in 40,000 homes in only 15 months, and was fully allocated.⁵⁵

Current Energy Poverty Initiatives

There are a few LIEEPs in B.C.; however, the province still lacks a comprehensive LIEEP platform. The three major investor-owned energy-utility companies in the province have yet to institute true LIEEPs, and although the LiveSmart HEEP was restored under the B.C. 2010 budget (with \$35 million in funding over three years),⁵⁶ it does not include a specific low-income component at this time.⁵⁷

In the same month that LSLIP was originally launched under the LiveSmart umbrella, the Ministry of Energy, Mines, and Petroleum Resources declared \$6.3 million in spending on four new projects:

1. \$4.1 million was allocated to the LiveSmart Energy Assistance Program (LEAP) managed by Eaga Canada and City Green. LEAP collaborated with the BC Non-Profit Housing Association and the Co-op Housing Federation of BC, and integrated funding from Terasen Gas, BC Hydro, FortisBC and the ecoENERGY Retrofit Program. From December 2009 to March 2010, almost 2000 social housing tenants received grants of up to \$2000 each, to cover 100% of the cost for energy assessments, insulation, weather stripping, water saving devices, and lighting and heating upgrades. LEAP delivered 18,200 GJ in

⁵⁵ B.C. Ministry of Energy, Mines, and Petroleum Resources, Information Bulletin, 2009EMPR0011-000230, "LiveSmart BC: Efficiency Incentive Program Hits Target" (14 August 2009) online: BC Government http://www2.news.gov.bc.ca/news_releases_2009-2013/2009EMPR0011-000230.pdf.

⁵⁶ LiveSmart BC, "Rebates and Incentives for your Home" (2010), online: LiveSmart BC http://www.livesmartbc.ca/homes/h_rebates.html, and B.C. Ministry of Energy, Mines, and Petroleum Resources, News Release, 2010EMPR0014-000437, "LiveSmart BC Home Efficiency Program Extended" (16 April 2010), online: BC Government http://www2.news.gov.bc.ca/news_releases_2009-2013/2010EMPR0014-000437.htm.

⁵⁷ Phone conversation with Cory Waters, Manager, Energy Efficiency Branch, Ministry of Energy, Mines and Petroleum Resources (19 April 2010).

annual energy savings and reduced CO2 emissions by 550 tonnes per year. This initiative was the flagship and most successful project of the four.

2. \$1.95 million was allocated to BC Housing to retrofit 820 units (623 directly-managed and 197 nonprofit housing units), energy audit 1250 nonprofit units, and work with BC Hydro and the BC Nonprofit Housing Association to develop a long-term energy efficiency strategy for the nonprofit housing sector.
3. \$155,000 was allocated to BC Hydro to install energy saving kits in nonprofit homes and Aboriginal communities. These kits comprise low-cost improvements such as weather-stripping, hot-water pipe insulation, low-flow showerheads, faucet aerators, electrical outlet draft-stoppers, fridge and freezer thermometers, energy-efficient night lights, and Energy Star[®] CFL bulbs.
4. \$157,000 was allocated to the District of Ucluelet to serve 70 LIHs with energy-efficiency evaluations and retrofits.

BC Hydro's main LIEEP is the Energy Conservation Assistance Program (ECAP), the low-income version of the Power Smart HEEP.⁵⁸ ECAP provides qualified low-income residential customers with a home energy evaluation, the installation of energy-saving products, and personalized energy-efficiency advice, free of charge. Installations depend on the home and may include: CFLs; faucet aerators; low-flow showerheads; water-heater pipe wrap and blanket; draft-proofing materials (weather-stripping, caulking, and outlet gaskets); insulation for attics, walls, and crawlspaces; low-wattage night lights; and an Energy Star[®] refrigerator.

To qualify for ECAP one must be a BC Hydro residential customer living in the Lower Mainland or on Vancouver Island, whose electricity consumption exceeds 8000 kWh/yr, and whose

⁵⁸ BC Hydro, "Energy Conservation Assistance" (2009), online: BC Hydro http://www.bchydro.com/powersmart/residential/energy_conservation.html.

combined household income is below Statistic Canada's LICO. Renters may participate in the program by having their landlord complete a consent form. BC Hydro also offers a more modest LIEEP in its provision of free energy saving kits to customers who are below the LICO.

Terasen Gas is an investor-owned natural-gas utility that serves 96% of B.C.'s natural-gas customers.⁵⁹ In the summer of 2009, it established the \$41.5-million Energy Efficiency and Conservation (EEC) program for both residential and commercial customers. Residential customers will have access to rebates for many appliances, including high-efficiency fireplaces, water heaters, dishwashers, and washing machines. The EEC program will tend to exclude poor households due to the cost of such major appliances, and low-income renters are further excluded by the difficulty of replacing major appliances in a property that they don't own. However, Terasen "is committed to developing initiatives and strategies for low income households ..."⁶⁰ So, for the moment, Terasen lacks an LIEEP, but is likely to implement one.

FortisBC is an investor-owned electric utility that serves approximately 110,000 customers throughout south-central British Columbia.⁶¹ It offers expert advice on household energy efficiency and rebates for energy-efficient products (windows, insulation, CFLs, air-source heat pumps, and ground-source heat pumps) through its PowerSense Home Improvement Program. One must be a FortisBC customer and live in an electrically heated home. Although the PowerSense program may benefit some LICs, it is not an LIEEP, as it targets homeowners, only the more affluent of which would be able to afford major retrofits.

⁵⁹ Terasen Gas, "About us", online: Terasen Gas <http://www.terasengas.com/AboutUs/default.htm>.

⁶⁰ Terasen Gas, "Terasen Gas celebrates Earth Day by announcing major program to help customers manage costs by reducing energy consumption", online: Terasen Gas <http://www.terasengas.com/AboutUs/News/EarthDayMajorProgram.htm>.

⁶¹ FortisBC, "Our Vision & Values", online: FortisBC http://www.fortisbc.com/about_fortisbc/company/our_vision.html.

Pacific Northern Gas is an investor-owned natural-gas utility that serves about 40,000 residential, commercial, and industrial customers.⁶² It currently does not have any HEEPs or LIEEPs.

In sum, LIEEPs have begun to appear in B.C., but the province still lacks comprehensive LIEEPs, and has no central coordinated LIEEP/HEEP administrator, both of which are key features for successful energy-efficiency initiatives.

The Regulatory Framework for HEEPs/LIEEPs in B.C.

As mentioned, B.C.'s current energy-efficiency framework is set out in the *BC Energy Plan*.⁶³ The principal legislation dictating HEEPs/LIEEPs in B.C. comprises the B.C. *Utilities Commission Act* and its 2008 *Demand-Side Measures Regulation (DSMR)*,⁶⁴ both of which have responded to the *BC Energy Plan*. Other provincial and federal legislation has a tangential impact on HEEPs/LIEEPs.

The Utilities Commission Act and the Public Utilities Commission

The British Columbia Utilities Commission (BCUC), which regulates public utility operations, is governed by the *Utilities Commission Act*.

The Act:

- requires public utilities to file long-term resource plans with the BCUC for approval;⁶⁵
- generally requires public utilities to plan DSM measures to reduce forecast demand, and estimate how much such measures would reduce demand;⁶⁶

⁶² Pacific Northern Gas, "Company: Operations", online: PNG http://www.png.ca/company_operations.cfm.

⁶³ *BC Energy Plan*, *supra* note 8.

⁶⁴ *Utilities Commission Act*, R.S.B.C. 1996, c. 473, and *Demand-Side Measures Regulation*, B.C. Reg. 326/2008 [DSMR].

⁶⁵ *Utilities Commission Act*, *ibid.*, s. 44.1.

⁶⁶ *Ibid.*, ss. 44.1(2)(a), (b), and (c).

- prioritizes conservation measures over the development or acquisition of new energy supplies, by requiring an explanation of why demands are not being met by DSM initiatives instead;⁶⁷ and,
- requires that BC Hydro plan long-term demand-side measures to contribute to a 50% reduction in the expected demand increase by 2020.⁶⁸

The Act further requires the BCUC to consider, in deciding to accept or reject a public utility's long-term resource plan and expenditure schedule (including BC Hydro's plan incorporating a proposal to reduce demand by 50%), whether demand-side measures are "adequate" and "cost-effective."⁶⁹ Pursuant to these requirements and the *BC Energy Plan* policies of encouraging utilities to pursue aggressive demand-side conservation,⁷⁰ BC Hydro has applied to the BCUC for approval of its Long-Term Acquisition Plan—a Plan that includes aggressive DSM measures.⁷¹

Other relevant provisions in the Act include s. 59, which prohibits public utilities from setting unjust, unreasonable, or discriminatory rates. (This section could potentially found a claim that rate hikes used to subsidize costly appliance retrofits in HEEPs are "unjust" when they affect LIHs that cannot afford the retrofits.) Finally, the Act requires BC Hydro to make conservation reports, a requirement designed to help realize the *BC Energy Plan* efficiency policies.⁷² The Act

⁶⁷ *Ibid.*, s. 44.1(2)(f).

⁶⁸ *Ibid.*, s. 44.1(4).

⁶⁹ *Ibid.*, ss. 44.1(8)(c), 44.2(5)(d).

⁷⁰ As discussed on page 11 of this paper.

⁷¹ B.C. Ministry of Energy, Mines, and Petroleum Resources, "BC Energy Plan Report on Progress" (2009), online: The BC Energy Plan http://www.energyplan.gov.bc.ca/report/BCEP_ReportOnProgress_web.pdf ["Progress Report"]. Note that the legislation does not require BC Hydro to meet the 50% conservation target by 2020. Instead it requires BC Hydro to determine what measures would be required to achieve that goal and put those measures before the BCUC in its plan. The BCUC can then approve or reject the plan depending on whether it is "adequate" and "cost-effective." Also note that the 50% target only applies to BC Hydro, and not to other B.C. utilities (phone conversation with Jennifer Champion, Policy Analyst, Electricity Generation & Regulation Branch, B.C. Ministry of Energy, Mines and Petroleum Resources (January 25, 2009), and follow-up email [January 26, 2009]).

⁷² *Utilities Commission Act*, *supra* note 64, s. 43(1)(b)(ii). See "Progress Report", *ibid.*

thus sets the regulatory context and compels public utilities to contribute to resource conservation through demand-side measures, including HEEPs. Explicit provisions for LIEEPs are found in the DSMR under the Act.

The Demand Side Measures Regulation

The DSMR was deposited in 2008, and initially applied only to BC Hydro.⁷³ However, in June 2009 the regulation became applicable to all other major utilities.⁷⁴ The Regulation requires that a utility include a LIEEP as part of its long-term resource plan in order for it to be considered adequate under the *Utilities Commission Act*.⁷⁵ (The DSMR defines “low-income household” as a household whose annual pre-tax income is equal to or less than the LICO established by Statistics Canada for households of that type that year.)

The DSMR also requires utilities to provide mainstream energy-efficiency programs for rental housing. As mentioned, LICs disproportionately rent and tenants have more barriers to adopting major retrofits than homeowners do. Thus, this provision may substantially benefit LICs, to the extent that they are renters.

Subsections 4(2)(a) and (b) of the Regulation give a degree of preference to LIEEPs. They require the Utilities Commission to consider the benefit of a LIEEP measure to be 130% of its value calculated under the “Total Resource Cost Test”, when calculating the cost-benefit of the

⁷³ DSMR, *supra* note 64, s. 2.

⁷⁴ Except those “owned or operated by a local government or ... [with] fewer than 10,000 customers” (*ibid.*, s. 2). The rationale for delayed implementation was that only BC Hydro had a plan before the BCUC at the time of implementation. Now that the phased application has taken effect, municipal and other small operators are exempt so that small companies such as community geothermal providers are not unduly burdened with requirements to go to the BCUC, which may be beyond their capacity (phone conversation with Jennifer Champion, *supra* note 71).

⁷⁵ Specifically, s. 3(a) of the DSMR (*ibid.*) requires utilities to include LIEEPs in their long-term resource plans in order for the plans to be considered adequate under s. 44.1(8)(c) of the *Utilities Commission Act* (*supra* note 64).

measure.⁷⁶ This attempts to capture the numerous “noneconomic benefits” of LIEEPs that are missed by the Total Resource Cost Test—such as improved health and less homelessness in the low-income population. The exclusion of these noneconomic benefits could otherwise undermine the approval of a utility LIEEP.

Again, these new provisions are intended to help implement the *BC Energy Plan* policy of encouraging utility DSM programs.⁷⁷

Other Measures Implementing the BC Energy Plan

To encourage and coordinate DSM plans, \$500,000 will be invested toward a review and implementation plan for all provincial utilities in 2010.⁷⁸ The province is also establishing the BC Partnership for Energy Efficiency and Conservation, which will “coordinate policy and program actions between government, utilities, and crown agencies.”⁷⁹

In May 2008, the Energy Efficiency Buildings Strategy was released.⁸⁰ The strategy calls for requirements that all new homes meet an EnerGuide rating of 80 by 2010, and the implementation of a “green” B.C. Building Code.⁸¹ The B.C. Building Code has subsequently been amended to upgrade insulation requirements for single-family homes and multifamily complexes that are four stories or less. Builders can alternatively meet an EnerGuide rating of 77. Requirements for high-rise multifamily residential buildings have also been upgraded to a 2004 international standard.⁸² Ultra

⁷⁶ See note 219 for a discussion of the Total Resource Cost Test.

⁷⁷ “Progress Report”, *supra* note 71.

⁷⁸ *Ibid.* at 12.

⁷⁹ *Ibid.* at 8.

⁸⁰ *Ibid.* at 12.

⁸¹ BC Government, “Energy Efficient Buildings Strategy: More Action, Less Energy”, online: The BC Energy Plan <http://www.energyplan.gov.bc.ca/efficiency/PDF/EEBS-FACTSHEET-Homes-Commercial-Institutional.pdf>.

⁸² High-rise multifamily residential buildings must now meet the American Society of Heating, Refrigeration, and Air-Conditioning Engineers 90.1(2004) standard (BC Ministry of Housing and Social Development, Housing and Construction Standards, “Greening the BC Building Code: First Steps”, online: BC Ministry of Housing and Social Development <http://www.housing.gov.bc.ca/building/green> [accessed January 22, 2010]).

low-flush toilets and other water-saving technologies will also be mandatory. These new standards apply to all new buildings and renovations obtaining building permits on or after September 5, 2008.⁸³

Energy Poverty Strategies in Other Jurisdictions

Canada

Canada-wide Initiatives

One Canada-wide LIEEP is the Homeowner Residential Rehabilitation Assistance Program, administered by the Canadian Mortgage and Housing Corporation (CMHC). It provides forgivable loans for low-income homes to bring their houses up to health and safety standards.⁸⁴

Improvements are not limited to energy efficiency initiatives, but include heating, electrical, and structural repairs. Intended to bring homes up to minimum standards, the program promotes energy efficiency to the extent that efficiency is required by those standards. Those eligible for the program are homeowners who meet CMHC's income thresholds and property requirements.⁸⁵

As mentioned above, the main federal government LIEEP, the EnerGuide for Low-Income Households program, was cancelled. The intended five-year program would have provided financial

⁸³ *Ibid.* There is other legislation that tangentially impacts B.C. HEEPs/LIEEPs: the federal *Energy Efficiency Act*, S.C. 1992, c. 36, the B.C. *Energy Efficiency Act*, R.S.B.C. 1996, c. 114 and their numerous regulations bear on the provision of HEEPs/LIEEPs in B.C. insofar as the retrofit equipment and appliances marketed in them are governed by the energy efficiency standards and labelling requirements for consumer products under the legislation. Following the *BC Energy Plan*, new standards are being developed under the B.C. *Energy Efficiency Act* pertaining to certain appliances, windows, and water heaters.

⁸⁴ The program provides forgivable loans up to a maximum of \$16,000 - \$24,000, depending on the location of the home.

⁸⁵ CMHC, "Homeowner Residential Rehabilitation Assistance Program — Homeowner RRAP", online: CMHC http://www.cmhc-schl.gc.ca/en/co/prfinas/prfinas_001.cfm.

assistance up to \$5,000-\$7,000 for low-income homes, helping a total of 130,000 homes and providing annual net savings of \$1 billion for affected families.⁸⁶ In place of this program, Natural Resources Canada implemented its EcoENERGY initiative, including the EcoENERGY Retrofit Program which promotes energy efficiency by providing energy audits and retrofit grants for homeowners and owners of rental properties.⁸⁷ Tenants interested in the program must have their landlords or property owners apply.⁸⁸

Common Provincial Programs

Although, as critics point out,⁸⁹ there is no specific low-income component to the federal EcoENERGY Retrofit Program, many provinces have used the program to develop their own supplementary programs for LIHs. These provincial programs generally follow the format of conducting an energy audit, making improvements and retrofits, and completing a follow-up energy evaluation.⁹⁰ The provincial programs provide funding to supplement federal funds. Audits are

⁸⁶ Shuan Loney, "Fast Facts: The case for a national strategy on low income energy and water efficiency", online: Canadian Centre for Policy Alternatives <http://www.policyalternatives.ca/publications/commentary/fast-facts-case-national-strategy-low-income-energy-and-water-efficiency>.

⁸⁷ This information was derived from the website for the Natural Resources Canada Office of Energy Efficiency, at <http://oee.nrcan.gc.ca/residential/personal/retrofit-homes/grants-residential.cfm> (accessed January 12, 2010), but has since been removed. Related information is available at Office of Energy Efficiency, Natural Resources Canada, "ecoENERGY Retrofit – Homes Program", online: Natural Resources Canada <http://oee.nrcan.gc.ca/residential/personal/grants.cfm?attr=0>.

⁸⁸ Natural Resources Canada, Office of Energy Efficiency, "Frequently-Asked Questions (FAQ) about ecoENERGY Retrofit – Homes", online: Natural Resources Canada <http://oee.nrcan.gc.ca/residential/personal/retrofit-homes/questions-answers.cfm?attr=4#intro1>.

⁸⁹ See the Canadian Centre for Policy Alternative's critique of program cuts in Loney, *supra* note 86.

⁹⁰ Programs include the Saskatchewan Home Energy Improvement Project (Saskatchewan Ministry of Social Services, "Repairs & Renovations", online: Social Services <http://www.socialservices.gov.sk.ca/home-repair>); the Nova Scotia EnerGuide for Houses Assistance Program (Conserve Nova Scotia, "EnerGuide for Low-to-Modest Income", online: Conserve Nova Scotia <http://www.conservens.ca/energuede/low-to-modest/> ["Nova Scotia EnerGuide"]) and Residential Energy Affordability Program (REAP) (Conserve Nova Scotia, "Residential Energy Affordability Program (REAP)", online: Conserve Nova Scotia <http://www.conservens.ca/reap.asp> ["REAP"]); New Brunswick's Energy Efficient Retrofit Program for Low Income Households (Government of New Brunswick, Supply & Services, "Energy Efficiency Retrofit Program for Low Income Households", online: Government of New Brunswick <http://app.infoaa.7700.gnb.ca/gnb/Pub/EServices/ListServiceDetails.asp?ServiceID1=19556&ReportType1=All> ["New Brunswick Program"]); P.E.I.'s EcoENERGY Audit Assistance Program (P.E.I. Office of Energy Efficiency,

usually subsidized or paid for, and grants and/or interest-free loans are provided to cover retrofits up to a certain amount. Grant amounts tend to vary depending on the location of the household, with more funds provided to northern households.⁹¹ Retrofit measures can include insulation, draft proofing, air sealing, heating and ventilation system upgrades, low flow showerheads, CFL light bulbs, programmable thermostats and furnace cleanings.⁹² Specific retrofits vary by program and household.

“Taking Advantage of the ecoENERGY and Energy Efficiency Programs”, online: Office of Energy Efficiency <http://www.gov.pe.ca/photos/original/oeeform10.pdf> [“Taking Advantage”], which finances audits, its Home Energy Low-Income Program (HELP), which provides materials and tradespersons to do building envelope retrofits (P.E.I. Office of Energy Efficiency, “Home Energy Low-Income Program (HELP)”, online: Office of Energy Efficiency <http://www.gov.pe.ca/photos/original/oeeform14.pdf> [“HELP”], and email from Andy Collier, Energy Programs Officer, P.E.I. Office of Energy Efficiency [March 15, 2010]), and its Energy Efficiency Loan/Grant Programs (P.E.I. Office of Energy Efficiency, “Loan Program & Loan Relief Program”, online: Office of Energy Efficiency <http://www.gov.pe.ca/photos/original/oeeform15.pdf>); and Newfoundland’s Residential Energy Efficiency Program (REEP) (Newfoundland and Labrador Housing Corporation, “2010 Residential Energy Efficiency Program (REEP) For Low-Income Households”, online: Newfoundland and Labrador Housing Corporation http://www.nlhc.nl.ca/reep/Q&A_Flyer.pdf [“Newfoundland REEP”]), created following Newfoundland’s 2007 Energy Plan, “Focusing our Energy,” which committed \$6.9 million over three years to the provincial housing corporation to fund an LIEEP (Newfoundland & Labrador Ministry of Natural Resources, *Energy Plan: Focusing Our Energy* (2007), online: Ministry of Natural Resources <http://www.nr.gov.nl.ca/energyplan/EnergyReport.pdf>).

⁹¹ Examples of grant amounts are as follows. Under the Saskatchewan Home Energy Improvement Project grant amounts vary by income, and are up to \$4,000 in southern Saskatchewan and \$4700 in northern Saskatchewan. For owners of rental buildings, top-up grants are also provided. Maximum grant values are \$1000 per apartment unit in the south to \$1200 in the north. Grants for rental houses are up to \$3500-\$4200 per unit for single, semi-detached or row rental housing (Saskatchewan Housing Corporation, “Saskatchewan Home Energy Improvement Program (SHEIP) For Low and Moderate-Income Homeowners”, online: Saskatchewan Housing Corporation <http://www.gov.sk.ca/adx/asp/adxGetMedia.aspx?mediaId=168&PN=Shared> [“SHIEP”]). Under Newfoundland’s REEP program, grants of \$3000-\$4,000 (depending on location) are provided, along with funding for pre- and post-retrofit evaluations (a value of approximately \$500) (“Newfoundland REEP”, *ibid.*). LIHs using New Brunswick’s LIEEP are eligible for up to \$4500 in grants, and possibly more if needed to meet minimum health and safety standards. Nonprofits and cooperatives are eligible for maximum grants of \$3000-\$5000 per unit (“New Brunswick Program”, *ibid.*). Participants in Nova Scotia’s EnerGuide for Houses Assistance Program receive a \$400 grant and reimbursement for the \$150 cost of a home evaluation. A zero-interest loan of up to \$5000 is also available (“Nova Scotia EnerGuide”, *ibid.*). P.E.I.’s Energy Efficiency Grant/Loan Programs vary loan forgiveness amounts by recipient-income levels (“Taking Advantage”, *ibid.*), but the provision of loans has also been criticized for not addressing the needs of LIHs and not reaching renters (“P.E.I. expands home heating program” *CBC News* (5 March 2008), online: CBC <http://www.cbc.ca/canada/prince-edward-island/story/2008/03/05/homeheat-loans.html>).

⁹² For example, P.E.I.’s HELP provides air sealing, low-flow showerheads, programmable thermostats, and vouchers for furnace cleanings (“HELP”, *supra* note 90). Measures under Nova Scotia’s REAP include “installing insulation, sealing drafts and applying weather-stripping and caulking” (Conserve Nova Scotia, News Release, “Province Launches Low-income Energy Efficiency Program” (21 February 2008), online: <http://www.gov.ns.ca/news/details.asp?id=20080221001>).

Most programs target homeowners of single, duplex or row housing. Where rental buildings are included, they usually must: be low-rise, have low-income renters, and have the permission of the landlord or owner, who also receives the financial incentives.⁹³

Income thresholds vary from province to province and often with location (again, with higher cut-offs for persons living in northern regions). For example, in Saskatchewan the income thresholds range from \$30,000 in the south to \$42,000 in the north, and vary according to the age and number of residents.⁹⁴ Eligibility may also be determined by other criteria, such as whether the person is receiving a provincial or federal benefit like the National Child Tax Benefit.⁹⁵

There are some interesting distinctions between these otherwise similar programs. Eligibility for Nova Scotia's REAP is simplified: participants do not initiate an application but are instead referred from a government list of homeowners who are "preapproved for other home repairs."⁹⁶ New Brunswick's Energy Efficiency Retrofit Program for Low Income Households aims to maximize energy savings by prioritizing upgrades that will obtain the most energy savings. It also draws on provincial/federal repair-program money where additional work is needed to bring a home up to minimum health and safety standards.

⁹³ For example, for multifamily rental units in Saskatchewan, the grant is made to the owner, and the owner must rent to low-income tenants whose annual income falls within the limits set by the Saskatchewan Housing Corporation ("SHIEP", *supra* note 91). New Brunswick provides some assistance to owners of rental units. LIEEPs in Newfoundland and Nova Scotia are only available to owners of single, semi-detached and row houses. P.E.I. provides services to homeowners and persons with rent-to-own or lease-to-own agreements.

⁹⁴ Information from a Natural Resources Canada summary of SHEIP (see database at Natural Resources Canada, Office of Energy Efficiency, "Directory of Energy Efficiency and Alternative Energy Programs in Canada", online: Natural Resources Canada http://oe.e.nrcan.gc.ca/corporate/statistics/neud/dpa/policy_e/programs.cfm?attr=0). Other income thresholds are \$35,000 for P.E.I.'s audit and retrofit programs ("More Islanders eligible for energy efficiency programs" *The Guardian* (23 October 2009), online: The Guardian <http://www.theguardian.pe.ca/index.cfm?sid=297143&sc=98>), \$32,500 for Newfoundland's REEP, and \$40,000 for families and \$25,000 for singles under Nova Scotia's EnerGuide for Houses Assistance Program ("Nova Scotia EnerGuide", *supra* note 90). New Brunswick's LIEEP income thresholds vary by household region.

⁹⁵ This is done under P.E.I.'s audit and retrofit LIEEPs ("Taking Advantage", *supra* note 90).

⁹⁶ "REAP", *supra* note 90.

Another positive feature of the New Brunswick program is that it requires participating owners of rental units to sign an approval letter stating that rents will not be increased as a result of any retrofits. This protects low-income tenants whose landlords might try to justify a rent increase on the basis of the property's renovation, or, where tenants pay the utility bills, on the basis of consequent utility-bill savings. It also guarantees that, where energy costs are included in rent, any savings resulting from the retrofits will be passed along to the renters.⁹⁷

Newfoundland provides a more comprehensive approach to Energy Poverty by also delivering a provincial rebate program. 2008-09 energy rebates provided up to \$500 to families with a net income of \$40,000 or less. Rebate amounts vary depending on fuel source and income. The program predates the provincial LIEEP and does not have an energy efficiency component.⁹⁸

Manitoba: A Provincial Leader

Among the provincial programs building on federal funding, Manitoba has been a leader through its collaborative, community-based LIEEPs. Successful pilot projects in Winnipeg and Brandon drew on provincial and federal funding, as well as support from Manitoba Hydro and

⁹⁷"New Brunswick Program", *supra* note 90. Another interesting feature of provincial programs that relates to HEEPs more generally is the development of a central conservation body. Nova Scotia, New Brunswick and P.E.I. have established provincial energy efficiency bodies. While P.E.I.'s Office of Energy Efficiency is more of a central body for information and advice (Office of Energy Efficiency homepage, online: <http://www.gov.pe.ca/oeef/>), Efficiency New Brunswick and Conserve Nova Scotia actually help administer HEEPs (Efficiency New Brunswick, Homepage, online: Efficiency New Brunswick <http://www.energycynb.ca/enb/home.jsp>, and Conserve Nova Scotia, "About the Agency", online: Conserve Nova Scotia <http://www.conservens.ca/about/>). The Quebec Energy Efficiency Agency also develops and administers energy efficiency programs, as does the Ontario Conservation Bureau (both are discussed below in this paper). Nunavut also had an Energy Centre to pursue energy efficiency initiatives. The Centre was managed and largely funded by energy provider Quilliq Energy Corp., but closed in 2009 and programs were shifted to government ministries ("A Discussion Paper for Ikummatit: An Energy Strategy for Nunavut" (Nunavut: Energy Secretariat, March 2007), online: <http://www.gov.nu.ca/documents/energy/Sustainable%20Energy.pdf>, and "Quilliq Energy turns lights out at Nunavut Energy Centre" *CBC News* (23 March 2009), online: CBC <http://www.cbc.ca/canada/north/story/2009/03/23/energy-centre.html>).

⁹⁸ Government of Newfoundland and Labrador, News Release, "2008-09 Home Heating Rebate Announced" (8 December 2008), online: Government of Newfoundland and Labrador <http://www.releases.gov.nl.ca/releases/2008/fin/1208n06.htm>.

nonprofits.⁹⁹ Manitoba Hydro’s funding is provided through the company’s \$35-million fund for targeting energy efficiency upgrades in low-income homes. The money is derived from energy export profits.¹⁰⁰ Local organizations provided skills-training to low-income residents of target areas. These persons were then employed to conduct retrofits, bringing additional social and economic benefits to the area.¹⁰¹

The programs have been successful. The pilot program in Winnipeg’s Centennial Neighbourhood resulted in retrofits to over 120 homes and household savings of \$500 per year. Its success led local organisation BUILD, which was delivering the program, to establish Warm Up Winnipeg, which expanded the program to 16 of Winnipeg’s poorest neighbourhoods.¹⁰² The program continues to employ locally, with trainees participating in a 6-month program in which they conduct retrofits free of charge using supplies provided by Manitoba Hydro. Trainee wages are paid by the provincial government.¹⁰³

In one year the Brandon project retrofitted 55 houses, employed 15 trainees, and developed building inspection practices, an eligibility list, and a tool inventory. Projected greenhouse gas savings, based on 65 household retrofits, was 120 tons per year. Program challenges included maintaining a steady workforce, establishing processes and eligibility, and

⁹⁹ The Centennial Neighbourhood Pilot Project in Winnipeg was provided supplies and funding from Manitoba Hydro (a Crown corporation and the main provincial utility), the provincial government, the Winnipeg United Way, the Winnipeg Foundation, and community organization and skilled-trades training body B.U.I.L.D. Federal funding through the Canada ecoTrust for Clean Air and Climate Change was also provided to expand the program to more Winnipeg neighbourhoods (Kelly, *supra* note 2 at 11; Warm Up Winnipeg, “Programs & Services”, online: Warm Up Winnipeg <http://www.warmupwinnipeg.ca/programs.html> [“Winnipeg Programs”]; and, Government of Manitoba, News Release, “Lower Bills, Clean Energy, Reduced Poverty Focus of Inspiring Community Project: Rondeau” (29 November 2006), online: Government of Manitoba <http://www.gov.mb.ca/chc/press/top/2006/11/2006-11-29-115500-523.html>).

¹⁰⁰ See Beyond Kyoto – Manitoba’s Green Future, “Energy: Expanding Clean Energy and Energy Efficiency – Manitoba Helping the World”, online: Government of Manitoba http://www.gov.mb.ca/beyond_kyoto/index.html [“Manitoba Helping the World”].

¹⁰¹ Loney, *supra* note 86.

¹⁰² “Winnipeg Programs”, *supra* note 99.

¹⁰³ Abbott, Dauncey & Juchau, *supra* note 11 at 32.

meeting the original target of retrofitting 120 houses in one year.¹⁰⁴ The overall success of the Winnipeg and Brandon projects contributed to Manitoba getting an “A” rating—the highest grade in Canada—from the Canadian Energy Efficiency Alliance in 2004 and 2006.¹⁰⁵

The latest provincial initiative, the Manitoba Hydro Lower Income Energy Efficiency Program, was launched in 2007 and follows the same successful, community-based, collaborative model that draws funding from multiple sources and implements programs through community organizations.¹⁰⁶ This province-wide LIEEP features three stages of delivery:

- First, it offers a free home evaluation and certain items like CFL bulbs and low-flow showerheads.
- Second, depending on the evaluation, insulation as well as low-flow or dual-flush toilets may be installed at no or minimal cost.¹⁰⁷
- Third, owner-occupied homes can upgrade to a high-efficiency natural-gas boiler or furnace. Boilers receive a \$2500 rebate, and furnaces are installed at a charge of \$19/month for 5 years.

¹⁰⁴ Brandon Neighbourhood Renewal Corporation, “Brandon Neighbourhood Renewal Corporation - Brandon Energy Efficiency Program” (Power Point Presentation at the conference Time for Action: Tackling Energy Poverty in Canada Through Energy Efficiency, Toronto, 29 September – 1 October 2008) [formerly posted on Canada Green Communities website, URL is no longer available]. For more information on the conference host, Green Communities Canada, see <http://greencommunitiescanada.org/index.php>. For more information on the Brandon Neighbourhood Renewal Corporation, see <http://www.bnrc.ca/>.

¹⁰⁵ “Manitoba Helping the World”, *supra* note 100 and Government of Manitoba, News Release, “Province Expands Low-Income, Energy-Efficiency Program to Brandon” (27 July 2007), online: Government of Manitoba <http://news.gov.mb.ca/news/index,print.html?archive=&item=2023> [“Expand to Brandon”].

¹⁰⁶ Provincial ministries, Manitoba Hydro, and the Green Manitoba Efficiency Fund together provide materials, training, administrative support, audits, and other services to community programs, which deliver the initiative. Green Manitoba recoups federal EcoEnergy funds that the projects qualify for. This collaborative, community-based setup has been one of the keys to the program’s success. See Manitoba Hydro & Community Partners, “Manitoba’s Low Income Efficiency Strategy” (Presentation at the conference Time for Action: Tackling Energy Poverty in Canada Through Energy Efficiency, Toronto, 29 September – 1 October 2008) [formerly posted on Canada Green Communities website, URL is no longer available] [“Manitoba’s Low Income Efficiency Strategy”].

¹⁰⁷ This is paid for through both the federal ecoENERGY Retrofit Program and Manitoba Hydro.

According to Manitoba Hydro, the cost savings will more than cover the monthly payment on the furnace.¹⁰⁸ Projected energy- and water-bill savings are \$450-500 per year, per household.¹⁰⁹

Program eligibility is based on income cut-offs that are 125% of the LICOs, which vary with the size of the household's community. For example, the cut-off for a single-person household in rural areas is \$19,077, but it is \$27,714 in urban areas with 500,000 or more inhabitants.¹¹⁰ The program is available for owners and tenants of single and semi-detached homes, including townhouses and multiplexes. Tenants who participate must pay their own utility bills, and the landlord or owner would apply for the actual retrofit.¹¹¹

Quebec: Getting Stronger

In Quebec, the Agence de l'efficacité énergétique du Québec (the Quebec Energy Efficiency Agency, or "AEE") delivers provincial energy-efficiency-retrofit programs.¹¹² As of 2007, all AEE programs and annual budgets must be approved by the Régie de l'énergie, the provincial energy regulation agency.¹¹³ This includes approval of comprehensive three-year plans designed to meet government targets for energy efficiency and new technologies.¹¹⁴

Existing AEE programs include "Econologis," its program for low-income households. This two-part program features a visit from an energy efficiency advisor and technician, who give advice

¹⁰⁸ Manitoba Hydro, "Lower Income Energy Efficiency Program", online: Manitoba Hydro http://www.hydro.mb.ca/your_home/lower_income.shtml.

¹⁰⁹ "Manitoba's Low Income Efficiency Strategy", *supra* note 106.

¹¹⁰ Manitoba Hydro, Low Income Energy Efficiency Program, "Who Can Participate?", online: Manitoba Hydro http://www.hydro.mb.ca/your_home/lower_income_who.shtml.

¹¹¹ *Ibid.* Finally, it should be noted that in addition to the above programs, Manitoba also offers an HEEP for homeowners aged 55 or older. Although this program is not specifically a LIEEP, it targets a population that, particularly in later years, often has limited funds. The program offers audits and retrofits, and interestingly uses volunteer seniors to conduct program audits. See Manitoba Society of Seniors, "W.I.S.E.- Seniors Helping Seniors Program", online: Manitoba Society of Seniors <http://www.msos.mb.ca/wiseprogram.htm>.

¹¹² Agence de l'efficacité énergétique (AEE), Homepage, online: AEE <http://www.aee.gouv.qc.ca/en/home/>.

¹¹³ Régie de l'énergie, "2008-2009 Annual Report", online: Régie de l'énergie http://www.regie-energie.qc.ca/documents/rapports_annuels/rapp_ann_2008-2009_ang.pdf, at 2.

¹¹⁴ *Ibid.* at 9.

on ways to save energy, look at the needs of the residence, and then depending on time and needs, may implement measures such as caulking, weather-stripping, temperature adjustments, installing CFL bulbs, and insulation of electrical outlets. The second step is the installation of an electronic thermostat. Both steps are free for eligible participants.¹¹⁵

The Quebec organization Equiterre administered the Econologis program in the greater Montreal area on behalf of AEE, and from 2004 to 2008 visited approximately 2979 LIHs in a span of just under 4.5 years.¹¹⁶ Despite some program success, the number of households served and energy savings achieved were relatively small, and there were difficulties in obtaining sufficient building knowledge and auditing capacity.¹¹⁷

Efforts have recently been made to strengthen Quebec's LIEEPs. Support for these efforts was provided by a 2008 Advisory Committee Opinion, which called for the development of more extensive LIEEP programs.¹¹⁸ Consultations ensued,¹¹⁹ and a new, more effective and aggressive

¹¹⁵ Eligible participants for Econologis must rent or own their residence, be billed directly for heating, and use a fuel source other than wood for the main heating system. They must also meet income thresholds, which range from \$22,171 for a single-person residence to \$58,673 for a residence of seven or more persons. Eligibility requirements are set out at AEE, "Eligibility criteria", online: AEE <http://www.aee.gouv.qc.ca/en/my-home/econologis/eligibility-criteria/>. See the table at http://www.aee.gouv.qc.ca/fileadmin/medias/pdf/econologis/econologis_seuils_revenus.pdf for all income thresholds. Also see generally, AEE, Éconologis, "Program Content", online: AEE <http://www.aee.gouv.qc.ca/en/my-home/econologis/contenu-du-programme-econologis/>.

¹¹⁶ Number based on annual statistics reported in Equiterre's annual reports, which are posted on the Equiterre website at <http://www.equiterre.org/en/organisme/rapportsAnnuels.php>.

¹¹⁷ Phone conversation with Andre Giguere, Secretary General of the Advisory Committee (January 15, 2010), and email from Nicole Leclerc, Project Director, Direction générale des secteurs résidentiel, des affaires et institutionnel, AEE (March 15, 2010) ["Leclerc email 2"].

¹¹⁸ The Advisory Committee Opinion was issued by the Comité consultatif de lutte contre la pauvreté et l'exclusion sociale (the "Advisory Committee"). The Advisory Committee called for "measures for greater reach into low-income households and to significantly improve the ability of these households to pay their electrical bills." See Comité consultatif de lutte contre la pauvreté et l'exclusion sociale, "The Impact of Public Rate Increases on the Living Conditions of Low-Income Groups" (Advisory Opinion) (Quebec: Bibliothèque et Archives nationales du Québec, 2008) at 28 ["Advisory Opinion"]. The Advisory Opinion addressed the impact of public rate increases on low-income households, including increases in energy rates. It was developed and provided to the Minister of Employment and Social Solidarity in accordance with ss. 32 and 33 of the *Act to Combat Poverty and Social Exclusion*, R.S.Q., Ch. L-7. The Act provides for an advisory committee to submit opinions to the Minister on policies affecting poverty and social exclusion (s. 32(3)), and to make those opinions public (s. 33).

program was designed by the AEE.¹²⁰ This “Quebec Plan” was developed in 2007-08.¹²¹ A pilot project based on the plan is running this spring in select communities. A province-wide LIEEP has also been submitted to the Régie for approval, and would launch in 2010-2011 following the results of the pilot project.¹²²

The “Quebec Plan” design report reviews possible income cut-offs, surveying where programs in other jurisdictions have drawn the line. At the time of the report, LIEEP income thresholds based on a before-tax income for a family of four included:

- \$30,000 for Columbia Gas customers in Ohio;
- \$39,000 in Ontario;
- \$39,000 for the Quebec Econologis program;
- around \$42,000 in Manitoba with room for variation; and
- \$51,000 for National Grid customers in the northeastern United States.

¹¹⁹ The report also recommended that proposals that are endorsed be incorporated into the next Government Action Plan to Combat Poverty and Social Exclusion, along with allocated government funding (*ibid.* at 29). This Plan has not yet been released, but the recommendations have led to formal and information consultation, with the Advisory Committee particularly concerned about possible impending rate hikes. As explained in this section, a new LIEEP pilot program has been implemented, and a provincial LIEEP is expected to be announced in 2010 if approved (phone conversation with Andre Giguere, *supra* note 117).

¹²⁰ In conjunction with Dunsky Energy Consulting. See Philippe Dunsky, “Energy Efficiency for Private Low-Income Homes: The Quebec Plan” (presentation at the conference Time for Action: Tackling Energy Poverty in Canada Through Energy Efficiency, Toronto, 29 September – 1 October 2008) [published by Dunsky Energy Consulting], at slide 4 [“Quebec Plan”]; and email from Nicole Leclerc, Project Director, Direction générale des secteurs résidentiel, des affaires et institutionnel, AEE (March 12, 2010) [“Leclerc email 1”] and “Leclerc email 2”, *supra* note 117. For clarification, the Advisory Opinion was not the catalyst for the development of the new LIEEP, but was a source of support for a more progressive LIEEP.

¹²¹ “Quebec Plan”, *ibid.* at slide 19. The relevant legal framework includes legislative requirements that all energy distributors fund efforts to meet 2015 fuel savings targets and a strategic commitment by the AEE to target low-income households (*ibid.* at slide 4). Note that the commitment to address low-income households is a strategy decision, not a legal requirement (email from Philippe Dunsky, President, Dunsky Energy Consulting [January 19, 2010]).

¹²² “Leclerc email 2”, *supra* note 117, and “Leclerc email 1”, *supra* note 120; and AEE, “Pilot project on energy-efficiency improvements for low-income households”, online: AEE <http://aee.gouv.qc.ca/en/my-home/pilot-project-on-energy-efficiency-improvements-for-low-income-households/>. The pilot project is being implemented in Trois-Rivières and Montreal North only.

In contrast, eligibility for participation in the U.K.'s Warm Front program depends on participation in other low-income programs rather than on an income cut-off.¹²³

Income thresholds in the aforementioned programs were set by varying mechanisms, including internal decisions, variations on federal thresholds, and percentages of median revenues.¹²⁴ The "Quebec Plan" design report does not reach a conclusion on a recommended income threshold. However, it does stipulate that the program should be delivered at no cost, noting that in the past a Quebec pilot project asked for an upfront payment of 10% or up to \$200 and was unsuccessful.¹²⁵

Components of the proposed Quebec LIEEP, outlined in the "Quebec Plan" design report, would draw on best practices:

- Campaign outreach would be done through marketing campaigns and community organizations, and high-use/low-income areas would be targeted. Call centres and community groups would help determine eligibility.
- An initial energy audit would be conducted where relevant and no- and low-cost measures would be installed.
- Next an agreement would be made to pursue bigger upgrades and a commitment to co-pay would be made where applicable.
- Larger upgrades would include renovations to the building envelope (this includes doors, windows, walls, crawl spaces, roof insulation, and air sealing)¹²⁶ and the replacement of heating systems or appliances.

¹²³ "Quebec Plan", *supra* note 120 at slide 8.

¹²⁴ *Ibid.*

¹²⁵ *Ibid.* at slide 11.

¹²⁶ *Ibid.* at slide 10.

- A follow-up audit would be conducted through the ecoENERGY program, and program providers would recoup some costs through federal incentives (this simplifies the process for LICs by making program providers as opposed to participants responsible for cost recovery).
- Random sampling would be conducted to ensure program quality.¹²⁷

The proposed Quebec LIEEP is expected to cost \$200 million over five years, and deliver \$310 million in societal benefits, \$245 million of which would be direct avoided costs.¹²⁸ Service costs per household would be around \$4000-\$5000 and retrofits are expected deliver energy-bill savings of approximately \$325 per year.¹²⁹ Seventy-six percent of energy savings will come from upgrades to the building envelope, 15% from furnace and boiler replacements, and 5% from refrigerator replacements.¹³⁰ The program is expected to reduce CO2 emissions by almost 15 kT/yr after five years.¹³¹

Again, this program has not been fully implemented, but a pilot project has been approved and is now running. The pilot project is available to low-income homeowners and owners of multi-unit rental buildings where tenants pay their own energy bills (i.e., their heating costs are not incorporated into rental rates). It applies to consumers with all fuel types other than wood, and even where the LIC was previously enrolled in Econologis. Services for LIHs are free, but owners of buildings with four or more units may be required to contribute up to 20% of costs.¹³² The program

¹²⁷ *ibid.* at slide 12.

¹²⁸ *ibid.* at slide 13.

¹²⁹ *ibid.* at slide 17.

¹³⁰ *ibid.* at slide 16.

¹³¹ *ibid.* at slide 17. Projected savings after five years include savings of “roughly 100 GWh/yr of electricity, 330,000 m³/yr of natural gas, 3.4 million litres of fuel oil, and 90,000 trees’ worth of wood” (*ibid.* at slide 18).

¹³² Homeowners must fall within income thresholds, which are set at (for example) \$22,171 for a single-person residence and \$41,198 for a four-person residence. For owners of rental buildings with four or more units, at least 50% of tenants must fall within income thresholds. Interested tenants are advised to contact their landlord about

provides an audit, renovations, and a verification visit. Blower door tests are conducted pre- and post-renovation. Possible renovations include roof and hot water pipe insulation, air sealing, thermostat replacements, caulking, weather-stripping, and installation of CFLs, low-flow showerheads, and tap aerators.¹³³ Services are administered through an authorized local organization in each participating area.¹³⁴

Ontario: In Transition

Overview

Several different bodies are involved in the provision of LIEEPs in Ontario. The Ontario Energy Board (OEB) is an independent Crown corporation that regulates Ontario's energy utilities in the public interest (similar to the BCUC).¹³⁵ The Ontario Power Authority (OPA) manages and plans power procurement, supply, conservation, demand management, and transmission.¹³⁶ It also created and operates the Ontario Conservation Bureau.¹³⁷

The Ministry of Energy and Infrastructure, the Ministry of Municipal Affairs and Housing, the Social Housing Services Corporation, and various utilities companies have also been involved in

program participation. See AEE, "Eligibility Criteria", online: AEE <http://aee.gouv.qc.ca/en/my-home/pilot-project-on-energy-efficiency-improvements-for-low-income-households/eligibility-criteria/#c1900>.

¹³³ AEE, "Work offered free of charge", online: AEE <http://aee.gouv.qc.ca/en/my-home/pilot-project-on-energy-efficiency-improvements-for-low-income-households/work-offered-free-of-charge/>.

¹³⁴ AEE, "Contact information for authorized service organizations", online: AEE <http://aee.gouv.qc.ca/en/my-home/pilot-project-on-energy-efficiency-improvements-for-low-income-households/contact-information-for-authorized-organizations/>.

¹³⁵ OEB, "About the OEB", online: OEB <http://www.oeb.gov.on.ca/OEB/Consumers/OEB+and+You/About+the+OEB>.

¹³⁶ OPA, "Management, Mandate and Organization", online: OPA http://www.powerauthority.on.ca/Page.asp?PageID=122&ContentID=822&SiteNodeID=119&BL_ExpandID=).

¹³⁷ Conservation Bureau, "Role of the Conservation Bureau at the OPA", online: OPA http://www.conservationbureau.on.ca/Page.asp?PageID=122&ContentID=1491&SiteNodeID=129&BL_ExpandID=141. The OPA was formed under Ontario's *Electricity Restructuring Act* in 2004.

LIEEPs. However, at present, such programs are relatively short-term or interim measures, because government is developing a new province-wide initiative.¹³⁸

Although no specific laws require utilities to provide energy efficiency programs to low-income households, there are relevant ministerial directives and other frameworks that have informed such programs.¹³⁹ Several ministerial directives have shaped OPA programs for LIHs. Such directives include a target of reducing electrical consumption in social and low-income housing by 100MW through conservation and DSM.¹⁴⁰

Most recently, a directive extended current utility company energy efficiency programs, while the province develops new programs under the *Green Energy Act* (GEA).¹⁴¹ The specific implications of the GEA are still being assessed, and several parts of the Act have not yet been proclaimed.¹⁴² Nonetheless, the development of a new LIEEP seems to be implied by the GEA.

In addition to the new *Green Energy Act* and Ministerial directives to the OPA, the Ontario Energy Board's legal and policy frameworks also encourage LIEEPs. Gas distributors have a framework agreement with the OEB regarding DSM programs that requires a minimum contribution

¹³⁸ Email from Alison Cazalet, Policy Advisor, Regulatory Policy and Compliance Division, Ontario Energy Board (13 January 2010) ["Cazalet Email 1"].

¹³⁹ Section 25.30(2)(d) of the *Electricity Act*, 1998, S.O. 1998, Ch. 15, Sch. A, allows the Minister of Energy and Infrastructure to issue binding directives to the OPA regarding "the development and implementation of conservation measures, programs and targets on a system-wide basis or in particular service areas." Section 25.30(4) ensures compliance with these directives, stating that, "The [Ontario Energy] Board shall review each integrated power system plan submitted by the OPA to ensure it complies with any directions issued by the Minister and is economically prudent and cost effective." (Directives are listed at OPA, "Directives to OPA from Minister of Energy and Infrastructure", online: OPA

<http://www.powerauthority.on.ca/Page.asp?PageID=122&ContentID=6268&SiteNodeID=118>).

¹⁴⁰ Ministry of Energy, Direction, "Conservation and Demand-Side Management Initiatives (Residents of Low-Income and Social Housing)", from Dwight Duncan, Minister of Energy (6 October 2005), online: OPA http://www.powerauthority.on.ca/Storage/14/956_2005-10-6_MOE_CDM_Low_Income_and_Social_Housing.pdf.

¹⁴¹ *Green Energy Act*, 2009, S.O. 2009, c. 12, Schedule A [GEA]; and Ministry of Energy, Direction, "Supplementary Initiative to July 13, 2006 Direction re Coordination and Funding of LDC activities to deliver Conservation and Demand-Side Management Programs", from Gerry Phillips, Minister of Energy (8 December 2009), online: OPA http://www.powerauthority.on.ca/Storage/112/15999_December_8_2009_-_MEI_Directive_Supplement_to_July_13_06.pdf.

¹⁴² "Cazalet Email 1", *supra* note 138.

to programs for LIHs.¹⁴³ The OEB further requires distribution companies to fund conservation programs through their rates.¹⁴⁴

The OEB also developed a new LIEEP in response to a court ruling that the Board could take affordability into account when establishing rates and developing assistance programs for LIHs. The new LIEEP has been put on hold in light of the GEA, but the court ruling could facilitate LIEEPs. In addition, the design of the Board's suspended LIEEP should inform subsequent LIEEPs developed under the GEA.¹⁴⁵

¹⁴³ *Ibid.* The OEB has been involved in the development of DSM programs for natural gas utilities. In 2006 it approved a DSM framework that would see 14% of the residential DSM budget spent on low-income programs, along with 14% of the market transformation budget. Consultations to review this framework were initiated in 2008, but have yet to conclude pending the development of a new province-wide program and fallout from the GEA. In the interim, the 2006 framework continues to apply (*Ibid.*).

¹⁴⁴ Email from Alison Cazalet, Policy Advisor, Regulatory Policy and Compliance Division, Ontario Energy Board (19 January 2010); and Michael Janigan, *Letting Everyone Help: Removing Barriers to Consumer Participation in Energy Conservation* (February 2006), online: Public Interest Advocacy Centre <http://www.piac.ca/energy/reports>.

¹⁴⁵ The OEB was subject to a court ruling in Ontario Divisional Court that “the OEB has the jurisdiction to take affordability into account as part of its statutory mandate to set just and reasonable rates” (The Low Income Energy Network (LIEN), News Release, “New OEB program to protect low-income consumers from rising energy costs: Board’s comprehensive, province-wide approach commended by advocates” (10 March 2009), online: LIEN <http://www.lowincomeenergy.ca/2009/03/new-oeb-program-to-protect-low-income-consumers-from-rising-energy-costsboard%E2%80%99s-comprehensive-province-wide-approach-commended-by-advocates/> [“OEB program to protect”]). The ruling led the OEB to undertake extensive consultation on low-income energy issues (see OEB, “Consultation on Energy Issues Relating to Low Income Consumers (EB-2008-0150)”, online: OEB <http://www.oeb.gov.on.ca/OEB/Industry/Regulatory+Proceedings/Policy+Initiatives+and+Consultations/Consultation+on+Energy+Issues+-+Low+Income>), and in 2009 it announced its creation of a Low-Income Energy Assistance Program (“OEB program to protect”, *ibid.*). The program was to implement one standard for all utilities and focus on temporary income assistance, increased customer service flexibility, and targeted DSM and conservation programs (OEB, News Release, “OEB moves forward with new Low-Income Energy Assistance Program” (10 March 2009), online: OEB http://www.oeb.gov.on.ca/OEB/ Documents/Press+Releases/press_release_BoardReport_20090310.pdf). In its report announcing the program, the OEB noted the difficulty that LIHs have accessing DSM and conservation programs. The report also included strong educational and outreach components, a move commended by the Ontario organization Low Income Energy Network (LIEN) (“OEB program to protect”, *ibid.*). However, program implementation was halted late 2009 following instruction from the Ministry of Energy and Infrastructure. The Ministry explained that it is developing a comprehensive, provide-wide low-income program in accordance with the GEA and the provincial Poverty Reduction Strategy. As a result, it asked that the OEB wait for ministerial direction before proceeding with new initiatives. The Ministry noted that it would build on the work done by the OEB to date (Letter from George Smitherman, Deputy Premier and Minister of Energy and Infrastructure, to Howard Weston, Chair, OEB (8 September 2009), online: OEB http://www.oeb.gov.on.ca/OEB/ Documents/EB-2008-0150/letter_Ministry_20090908.pdf; and Letter from Kristin Walli, OEB Secretary, to “All Natural Gas Distributors, All Electricity Distributors, [and] All Participants in Consultation Processes EB-2007-0722, EB-2008-

Examples of Existing Programs

Following a 2006 ministerial directive to address LIHs, the Conservation Bureau provided low-income programs, including programs for social housing, private single-unit households, and private multi-unit buildings.¹⁴⁶ Specific programs included the Energy Efficiency Assistance for Housing pilot program, which was launched in November 2006 and targeted 2500 renter and owner LIHs. The audit and retrofit program aimed to save 1.3MW in electricity by the fall of 2007.¹⁴⁷

Other programs were administered for social housing, such as the Green Light Initiative and Affordable Housing Project – Energy Efficiency Program, described below.¹⁴⁸ The Conservation Bureau also developed a unique program for a First Nations community: the Georgina Island Project conducts community load analysis and household audits and retrofits in 100 homes. The measures include draft-proofing, and insulation and lighting upgrades. Band members are involved in the program and teach energy conservation to households and the community.¹⁴⁹

New energy-efficiency funding was provided in 2008 through the High Performance New Construction Program, developed by the gas utility Enbridge and the Ontario Power Authority.¹⁵⁰ The program deals with the construction and major renovation of certain industrial, commercial,

0150 and EB-2008-0346” (28 September 2009), online: OEB http://www.oeb.gov.on.ca/OEB/Documents/EB-2008-0150/letter_LowIncome_NextSteps_20090928.pdf).

¹⁴⁶ Conservation Bureau, “Ontario – a new era in electricity conservation” (Annual Report) by Peter Love, Chief Energy Conservation Officer (Toronto: Conservation Bureau, 2006), online: Conservation Bureau http://www.conservationbureau.on.ca/Storage/16/2123_CEEOAR2006.pdf, at 42 [“2006 Annual Report”].

¹⁴⁷ LIEN, News Release, “New energy conservation pilot program good news for 2,500 low-income homeowner and renter households, lays groundwork for a province-wide program” (9 November 2006), online: LIEN <http://www.lowincomeenergy.ca/2006/11/new-energy-conservation-pilot-program-good-news-for-2500-low-income-homeowner-and-renter-households-lays-groundwork-for-a-province-wide-program/>.

¹⁴⁸ Conservation Bureau, “A Progress Report on Electricity Conservation” (February 2007), online: http://www.conservationbureau.on.ca/Page.asp?PageID=122&ContentID=1715&SiteNodeID=156&BL_ExpandID=, at 10 [“Conservation Bureau 2007 Progress Report”]; Conservation Bureau, “Taking Action” (Annual Report) by Peter Love, Chief Energy Conservation Officer (Toronto: Conservation Bureau, 2007), online: Conservation Bureau [http://www.conservationbureau.on.ca/Storage/18/2340_AR2007_26Oct07\(Final\).pdf](http://www.conservationbureau.on.ca/Storage/18/2340_AR2007_26Oct07(Final).pdf) [“2007 Annual Report”], at 30; and “2006 Annual Report” *supra* note 146, at 43.

¹⁴⁹ “2006 Annual Report”, *ibid.*

¹⁵⁰ Ontario Ministry of Municipal Affairs and Housing, “High Performance New Construction (HPNC)”, online: Ministry of Municipal Affairs and Housing <http://www.mah.gov.on.ca/Page134.aspx> [“HPNC”].

and multi-unit residential buildings. It offers financial incentives at the design stage to encourage the energy efficient design of buildings, as well as at the completion of construction (based on kWh saved).¹⁵¹

Enbridge provides several LIEEPs, including its Home Weatherization Retrofit Program, to low-income gas customers in specified cities across Ontario. The program includes free audits, upgrades, and follow-up visits. Audits are particularly lengthy (three hours, while many programs provide 60- to 90-minute audits) and include inspections of attics, water heaters, wall and foundation insulation, heating systems, and ventilation, as well as advice in energy savings and reducing energy bills. Upgrades (such as insulation and draft-proofing) that an auditor identifies as applicable and cost-effective are carried out by contractors. Finally, a second assessment is done several weeks later to assess energy savings.

Eligible customers must own or rent a single, semi-detached, or row house that is 25 years or older, heat their home by natural gas, and meet income criteria.¹⁵²

Another Enbridge initiative is the Enhanced TAPS Program, which provides LIHs with energy-saving measures such as programmable thermostats, pipe insulation, high-efficiency showerheads, and kitchen and bathroom aerators, free of charge.¹⁵³ Union Gas provides these same measures to low-income families through its Helping Homes Conserve program.¹⁵⁴ At a more local level, the

¹⁵¹ City of Toronto, “Better Buildings Partnership – New Construction”, online: City of Toronto <http://www.toronto.ca/energy/bbp-nc.htm>, and Enbridge, Union Gas & OPA, “High Performance New Construction: Program Summary”, online: Enbridge https://portal-plumprod.cgc.enbridge.com/hpnc/files/OPA-HPNC_program_summary.pdf).

¹⁵² Eligible customers are those who reside in specified cities, and who meet the requirements listed above. In terms of income criteria, they must either be receiving one of the listed benefits (such as Allowance for Seniors or Guaranteed Income Supplement) or have an income at or below set thresholds (\$32,000 for a single person, or \$39,500 for four people). Enbridge, “Home Weatherization Retrofit Program”, online: Enbridge <https://portal-plumprod.cgc.enbridge.com/portal/server.pt?space=CommunityPage&control=SetCommunity&CommunityID=832>

¹⁵³ Ontario Ministry of Energy and Infrastructure, “Ontario’s Energy Efficiency Resource & Funding Guide” (February 2009), at 23.

¹⁵⁴ *Ibid.* at 24.

Toronto Community Housing Corporation's Appliance Renewal Program provides over 28,000 low-income renters with high-efficiency replacement appliances.¹⁵⁵

Finally, there are many energy assistance programs that address Energy Poverty but not energy efficiency, such as the Winter Warmth program. Under this program, the United Way partners with local utility companies, including Enbridge and Hydro One, to provide financial support to low-income families to help them pay their heating bills.¹⁵⁶

Social Housing Programs

Ontario also provides targeted LIEEPs for social and affordable housing.¹⁵⁷ In 2006, Ontario's Social Housing Services Corporation launched its Green Light Initiative. Funded by the OPA, this program built on existing energy audits done through the Corporation's Energy Management Program, and facilitated the implementation of energy efficiency measures by offering financial incentives. It also featured education programs for housing providers and residents.¹⁵⁸ By 2007, 5975 housing units had participated and generated savings of 1.2 MW.¹⁵⁹

2006 also saw the release of the Canada-Ontario Affordable Housing Program Guidelines, which included energy efficiency requirements for project proposals, based on recommendations

¹⁵⁵ *Ibid.* at 10.

¹⁵⁶ Winter Warmth Program, News Release, "Growing Support of Local Utilities for the Winter Warmth Program Helps More Ontario Families Stay Warm this Winter" (1 December 2009), online: Hydro One http://www.hydroone.com/OurCompany/MediaCentre/Documents/NewsReleases2009/ProvincialWinterWarmthFundRelease_2009.pdf.

¹⁵⁷ Note that Saskatchewan also has an LIEEP for social housing, its HomeFirst Initiative. This LIEEP provided affordable housing to lower income families. The five-year project was commenced in 2004, and included conservation or energy efficiency grants of up to \$1500 for 3000 homes (Canadian Housing and Rental Association, "Affordable & Efficient: Towards a National Energy Efficiency Strategy for Low-Income Canadians" (February 2005), online: Canadian Housing and Rental Association http://www.chra-achru.ca/CMFiles/Affordable_&_Efficient_-_symposium_background_paper17OCI-11192009-3571.pdf.

¹⁵⁸ OPA, "2007 Housing Initiatives", online: OPA <http://www.powerauthority.on.ca/Page.asp?PageID=924&ContentID=6498>.

¹⁵⁹ "Conservation Bureau 2007 Progress Report", *supra* note 148 at 10.

by the Conservation Bureau.¹⁶⁰ The Affordable Housing Project – Energy Efficiency Program was created in 2007 and promoted the purchase of select Energy Star® appliances.¹⁶¹

In 2009 the Ontario government matched federal funding to provide a total of \$1.2 billion for affordable housing in Ontario. Of that, \$704 million will go toward housing repairs and energy efficiency upgrades over a two-year span through the Social Housing Renovation and Retrofit Program (SHRRP).¹⁶² Provincial objectives for the SHRRP are to increase accessibility for seniors and persons with disabilities, increase tenant health and wellbeing, and increase buildings' energy efficiency.¹⁶³ Thus, retrofits and renovations are not limited to energy efficiency initiatives, but may include repairs or replacements of windows, doors, roofs, heating/cooling/ventilation systems, and appliances.¹⁶⁴ Maximum funding for renovation and retrofit projects is \$28,000-32,000 per unit although most projects are expected to average about \$14,000 per unit.¹⁶⁵

Potential program weaknesses are that energy audits are recommended but not required, and energy efficiency standards are not particularly stringent.¹⁶⁶ Positive features include

¹⁶⁰ "2006 Annual Report" *supra* note 146, at 43.

¹⁶¹ The Affordable Housing Project – Energy Efficiency Program was jointly provided by the OPA, the Ontario Ministry of Municipal Affairs and Housing, and Natural Resources Canada. Up to \$850 per unit was provided to purchase the appliances, and 848 households were served through this project. An educational component was also provided ("HPNC", *supra* note 150, and "2007 Annual Report", *supra* note 148).

¹⁶² The repairs and renovations component runs March 2009 to March 2011. Ontario Ministry of Municipal Affairs and Housing, "Affordable Housing Program Extension (2009) and Social Housing Renovation and Retrofit Program (SHRRP)", online: Ministry of Municipal Affairs and Housing, <http://www.mah.gov.on.ca/Page6602.aspx> ["SHRRP"].

¹⁶³ Canada-Ontario Affordable Housing Initiative, "Social Housing Renovation and Retrofit Program (SHRRP)" (Program Guidelines) (June 2009), online: Ministry of Municipal Affairs and Housing <http://www.mah.gov.on.ca/AssetFactory.aspx?did=6867>, at 7 ["SHRRP Program Guidelines"].

¹⁶⁴ *Ibid.* at 3 and 7. See Appendix G for a detailed list of possible energy efficiency retrofits.

¹⁶⁵ Maximum funding ranges from \$28,000 per unit in southern Ontario to \$32,000 per unit in the north. *Ibid.* at 10.

¹⁶⁶ Other than requiring that all replacement appliances be Energy Star® rated, SHRRP does not appear to have very demanding energy standards. It only requires that low-rise buildings subjected to retrofits and repairs meet provincial energy efficiency standards for buildings of the same age, and that high-rise buildings have greater energy efficiency than the Model National Energy Code for Buildings (*ibid.* at 11). (The Code was set in 1997, so its efficiency standards are likely lower than the standard that could be achieved today [National Research Council Canada, "National Model Construction Code Documents – About", online: National Code Documents http://www.nationalcodes.ca/mnecb/index_e.shtml].) Specific changes, like retrofitting windows, are encouraged to maximize energy efficiency but are not required to meet a specific standard (*ibid.*).

requirements that service providers sign an accountability framework¹⁶⁷ and agree to provide the units as affordable housing for at least 10 years.¹⁶⁸ Also, providers will be supplied with a full-time administrator to help implement the project, at no cost.¹⁶⁹

Other Provinces & Territories

Finally, some provinces do not have LIEEPs. Alberta has no province-wide program, but the City of Edmonton offers the High Efficiency Furnace Rebate for LIHs, a one-dimensional LIEEP which provides a \$2000 rebate to eligible households through the federal Residential Rehabilitation Assistance Program. The rebate covers the cost of installing a high-efficiency Energy Star® furnace.¹⁷⁰

The Yukon, Nunavut, and Northwest Territories all offer mainstream HEEPs only.

The United Kingdom

A National Fuel Poverty Strategy

The U.K. has one of the most progressive and comprehensive frameworks for the eradication of Energy Poverty (referred to in the U.K. as “fuel poverty”) in the world. The U.K. Government has pledged to end fuel poverty in vulnerable households in England by 2010, and to entirely eradicate fuel poverty from England by November 22, 2016. For the rest of Great Britain, the U.K. Government and Devolved Administrations (Scotland, Wales, and Northern Ireland) have set the goal of eradicating fuel poverty by 2018. The British Government has a national fuel-poverty

¹⁶⁷ “SHRRP”, *supra* note 162.

¹⁶⁸ “SHRRP Program Guidelines”, *supra* note 163.

¹⁶⁹ See “SHRRP”, *supra* note 162. Also note that service providers are subject to regular reporting requirements and audits as part of the program. Furthermore, the SHRRP cannot be combined with other programs without government approval. See “SHRRP Program Guidelines”, *supra* note 163, at 15.

¹⁷⁰ As opposed to a mid-efficiency furnace meeting building code requirements. See Carbon Dioxide Reduction Edmonton, “Frequently Asked Questions” (7 December 2009), online: City of Edmonton <http://www.edmonton.ca/environmental/documents/LowIncomeFAQ-200-12-07.pdf>.

strategy to tackle its root causes—household energy inefficiency, high fuel prices, and low household income.

The strategy comprises a strong “package” of measures across Government Departments, including:

- the Warm Front Scheme (under the Department of Energy & Climate Change [DECC]),
- the Carbon Emissions Reduction Target (CERT, under both DECC and the Office of the Gas and Electricity Markets), and
- the Decent Homes Programme (DHP, under the Department for Communities and Local Government).

These three programs address household energy efficiency, the need for a robust regulatory system to protect all consumers, Winter Fuel and Cold Weather Payments, and a wider tax and benefit system to increase household incomes.

The Warm Front Scheme

The Warm Front Scheme offers household energy audits and energy efficiency measures such as insulation, draft-proofing, and heating and lighting retrofits.¹⁷¹ With a recent increase to grant limits under the program,¹⁷² the vast majority of households do not have to contribute any payment toward their measures.

Eaga, the U.K.’s largest supplier of heating and renewable energy, is the lead contractor providing Warm Front services.¹⁷³ Eaga also offers domestic energy advice and an extraordinary proactive service, the Benefit Entitlement Check, to guide customers through a questionnaire to

¹⁷¹ Kelly, *supra* note 2 at 10.

¹⁷² Increases consist of a £3500 increase to grant limits in 2008-09, and a £6000 increase where oil or new, low-carbon heating technology is recommended.

¹⁷³ U.K. Department of Energy & Climate Change, The Warm Front, “The Warm Front Scheme Annual Report 2008/09” online: Warm Front <http://www.warmfront.co.uk/files/wf%20annual%20report%202008%202009.pdf>, at 2 [“Warm Front 2008/09”].

determine their eligibility for government benefits. Eaga then sends the customers a report detailing the benefits to which they are entitled and how to claim them. Finally, Eaga makes “closing the loop calls” to ensure that customers have gone on and made the claim. If they have not, they are given extra support and advice to do so.

There are three eligibility categories for participation in Warm Front: “Those Aged 60 or Over”; “Those Who Are Pregnant and Have Children Under 16”; and “Those in Receipt of Means Tested Benefits.” Applicants can be either homeowners or tenants (in which case the written permission of the landlord is required for the installation of any measures), but must receive at least one of an enumerated list of government benefits, such as a Pension Credit, Housing Benefit, Income Support, or a Child Tax Credit.¹⁷⁴

The Benefit Entitlement Check has dual benefits: it may directly increase the income of participants by facilitating benefits that they did not know they qualified for, and it qualifies applicants for participation in Warm Front where they were not receiving any benefits but are entitled to do so.

The Benefit Entitlement Check has had powerful results: 42% of originally ineligible applicants were found to be entitled to a benefit and thus eligible for Warm Front, and the annual increase in benefits averaged £1616 per customer.¹⁷⁵ Of another 2300 customers who had applied through the checks to see if they might be eligible for a cheaper tariff with their current supplier, 43% were found to be eligible and had their accounts amended accordingly.¹⁷⁶

¹⁷⁴ Haringey Council, “Warm Front Grants”, online: Haringey http://www.haringey.gov.uk/index/housing_and_planning/housing/housingadvice/homeheatloss/fuel_poverty_grant_assistance/warm_front_grants.htm.

¹⁷⁵ “Warm Front 2008/09”, *supra* note 173 at 12.

¹⁷⁶ U.K. Department of Energy and Climate Change, “The UK Fuel Poverty Strategy 7th Annual Progress Report 2009” (2009), online: DECC http://www.decc.gov.uk/en/content/cms/what_we_do/consumers/fuel_poverty/strategy/strategy.aspx, at 24 [“Fuel Poverty Progress Report”].

Warm Front remains the U.K. Government's flagship fuel-poverty-reduction program, and has over £950 million in funding for the period 2008-2011.¹⁷⁷ From 1996 to 2004, fuel poverty in the U.K. steadily diminished due to fuel-poverty-alleviation measures and stable fuel prices, reaching a low in 2004, when 2 million households were in fuel poverty, 1.5 million of which were "vulnerable" households (households in the "Priority Group": those with elderly persons, children, or the chronically sick or disabled).¹⁷⁸ However, since 2004, rising fuel prices have reversed the trend, adding another 2 million households to those in fuel poverty, 1.75 million of which are "vulnerable".¹⁷⁹ In 2008-09, Warm Front assisted almost 235,000 households.¹⁸⁰

The Carbon Emissions Reduction Target & The Decent Homes Programme

The Carbon Emissions Reduction Target (CERT) is the Government's main domestic energy-efficiency instrument and part of a three-phase obligation for large domestic energy suppliers to reduce household CO₂ emissions.¹⁸¹ CERT runs from 2008 through 2011 and requires energy suppliers to meet 40% of their energy reduction targets through a priority group of low-income households and households with elderly residents (70+ in age).¹⁸² CERT's lifetime carbon-savings goal is 185MtCO₂, which has required energy suppliers to invest £3.2 billion to help householders install energy efficiency measures by 2011.¹⁸³ Measures include the provision of insulation (cavity wall, loft, and solid-wall insulation), heating (fuel switching), lighting (CFLs), and microgeneration (ground-source heat pumps, solar water heating, and small-scale combined heat and power)

¹⁷⁷ *Ibid.* at 35.

¹⁷⁸ *Ibid.* at 3.

¹⁷⁹ *Ibid.*

¹⁸⁰ *Ibid.* at 4.

¹⁸¹ Obligations apply to the six major domestic energy suppliers with a customer base in excess of 50,000 customers.

¹⁸² "Fuel Poverty Progress Report", *supra* note 176 at 13.

¹⁸³ *Ibid.* at 14.

measures. Energy suppliers and consumers, except vulnerable customers in the Priority Group, co-finance CERT through levies on their energy bills.¹⁸⁴

The Decent Homes Programme (DHP) is a commitment that the Government made in 2001 to improve low-income housing. By 2010, DHP aims to: bring all social housing into a “decent” condition;¹⁸⁵ and, for vulnerable households in the private sector to increase the proportion of “decent” homes to 70%.¹⁸⁶ The standard of decency requires adequate heating and insulation to ensure thermal comfort. The DHP has greatly increased the energy efficiency of social-sector homes. Since 2001, 36% fewer homes fail the thermal comfort criterion, and between 1996 and 2006 tenants’ average heating bills dropped by £132/year (2008 prices).¹⁸⁷

Recent Reforms to the National Fuel Poverty Strategy

The British Government made a series of reforms to its fuel poverty strategy in 2008-2009.¹⁸⁸ In September 2008, the Prime Minister announced the £1 billion Home Energy Saving Programme, to be funded £90 million by the Government and £910 million by energy suppliers and (through passage of costs) consumers.¹⁸⁹ The Programme will provide energy cost subsidies to LIHs and seniors. It will also include a national energy-efficiency-education campaign—comprising

¹⁸⁴ This information was supplied through an email from Steve McBurney, Head of Energy Efficiency, U.K. Office of the Gas and Electricity Markets (23 November 2009).

¹⁸⁵ U.K. Department for Communities and Local Government, “PSA Target 7 – Decent Homes” (2009), online: Department for Communities and Local Government <http://www.communities.gov.uk/documents/corporate/pdf/psa-target7.pdf>, at 4. “Decent” housing is housing that: 1) meets the statutory minimum standard for housing; 2) is in a reasonable state of repair; 3) has reasonably modern facilities and services; and 4) provides a reasonable degree of thermal comfort (see 4, 7).

¹⁸⁶ *Ibid.* “Vulnerable” households are identified through receipt of one or more income-related or disability benefits, such as income support, a housing benefit, or a disablement benefit.

¹⁸⁷ “Fuel Poverty Progress Report”, *supra* note 176 at 14.

¹⁸⁸ *Ibid.* [No pinpoint].

¹⁸⁹ The (U.K.) Prime Minister’s Office, “HM Government Home Energy Saving Programme – Helping Households to Save Money, Save Energy” (11 September 2008), online: Number 10 <http://www.number10.gov.uk/wp-content/uploads/energy-saving-programme110908.pdf>, at 6-7.

personal letters to customers and print, radio, and TV advertisements—delivered jointly by government and energy companies.¹⁹⁰

The Government's £74-million increase of the Warm Front budget in its September 2008 Home Energy Saving Programme announcement, and £100-million increase in its November 2008 Pre-Budget Report, raised Warm Front's 2008-2011 funding to £959 million.¹⁹¹ In addition, between October 2008 and September 2009, the Government opened up Warm Front to competition, thereby improving customer service and value.¹⁹²

The Government also began a Warm Front pilot project to install low-carbon technologies like thermal heating systems and air-source heat pumps,¹⁹³ and launched the Community Energy Saving Programme (CESP), which obligates energy suppliers and generators to partner with local authorities and community groups to deliver £350 million in free and discounted central heating, energy efficiency measures, and benefit checks to some 90,000 households in 100 of the country's poorest communities.¹⁹⁴

At the same time, the Government allocated targeted funding for the Carbon Emissions Reduction Target (CERT) and the Decent Homes Programme (DHP), which will increase energy-saving measures for LIHs, the elderly, and social housing.¹⁹⁵ Finally, the Government has also

¹⁹⁰ *Ibid.* at 4-5.

¹⁹¹ "Fuel Poverty Progress Report", *supra* note 176 at 10.

¹⁹² *Ibid.* at 2.

¹⁹³ *Ibid.* at 37.

¹⁹⁴ *Ibid.* at 16. Delivery of CESP is to be via a street-by-street, "whole-house" approach (i.e., a package of measures that is tailored to each home). Consumers fund CESP through energy-bill levies imposed by the obligated energy suppliers and generators (email from Urszula Thorpe, CESP Manager, U.K. Office of the Gas and Electricity Markets [November 24, 2009]).

¹⁹⁵ "Fuel Poverty Progress Report", *ibid.* at 14-16. The Government modified CERT to be more beneficial to vulnerable populations: from August 2009 to 2011, a priority group of low-income and elderly households will receive approximately £1.9 billion for energy-saving measures. Furthermore, new legislation is planned to place social price support for households on statutory footing when the current voluntary agreement with energy suppliers ends in March 2011. This will give energy suppliers guidance on household types eligible for future support. For 2008-2011, the Government plans to invest a further £2.2 billion for energy efficiency enhancement in social rented homes through the DHP.

undertaken a range of initiatives to reduce fuel poverty through stabilization of the second fuel-poverty factor: retail energy markets (the price of energy).¹⁹⁶

The Regulatory Framework for HEEPs/LIEEPs in the U.K.

The *Utilities Act 2000* underpins HEEPs and LIEEPs by establishing an independent Gas and Electricity Consumer Council that aims to balance consumer and stakeholder interests.¹⁹⁷ Section 17(2) establishes the Council's duty to "have regard for" the interests of four priority categories of disadvantaged consumer: 1) low-income consumers; 2) the chronically sick or disabled; 3) pensioners; and 4) consumers in rural areas. Sections 9 & 13 impose a similar duty on the Gas and Electricity Markets Authority (established under s. 1). The *Utilities Act* also authorizes the Secretary of State to make regulations to provide for a cross-subsidy for the benefit of disadvantaged consumers.¹⁹⁸

HEEPs under CERT are mainly dealt with through the *Electricity and Gas (Carbon Emissions Reduction) Order 2008 (No. 188)*.¹⁹⁹ The Order establishes carbon-dioxide-reduction targets and mandates that large suppliers achieve at least 40% of the reductions through measures for disadvantaged priority groups.²⁰⁰

¹⁹⁶ *Ibid.* at 4-5. This was catalyzed by the fact that increases in gas and electricity prices have driven the increase in fuel poverty in the U.K. since 2004.

¹⁹⁷ *Utilities Act 2000* (U.K.), 2000, c. 27, s. 2.

¹⁹⁸ *Ibid.*, ss. 69, 98.

¹⁹⁹ Amended in 2009. See *Electricity and Gas (Carbon Emissions Reduction) Order 2008, S.I., 2008/188*.

²⁰⁰ The CERT Order obligates electricity and gas suppliers who have 50,000 or more domestic customers to achieve a target carbon-emissions reduction. Article 3 sets out this target (154- later amended to 185-million lifetime tons CO₂), which must be achieved by electricity and gas suppliers by March 2011. Article 13 requires a supplier to achieve at least 40% of its CO₂-reduction obligation by promoting measures to members of disadvantaged priority groups. The legislation defines "priority groups" as those domestic energy users who receive at least one government benefit from an enumerated list, who receive at least one government credit from an enumerated list and whose annual income is below £15,592, or who are at least 70 years old.

The Community Energy Saving Programme (CESP) was established through the *Electricity and Gas (Community Energy Saving Programme) Order 2009*.²⁰¹ The CESP Order adds to the CERT obligation by requiring specified electricity and gas suppliers to further reduce their carbon emissions, in part by promoting particular energy-efficiency measures to households in areas of low income.²⁰² This encourages progressive programs by crediting greater carbon-reduction values for such measures.²⁰³ Finally, to allow suppliers and generators flexibility in managing their carbon-reduction obligation, the CESP Order allows them to transfer and trade up to 100% of their individual obligation.²⁰⁴

The United States

Regulatory Background

The Low-Income Home Energy Assistance Program (LIHEAP) and Weatherization Assistance Program (WAP) are the cornerstones of the U.S. federal LIEEP framework.²⁰⁵

LIHEAP is delivered by the U.S. Department of Health and Human Services.²⁰⁶ Its mission is to assist LIHs in meeting their immediate home-energy needs. Its budget for 2009 comprised \$4.5

²⁰¹ *The Electricity and Gas (Community Energy Saving Programme) Order 2009*, S.I., 2009/1905 ["CESP Order"].

²⁰² *Ibid.*, art. 14. The specified gas and electricity suppliers are suppliers who have 50,000 or more domestic customers and electricity generators who have generated 10TWh/yr or more of electricity in specified years.

²⁰³ For each qualifying carbon-reduction action, art. 23 applies a carbon coefficient for the target household's fuel source, and a percentage multiplier (to account for the differential carbon impacts of different energy-efficiency measures: see Appendix I). Article 24 encourages the delivery of multiple measures per household by adding a "whole-house bonus" to the carbon-reduction calculation of each measure where more than one measure is delivered to a household (see Appendix II). Article 25 incentivizes the engagement of households by increasing the carbon-emissions reduction for each qualifying action by X%/2, where those actions are provided to more than 25% of domestic energy users in a particular low-income area, and X% is the percentage of domestic energy users to whom those actions are provided.

²⁰⁴ "CESP Order", *supra* note 201, arts. 20-21.

²⁰⁵ U.S. Department of Health and Human Services, Administration for Children & Families, Office of Community Services, "Low Income Home Energy Assistance Program (LIHEAP)", online: Administration for Children & Families <http://www.acf.hhs.gov/programs/ocs/liheap/>. (All following information on LIHEAP was drawn from this website.)

²⁰⁶ *Omnibus Budget Reconciliation Act of 1981*, Pub. L. No. 97-35, 95 Stat. 357-933. Title XXVI of the Act authorizes the U.S. Department of Health and Human Services to administer LIHEAP.

billion for block grants and \$590 million for contingencies. Much of LIHEAP's funding derives from WAP, which in turn is funded through income taxes. States apply for a block grant and receive an amount determined by Congress according to the state's particular weather and low-income-population dynamics. The President has the discretion to release contingency funds to states affected by extreme weather events or energy price spikes. To be eligible for LIHEAP assistance, a household's income must not exceed the greater of 150% of the poverty level or 60% (75% in 2009) of the State median income.

Title IV of the *Energy Conservation and Production Act*,²⁰⁷ as amended, authorizes the U.S. Department of Energy (DOE) to administer the low-income WAP.²⁰⁸ Through this program, weatherization service providers install free energy-efficiency measures in the homes of qualifying homeowners. Eligibility depends on the state, but is triggered either where the household income is less than 200% of the federal poverty line, or where the household income is 60% of the median state income. The average expenditure limit under WAP is \$6500 per home and energy savings pay for the upgrades within a few years.

DOE documents the savings and compares them against costs, so that over the years it can determine the efficacy of these measures. It also provides funding and technical guidance to the states, but the states run their own programs and set rules for issues such as eligibility. They also select service providers, which are usually nonprofit agencies that serve families in their communities, and review their performance for quality. Together, this group of more than 900 agencies makes up a nationwide weatherization network.

Under the federal umbrella of LIHEAP and WAP, states pass their own legislation to authorize HEEPs and LIEEPs. The standard regulatory framework for HEEP and LIEEP delivery in the

²⁰⁷ *Energy Conservation and Production Act of 1976*, Pub. L. No. 94-385, (codified as amended at 42 U.S.C. 6801).

²⁰⁸ "About WAP", *supra* note 6. (All following information on WAP was drawn from this website.)

U.S. is as follows. A statutory public-utility regulator authorizes energy utilities to levy a “system benefits charge” (SBC) on their consumers.²⁰⁹ The utility companies use the SBC to finance their own HEEPs/LIEEPs, which tend to promote costly infrastructural energy-efficiency upgrades such as appliance rebates and modest base-building work. This has frequently prejudiced low-income consumers, who help subsidize the energy efficiency measures that only more affluent households can afford.

A final federal law of note is the 2009 *American Clean Energy and Security Act*,²¹⁰ which establishes a cap on carbon emissions and is expected to raise energy prices. The Act protects LIHs from energy price increases by rebating the proceeds that result from the sale of 15% of the emissions credits associated with the carbon cap to LIHs. This is done through a refundable “energy tax credit” and an “energy refund.”²¹¹ A review of exemplary LIEEPs in the U.S. follows.²¹²

New England

The Appliance Management Program (AMP) is an exemplary LIEEP operative in Massachusetts, Rhode Island, and New Hampshire.²¹³ In 1995, electricity supplier National Grid

²⁰⁹ An SBC is designed to fund certain “public benefits” that are placed at risk in a more competitive (i.e., deregulated) utility industry. These benefits include, but are not limited to, assistance for LICs. SBCs may also help fund include renewable energy, research and development, and energy efficiency. See Fisher, Sheehan & Colton, “Electric Utility Restructuring and the Low-Income Consumer: What’s a ‘System Benefits Charge’?” (Facts on File: No.14, October 1997), online: FSC http://www.fsconline.com/downloads/Papers/1997_10_ICAA-14.pdf.

²¹⁰ U.S., Bill H.R. 2454, *American Clean Energy and Security Act of 2009*, 111th Congress, 2009.

²¹¹ Robert Pollin, Jeannette Wicks-Lim & Heidi Garrett-Peltier, “Green Prosperity: How Clean-Energy Policies Can Fight Poverty and Raise Living Standards in the United States” (Department of Economics and Political Economy Research Institute, University of Massachusetts, Amherst, June 2009) at 5.

²¹² Unless otherwise cited, all following information on specific U.S. LIEEPs was drawn from: Martin Kushler, Dan York & Patti Witte, *Meeting Essential Needs: The Results of a National Search for Exemplary Utility-Funded Low-Income Energy Efficiency Programs*, Report No. U053 (Washington: American Council for an Energy-Efficient Economy, September 2005).

²¹³ See *ibid.* at 11-15 for information on AMP.

partnered with the local low-income-weatherization and fuel-assistance network of Community Action Program (CAP) agencies²¹⁴ to develop the low-income, electricity-conservation AMP.

The main legislation governing AMP in Massachusetts is the 2008 *Green Communities Act*,²¹⁵ which requires that at least 25% of the state's electric load be satisfied by demand-side measures by 2020.²¹⁶ It also requires that the benefits of HEEPs be distributed equally to all customers, and that LICs are protected from adverse energy costs.²¹⁷

The program begins with an in-home visit by a CAP representative to assess energy use and efficiency.²¹⁸ It also includes referrals to other energy-efficiency and community-action opportunities, such as job training and educational programs.

AMP is funded by the systems benefit charge (SBC) that is required in all three states. Budgets vary year-by-year, but average US\$4.5 million in Massachusetts, US\$1 million in Rhode Island, and less than US\$100,000 in New Hampshire. Since 1996, the program has delivered more than 30,000 MWh in cumulative annual savings and 425,000 MWh in lifetime savings to over 30,000 customers. The program has achieved consistently high electricity savings—an average of 1200 kWh/household—that have reduced LIH electricity expenditures by about US\$100/year. Under the

²¹⁴ CAP agencies are local private and public nonprofit organizations that carry out the CAP, which was founded by the 1964 *Economic Opportunity Act* to empower the poor in the United States. CAP agencies aim to promote self-sufficiency in LICs and heavily depend on federal funding and LIC volunteers. There are currently over 1,000 CAP agencies, whose activities include promoting citizen participation, providing utility bill assistance, job training, and home weatherization for low-income individuals. See: Wikipedia, "Community Action Agencies", online: Wikipedia http://en.wikipedia.org/wiki/Community_Action_Agencies [accessed November 21, 2009].

²¹⁵ U.S., S.B., 2768, *An Act Relative to Green Communities*, Mass., 2008 (enacted).

²¹⁶ *Ibid.*, s. 116(a)(1).

²¹⁷ *Ibid.*, s. 116(b)(3). Also relevant is s. 106, which requires the Department of Housing and Community Development to make recommendations regarding what funding levels and sources—if any—will be spent on the LIHEAP, in order to assist LIHs in purchasing heating supplies.

²¹⁸ Audits include the use of AMP-innovated appliance-audit software and the use of blower-door-guided infrared scanners to accurately measure energy use from appliances and unnecessary heat and air losses through the building envelope.

standard Total Resource Cost Test,²¹⁹ AMP has a benefit-to-cost ratio of 2.56. Eligibility for participation in the AMP is 60% of the median income in Massachusetts (though ostensibly different standards apply in Rhode Island and New Hampshire).

AMP's success is attributable to a number of factors:

- The close relationship Community Action Program agencies have with LICs facilitates program marketing and customer engagement.
- Regulatory support has allowed AMP to be delivered to a broad audience: in Rhode Island and Massachusetts, regulating entities credit National Grid for non-electric savings, thereby allowing households that are heated with non-electric fuels to participate in the program.
- AMP delivers a “total package” of energy efficiency services according to an integrated, “house-as-a-system” approach. This can involve education, heating-system pumps and blowers, weatherization to address heating usage, and refrigeration, lighting, heating, and appliance upgrades.
- AMP auditors require diverse skills, including an ability to audit electric base-load conservation, diagnose causes and solutions for high electricity use, and run computers. National Grid found it helpful to phase program implementation to allow time for these skills to become more widespread.

²¹⁹ The Total Resource Cost Test is the primary DSM-program-evaluation tool used in most jurisdictions in North America. It is a test that measures the net costs of a DSM program as a resource option based on the total costs of the program, including both the participant's and the local distribution company's (i.e., the utility's) costs. See: Mark S. Winfield & Tatiana Koveshnikova, *Applying the Total Resource Cost Test to Conservation and Demand Management Initiatives of Local Electricity Distribution Companies in Ontario: Assessment and Recommendations for Reform* (Toronto: York University, June 2009), online: York University <http://www.yorku.ca/fes/research/docs/TotalResourceCostTest.pdf>, at 8.

AMP's success is also facilitated by National Grid's membership in a statewide "Best Practices Group" in Massachusetts, and through collaboration with other programs to enhance outreach to LICs via a joint-marketing effort called "Energy Bucks."²²⁰

Vermont

Vermont offers two leading LIEEPs: the Low-Income Single Family Service (LISF) and the Multifamily Low-Income Program. These programs were created as a result of Order #5980 of the Vermont Public Service Board, which required the creation of a state energy-efficiency utility, and mandated that at least 15% of the body's budget be spent on low income services. For the past 10 years, Efficiency Vermont has served as the state energy-efficiency utility, along with the Burlington Electric Department.²²¹

LISF was initiated in 2000.²²² It partners with the state Weatherization Assistance Program, "piggy-backing" onto WAP services to provide a comprehensive energy-efficiency service. Costs are saved upfront by using WAP energy audits and WAP identification and qualification of eligible households.²²³ Services include analyzing energy bills, installing high efficiency lighting, switching fuels, refrigerator and freezer replacement, education, and custom measures and arrangements with contractors. Measures are screened using a state cost-effectiveness measurement and must

²²⁰ Energy Bucks unites gas- and electric-utility companies with the Massachusetts Community Action Program Directors' Association and the Low-Income Energy Affordability Network to promote energy efficiency programs, fuel assistance, and utility discounts to qualifying LIHs.

²²¹ Burlington Electric Department serviced only the city of Burlington, with Efficiency Vermont delivering services to the remaining population. Together these two entities formed the mandated state energy efficiency utility. They are now subject to a proposal to combine them as a single entity (emails from Frances Huessy, Executive Assistant, Policy and Public Affairs, Vermont Energy Investment Corporation [March 12, 2010 and March 15, 2010]); and Vermont Public Service Board, Investigation into Energy Efficiency Utility Structure (Docket 7466), online: Vermont Public Service Board <http://psb.vermont.gov/docketsandprojects/eeu/7466>).

²²² See Kushler, York & White, *supra* note 212 at 25-29, for more information on LISF.

²²³ Homes are assessed for energy efficiency improvement at the same time they are evaluated for weatherization. Anyone on using electricity and eligible for WAP services is considered eligible for LISF. Those not eligible for reasons such as previous completion of WAPs or falling outside income guidelines will be considered for service outside the WAP.

have a benefit-to-cost ratio of at least 1.0. Between 2000 and 2005, 4515 households were served, 9353 MWh of energy were saved, and heating bills were reduced by an average of US\$234 per year per household.

In 2005 and 2006 the LISF program expanded to reach markets beyond WAP. This included collaborating with local low-income housing groups and state-funded affordable housing units, as well as stocking food banks with high-efficiency light bulbs and water-saving devices.

This comprehensive program has overcome the limitations of the previous patchwork of initiatives provided by some utilities, and helps ensure consistency of services and quality standards. LISF has taken steps to address other market barriers:

- Services are provided at no cost to households, negating the disincentive of upfront costs.
- Lack of knowledge and lack of customer investment and acceptance are dealt with by having energy auditors provide households with cost savings estimates, implementation protocols that include the latest technology, free light fixtures, contract management for major renovations, and increased education campaigns.
- The lack of incentives for owners of rental buildings is addressed by leveraging and facilitating financing for major renovations.
- A referral network is in place for referring LIHs to other available services.

The program is administered by Efficiency Vermont, which is funded through an energy efficiency charge to ratepayers. Additional funding for the LISF program comes through WAP and the State Office of Economic Opportunity.

The Multifamily Low-Income Program also receives funding from Efficiency Vermont.²²⁴ The program partners with other state utilities, and provides energy efficiency improvements to new and used residential multifamily buildings with five or more units, low-income tenants, and all fuel types. Like LISF, it also partners with the Weatherization Assistance Program. Measures provided include improvements in lighting fixtures, space and water heating and cooling systems, and ventilation, as well as building shell improvements and fuel substitution. Between 1997 and 2002, the program made improvements to 5937 housing units. Cumulative energy savings reached 12,291 MWh, plus additional savings in natural gas.²²⁵

As for lessons learned, the program found written guidelines were not sufficient. Instead, plans were reviewed with developers and suggestions for improvements made, all at no cost to the developer. Site visits were conducted. Incentives were reduced if developers failed to comply with incentive offers. The program has generated awareness and market demand, and has been successful in leveraging investment, such that ratepayers fund less than 50% of it.

Efficiency Vermont has continued to grow and foster energy savings. Its 2008 budget was 105% greater than its 2005 budget, and energy savings increased 150%. From 2006 to 2008 it spent \$6.3 million on LIEEPs.²²⁶ LIEEPs partnering with WAP served 1020 customers in 2008 and saved 1400 MWh.²²⁷ Efficiency Vermont's overall energy savings in 2008 were the highest in the U.S., at

²²⁴ See Kushler, York & Witte, *supra* note 212, at 29 and 83-86 for more information on the Multifamily Low-Income Program.

²²⁵ Of the total units participating between 1997 and 2002, 655 were natural gas customers. For savings, "[a]n estimated 7,201 annualized Mcf of natural gas are being saved as a result of projects completed between 1997 and 2003. The average estimated measure lifetime for natural gas saving measures is 23.4 years." (*Ibid.* at 85.)

²²⁶ Efficiency Vermont, "Year 2008 Annual Report" (1 October 2009), online: Efficiency Vermont http://www.encyvermont.com/stella/filelib/2008_Efficiency_Vermont_Annual_Report.pdf, at 1.

²²⁷ *Ibid.* at 5.

144,000 MWh, or 2.5% of the electric energy requirements of persons served by Efficiency Vermont.²²⁸

California: The Energy Management Assistance Program

An exemplary LIEEP operative in California is the Energy Management Assistance (EMA) program.²²⁹ EMA was developed in 1984 by Southern California Edison (SCE), a private electric utility, in collaboration with a gamut of community-based organizations, private contractors, other investor-owned utilities, and the California Public Utilities Commission (CPUC). EMA offers comprehensive, household-tailored services to qualifying LICs. Annual household-income thresholds set by the CPUC determine eligibility. Income thresholds are graduated, with an income of US\$30,500 for one-to-two-person households at the bottom end, to US\$58,000 for six-person households toward the top end.²³⁰

The program offers a “Comprehensive Service” delivery approach using the “Home Assessment Tool” to identify each energy efficiency measure in customer homes to determine whether the measure should be replaced. Appropriate energy-saving measures are then installed, and include both “non-weather-sensitive” and “weather-sensitive” measures. Non-weather-sensitive measures are universally available and include: high-efficiency refrigerators; CFLs; low-flow showerheads; water-heater blankets; faucet aerators; water-heater pipe wrap; hard-wired porch light-fixtures; and in-home energy education. Weather-sensitive measures may be subject to geographic limits and include: high-efficiency window/wall air conditioners; evaporative coolers; outlet gaskets; ceiling insulation; weather-stripping; caulking; and minor home repairs.

²²⁸ *Ibid.* at 2.

²²⁹ See Kushler, York & Witte, *supra* note 212 at 16-19 for information on EMA.

²³⁰ Income thresholds for households with more than 6 members add an additional US\$7400 per person. See California Public Utilities Commission, “Low-Income Energy Efficiency Program (LIEE)”, online: California Public Utilities Commission <http://www.cpuc.ca.gov/PUC/energy/Low+Income/liee.htm>.

Southern California Edison contracts a network of community-based organizations to deliver the EMA services, but contracts directly with suppliers for bulk-appliance purchases through a bid process. This procurement method has a number of benefits: it 1) ensures that applicable appliances are Energy Star[®] rated; 2) reduces the unit-cost of appliances; 3) uses SCE's capital rather than the far-smaller capital of community-based organizations; and 4) reduces warehousing and inventory costs for the community-based organizations as they receive supplies as needed.

The most competitive vendor supplies all program appliances to the community-based organizations and private contractors. This saves the utility and contractors money. Furthermore, SCE leverages its program with non-electric utilities and Low-Income Home Energy Assistance Program contractors. This allows some cost-sharing (such as in the provision of in-home energy education), and helps ensure that customers receive all services available to them. This increases participation in both EMA and LIHEAP.

In 2004, EMA budgeted US\$16 million, engaged 37,400 participants, saved 15.3 million kWh of energy, and had a cost-effectiveness of 0.63 under the Total Resource Cost Test. Over 2001-2004, EMA's participation rate was 16.3%, drawing 187,685 participants from 1.149 million eligible customers. EPA is funded through a public goods charge (i.e., an SBC) levied on customers.

California: The Regulatory Framework for LIEEPs

The state *Public Utilities Code*²³¹ grants robust statutory footing for LIEEPs.²³² Article 7 requires the Public Utilities Commission to ensure that LICs are not "jeopardized or overburdened

²³¹ *Public Utilities Code*, Division 1 ("Regulation of Public Utilities"), Part 1 ("Public Utilities Act"), Chapter 2.3 ("Electrical Restructuring"), Article 7 ("Research, Environmental, and Low-Income Funds").

²³² Subsection 381.5(a) stipulates that any evaluation of the effectiveness of LIEEPs will not solely be based on cost criteria, but also on the degree to which they facilitate low-income communities' access to other "quality" service programs. Subsection 381.5(b) ensures that LIEEPs be delivered to the "maximum number of eligible participants at a reasonable cost." Subsection 382(e) requires that the CPUC, with the assistance of the Low Income Oversight

by monthly energy expenditures,” and it authorizes different rates for LICs, different levels of rate assistance, and LIEEPs.²³³ It requires that funding be allocated to meet these objectives²³⁴, and it establishes a Low-Income Oversight Board.²³⁵ The Board’s tasks include needs-assessments, program evaluation and reporting, facilitating collaboration between state and utility LIEEPs, and encouraging the use of community service provider networks.

New York

New York is unique in having established the New York State Energy, Research, and Development Authority (NYSERDA), a public-benefit corporation that is funded through the system benefits charge that investor-owned energy utilities are required to exact from electric consumers.²³⁶ NYSEDA aims to help New York meet its energy goals by funding, among other activities, energy efficiency programs, including LIEEPs. For example, NYSEDA funding helped establish the New York Energy Smart program, which features energy efficiency outreach and education, DSM, and low-income services.²³⁷

The roles of NYSEDA include mediating between the Public Services Commission and contractors. This is a progressive approach: in most states, utility companies mediate between the

Board, periodically assess whether existing LIEEPs adequately address LIHs’ energy expenditures, hardships, language needs, and economic burdens.

²³³ Subsection 382(b), which also recognizes that “all residents of the state should be able to afford essential electricity and gas supplies”.

²³⁴ Subsection 382(d) directs the CPUC to allocate funds necessary to meet the low-income objectives detailed in s. 382.

²³⁵ Subsection 382.1(a) establishes the Low-Income Oversight Board and details its duties, which include: (1) monitoring and evaluating all LIEEPs; (2) assisting in the development and analysis of LICs’ needs-assessments; (3) encouraging collaboration between state and utility LIEEPs to lower the bills and increase the comfort of LICs; (4) providing the Legislature with reports on LIEEP implementation and LICs’ needs-assessments; (5) streamlining LICs’ application and enrolment in LIEEPs with general low-income programs; and (6) encouraging the usage of community service provider networks.

²³⁶ Unless otherwise cited, all information on NYSEDA was obtained by phone conversation with Candace Damon, of Hamilton, Rabinovitz & Alschuler, Inc., the past program implementer of New York’s Assisted Multifamily Building Program (November 13, 2009).

²³⁷ New York State Energy Research and Development Authority, “About NYSEDA”, online: New York State Energy Research and Development Authority <http://www.nyserda.org/About/default.asp>.

utility regulator and contractors, and utility companies are free to design and administer their own LIEEPs. Unfortunately, this often devolves LIEEPs to the promotion of expensive infrastructural upgrades in a small number of well-off homes. In contrast, NYSERDA is positioned to plan more comprehensive, ambitious, socially just LIEEPs.

Notable programs include the Assisted Multifamily Program (AMFP), an LIEEP targeted at residents of multifamily residential buildings whose average income is no greater than 80% of the State median. AMFP offers both technical and financial services to help buildings identify, finance, implement, and monitor energy-saving measures. Eligible measures include windows, boilers, insulation, and replacement appliances. Financial assistance is in the form of low-interest loans and needs-based grants. AMFP also provides free training to building owners, maintenance staff, and operators in the proper use and maintenance of energy-efficient technologies.

The Assisted Multifamily Program is a US\$19.3-million New York Energy \$mart™ program; therefore, it is funded by an SBC. Most energy improvements recommended by AMFP engineers generate savings that can be used to finance the capital work itself, and funding mechanisms have been designed accordingly. The New York Energy Smart Loan is a collaboration with conventional lenders across New York State that lowers the interest rate on loans for energy efficiency improvements. The Multifamily Loan Program offers low-interest financing for buildings that would not qualify for a conventional loan. The financing is secured by 80% of the project savings from energy efficiency upgrades.²³⁸

²³⁸ AMFP is modelled on a “whole-building” and “gap-funding” approach. The whole-building approach uses sophisticated computer modelling to accurately estimate the overall energy savings from complementary measures, thereby avoiding overestimating. The gap-funding approach analyzes whether there is a gap between the amount a property can finance alone and the cost of recommended energy improvements (which may cost from tens of thousands to millions of dollars). If there is a gap, NYSERDA funds are leveraged with funding from other local, state, federal, and utility programs. AMFP leverages an average of US\$4 in private funds for every US\$1 in public program funds.

Between 2000 and 2002, AMFP serviced 480 low-income properties and aimed to service 100,000 units by 2005. Total funding provided for this period was \$258 million.²³⁹ Energy efficiency rehabilitations financed through AMFP have helped ensure properties' financial solvency by reducing tenants' bills and increasing their comfort and safety, thereby decreasing vacancy and raising building owners' cash flows and reserves. Health and safety measures are a standard part of AMFP analyses, so tenants usually enjoy improved lighting and ventilation, as well as safer buildings.

Finally, AMFP's prioritization of quality assurance ensures that its practices are consistent and easily replicable. This is accomplished through firm underwriting standards, a detailed Policy and Procedures Manual, and rigorous documentation requirements.

The European Union

In 2002, the European Union adopted the *Directive on the Energy Performance of Buildings* (the "Directive"). The Directive is the EU's main policy tool for promoting energy efficiency in new and used buildings. It requires such things as baseline efficiencies in all new buildings and all large existing buildings undergoing major renovation.²⁴⁰ It also mandates energy efficiency labelling for all buildings offered for sale or lease. As of 2009, mandatory labelling schemes for existing buildings had been introduced in nine EU countries.²⁴¹ LIHs are not specifically mentioned in the Directive, but

²³⁹ Since its launch in 2000 through 2002, AMFP assisted more than 480 affordable-housing properties, or 7.5% of eligible units, in the state. From 2000 to 2003, AMFP was projected to save 58.5 million kWh with a cost-effectiveness of US\$.01 per kWh saved (electricity). From 2000 to 2005, NYSERDA committed some US\$70 million for 100,000 units. Combined with US\$258 million leveraged from other sources, new investments for energy efficiency renovations of affordable housing total US\$328 million. AMFP is projected to save consumers US\$70-80 million. On average, LIHs have saved US\$103 per unit per year in direct benefits (including averted rent increases), and property owners have saved US\$252 per unit annually.

²⁴⁰ European Council for an Energy Efficient Economy (eceee), "The Energy Performance of Buildings Directive", online: eceee <http://www.eceee.org/buildings/> ["eceee on Buildings Directive"]. "Large" buildings are 1000+ m².

²⁴¹ See Abbott, Dauncey & Juchau, *supra* note 11 at 48 (specifically at footnote 55 of this source).

the preamble stipulates that “the certification process may be supported by programmes to facilitate equal access to improved energy performance”.²⁴²

Although the Directive has had some positive impacts, implementation by member states has been slow, and further promotion and enforcement is needed.²⁴³ There has been a move to strengthen the Directive and its implementation, and in 2008 the European Commission proposed recasting it. The recast Directive is now in the last stages of adoption in the European Parliament and Council.²⁴⁴ The recast Directive includes the deletion of the “large” threshold requirement for the application of energy efficiency requirements to renovated existing buildings (meaning all renovated buildings would be subject to energy efficiency requirements). It also requires new buildings meet “near-zero” emissions levels, and introduces penalties for noncompliance. No

²⁴² EC, *Commission Directive 2002/91/EC of 16 December 2002 on the energy performance of buildings*, [2003] O.J. L 001/65, at para.16, online: EUR-Lex <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0091:EN:NOT>.

Other relevant provisions in the Directive are as follows. The preamble stipulates that the Directive sets out the base principles, but methods of implementation will be left to member states to develop in order to allow them to meet their unique circumstances (para. 21). It also states that provision should be made for adjusting standards and calculations to meet advancements in technology (para. 22). According to art. 1 of the Directive, “[t]he objective of this Directive is to promote the improvement of the energy performance of buildings within the Community, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness.” The Directive then lists requirements regarding: a general framework of calculating building energy-efficiency; minimum efficiency levels in all new buildings and all large existing buildings subjected to major renovation; an energy certification process; and boiler and air-conditioning system inspections. Article 11 allows for future refinement of the Directive to provide better incentives for energy efficiency measures, and to expand the Directive to include renovations for smaller existing buildings (buildings with less than 1000 m² of useful floor area). Finally, art. 13 facilitates the regular adaptation of the Directive as technology advances by requiring Annex 1 and 2, which respectively list the methodology of calculating energy performance, and energy efficiency technologies that must be considered, to be reviewed every two or more years, with amendments made to the Directive as necessary.

For a good description of the Directive, see the “ecee policy brief” (at European Council for an Energy Efficient Economy [ecee], “Buildings: Documents and links”, online: ecee <http://www.ecee.org/buildings/docs/> [“Buildings”]). Implementation has been facilitated by the European Commission’s “Buildings Platform”, an information-sharing body that posts stakeholder and implementation updates on its website, and “Concerted Action”, which facilitates meetings between experts from Member States (“ecee policy brief”, *ibid.* 3-4).

²⁴³ “ecee policy brief”, *ibid.* at 2.

²⁴⁴ “ecee on Buildings Directive”, *supra* note 240.

specific energy efficiency target is set for existing buildings, a feature that has been criticized,²⁴⁵ but member states are to develop policies and targets in which renovated existing buildings will also be brought up to a near-zero emissions standard. A harmonized calculation system was also introduced.²⁴⁶

Germany

Within the EU, Germany has emerged as a leader in energy efficiency programs for buildings, garnering the highest ranking on a list of best energy efficiency policies in the world's largest economies.²⁴⁷

Part of Germany's energy efficiency initiatives for buildings has been a highly successful pilot project for LIHs. Financed by the federal government, the project offers a combination of audits, advice, retrofits, financial incentives, and microcredit towards the replacement of major appliances. Energy audits follow a set procedure. Retrofits are provided through the "instant help package", which includes water-saving appliances and the provision of five CFL bulbs strategically installed in areas that demand the most operating hours.

Power-measuring devices are installed on refrigerators and freezers. If replacements with high-efficiency models will save at least 200 kWh, then a grant of €200 is provided for replacement, along with microcredit of around €200-300 to finance the difference between the cost of the high-

²⁴⁵ The non-governmental agency European Council for an Energy Efficient Economy (eceee) has expressed concern that the recast Directive does not include targets for existing buildings, given their large proportion of the housing stock ("eceee policy brief", *supra* note 242).

²⁴⁶ *Ibid.*

²⁴⁷ WWF & E3G, "The best and worst policies for climate and economic recovery" (November 2009), online: WWF http://assets.panda.org/downloads/e3g_wwf_scorecards_ii_briefing_note_nov_2009.pdf, at 5. The report notes that Germany's program "reduces emissions substantially in the short and long term, creates jobs in the building market and can be implemented effectively in almost all other countries" (5-6). The report notes that although similar programs exist in other countries, they are not as integrated or comprehensive as Germany's program.

efficiency model and the grant.²⁴⁸ Microcredit loans are tailored to the individual household to ensure that the savings from retrofits and new appliances will cover the cost of the loan.²⁴⁹

A study of the energy savings from the project found significant savings from replacing old refrigerators and freezers, because many low-income households used obsolete second-hand appliances. The refrigerator replacements alone accounted for 48% of the total costs saved by families participating in the program.²⁵⁰ Overall, the program reduced household energy use by approximately 18%, or a reduction of 3.7 tons of CO₂ per household. The cost was 7¢ per kWh, and the financial savings were approximately €840 per household, not accounting for increases in electricity prices.²⁵¹ In further assessing the cost-benefit ratios for the project, researchers concluded that the macroeconomic benefits covered project costs with ease.²⁵²

Other European Initiatives

Intelligent Energy Projects

There are several low-income projects run by the European Commission's "Intelligent Energy" program. Intelligent Energy provides funding to overcome market barriers to energy efficiency and renewable energy initiatives.²⁵³

The Energy Exploitation and Performance Contracting for Low Income and Social Housing project ran from 2006 to 2009 and organized and studied pilot projects in four European countries. The program resulted in improved indoor conditions for program participants, follow-up projects by

²⁴⁸ Dieter Seifried, Evelin Richter, & Rainer Schüle, "Improving energy efficiency for low-income families", in eceeee, *ECEEE 2009 Summer Study*, online: Büro Ö-quadrat http://www.oe2.de/fileadmin/user_upload/download/2130_Seifried.pdf, at 401.

²⁴⁹ *Ibid.* at 402.

²⁵⁰ *Ibid.* at 403.

²⁵¹ *Ibid.* at 401.

²⁵² *Ibid.* at 405. For a more detailed breakdown of costs and benefits, see pages 404-405 of the report.

²⁵³ Intelligent Energy – Europe, homepage, online: European Commission <http://ec.europa.eu/energy/intelligent/>.

municipalities and towns, and templates and guidelines for programs.²⁵⁴ The European Fuel Poverty and Energy Efficiency project also ran from 2006 to 2009. This information sharing program aimed to bring together various member states to develop awareness of the issue of fuel poverty and find optimal ways to address it within the individual circumstances of member states. The program focused on workshops discussing definitions of fuel poverty and best methods for addressing it, looking at the three contributing factors: low income, high energy prices (and their disproportionate impacts), and poor housing stock.²⁵⁵

Finally, the SQUARE project (a System for Quality Assurance when Retrofitting existing buildings to Energy efficient buildings) runs from 2007 to 2010 and aims to develop a strong Quality Assurance system for energy efficiency retrofits. The program retrofits social housing in Sweden, Finland, Austria and Spain using a Quality Assurance system, which aims to ensure both energy efficiency and improvement of the indoor environment are addressed. It also ensures that the improvements with the most energy savings are selected. The project seeks to:

- improve current Quality Assurance systems;
- develop examples of successful model retrofit projects using up-to-date knowledge;
- collect useful data to disseminate through member states and inform future projects; and
- lead to the implementation of an energy management standard in Europe.

²⁵⁴ Intelligent Energy – Europe, Intelligent Energy Projects, “Energy Exploitation and Performance Contracting for Low Income and Social Housing (ECOLISH)”, online: European Commission http://ieea.erba.hu/ieea/page/Page.jsp?op=project_detail&prid=1517. See <http://www.ecolish.com> for more program information.

²⁵⁵ More information about the European fuel Poverty and Energy Efficiency project are available at the European fuel Poverty and Energy Efficiency homepage, online: <http://www.alpheeis.biz/epeeproject/index.htm> or <http://www.fuel-poverty.org/>.

One of the lessons learned so far in this project is the importance of having a quality assurance program that is easy to understand and adopt. An instructive guide for owners and clients was found to be beneficial.²⁵⁶

Other EU Projects

A recent EU-funded pilot project in the southern and eastern Mediterranean financed building or retrofitting and monitoring ten low-energy demonstration buildings.²⁵⁷ Although only one of the ten buildings involved low-income residents, the countries involved were mostly developing nations (e.g., Algeria, Syria, Turkey), and lessons learned from the project are still informative. Project findings included that upfront costs and lack of education can form barriers to engagement and savings,²⁵⁸ and that insulation, efficient lighting, solar water heating and improved air conditioning are among the most cost-effective measures.²⁵⁹

The project evaluation also found that unforeseen costs can arise from the need to train and supervise workers and import materials.²⁶⁰ Furthermore, countries with low energy costs, often due to high subsidies, will require strong political will and comprehensive government support to implement energy-efficient building programs. Otherwise, because the potential for financial

²⁵⁶ Intelligent Energy – Europe, Intelligent Energy Projects, “A System for Quality Assurance when Retrofitting existing buildings to Energy efficient buildings (SQUARE)” online: European Commission http://ieea.erba.hu/ieea/page/Page.jsp?op=project_detail&prid=1738. More details are available at the program website: <http://www.iee-square.eu>.

Other projects include Social Housing comprehensive Refurbishment through energy Performance contracting (FRESH) (see http://ieea.erba.hu/ieea/page/Page.jsp?op=project_detail&prid=1869), the big green housing and energy exchange (POWER HOUSE EUROPE) (see http://ieea.erba.hu/ieea/page/Page.jsp?op=project_detail&prid=1795), and ROSH, which also undertakes social housing retrofits (see http://www.rosh-project.eu/project_about.php).

²⁵⁷ Klaus Wenzel, “Low-energy buildings in southern and eastern Mediterranean countries”, in eceee, *ECEEE 2009 Summer Study*, online: MED-ENEC, http://www.med-enec.com/docs/20090606_4016_Wenzel.pdf, at 767.

²⁵⁸ *Ibid.* at 769-771, and 74-775. Note that one progressive program for addressing upfront costs is the ProSolProgramme in Tunisia, in which solar water heaters are paid for through a credit. The credit is then paid off in monthly instalments corresponding to the energy cost savings generated (774). This is similar to the approach taken by Manitoba in financing furnace replacements.

²⁵⁹ *Ibid.* at 773.

²⁶⁰ *Ibid.* at 774-775.

savings is low, motivation to engage is reduced.²⁶¹ As well, builders of rental buildings favour low-cost construction because they do not realize any benefits from energy efficiency construction (the split-incentives issue). The report noted that some European countries have tried to address this by publishing rent rates including energy costs.²⁶²

The project report concluded that there are significant macroeconomic benefits to be gained by such programs.²⁶³ It also recommended that government should cultivate such programs with a regulatory framework, enforced standards, subsidies for energy-efficient technology and other financial incentives, as well as training, education and awareness initiatives.²⁶⁴

Summary of Best Practices for LIEEPs

A review of the literature and of Canadian, U.S. and European LIEEPs reveals the following best practices:²⁶⁵

- **Centralize program oversight:** A central energy-efficiency body should oversee, fund and monitor HEEPs and LIEEPs. This improves accessibility, advocacy, and consistency of services and standards (see, for example, the use of centralized energy-efficiency bodies in Quebec and Vermont).
- **Comprehensive and holistic:** LIEEPs should address multiple end-uses and savings-opportunities simultaneously, instead of a single technology or end-use. All measures

²⁶¹ *Ibid.* at 776-778.

²⁶² *Ibid.* at 775.

²⁶³ These macroeconomic benefits include training, knowledge and job development in an emerging sector, improved protection of vulnerable persons, improved health of residents and building users, potential economic gain by exporting unused energy, and savings on direct energy subsidies and additional power generation infrastructure (*ibid.* at 777).

²⁶⁴ *Ibid.* at 778.

²⁶⁵ Unless otherwise noted or more specifically pinpointed, the following best practices and recommendations are drawn generally from: LIEEP programs described above; Longland, *supra* note 15; Kushler, York & Witte, *supra* note 212; and Green Communities Canada, *Proposed Framework for a National Low-Income Energy Efficiency Program* (Peterborough, ON: Green Communities Canada, March 2006).

should be considered, including household behaviours. All fuel types should be addressed. This minimizes intrusion into customers' homes while maximising benefits, facilitates program marketing and reach, is more cost-effective, and prevents lost opportunities for savings.²⁶⁶ LIEEPs should also provide basic health and safety upgrades where needed. For example, this holistic approach is done in New Brunswick, where both provincial and federal health and safety repair funds are leveraged.²⁶⁷ As one report puts it, “[b]uilding envelope improvements are useless if windows are broken”.²⁶⁸

- **Inclusive eligibility requirements and program elements:** All housing types, including rental and mixed-occupancy or mixed-use buildings, should be eligible for the LIEEP,²⁶⁹ and LIEEP elements should be consistent with target populations.²⁷⁰ By addressing all housing and consumer types and designing programs accordingly, programs will reach more LIHs, be more effective, and achieve greater energy savings.
- **Simple and consistent income criteria:** Income criteria for participation in the LIEEP should be simple and consistent with other low-income programs. For example, eligibility for an existing income-tested program (e.g., the GST rebate) should automatically qualify eligibility

²⁶⁶ See for example Kushler, York & Witte, *ibid.* at 5-6, Maynes, *supra* note 18 at 10, and Keith Stewart & Kim Fry, *A Low-income Energy Efficiency Program: Mapping the Sector and Program Design Principles*, commissioned for the Ontario Conservation Bureau (Toronto: Toronto Environmental Alliance, March 2006), at 28. As Kushler et al. explain, cost-efficacy is achieved both by ensuring the most cost-effective measures are used, and by having one marketing campaign for all fuel types, as opposed to separate campaigns for each type.

²⁶⁷ “New Brunswick Program”, *supra* note 90.

²⁶⁸ Maynes, *supra* note 18 at 11.

²⁶⁹ See Stewart & Fry, *supra* note 266, which recommended developing five “streams” for LIEEPs, each specific to a target population. The recommended streams were: aboriginal housing; owner-occupied households; small, private, multi-unit rental buildings; large, private, multi-unit rental buildings (e.g., high-rises); and social housing (25-27). Also see Kushler, York & Witte, *supra* note 212 at 6.

²⁷⁰ Mass marketing may be less successful than marketing to a target group. For example, some target LIHs will need marketing delivered in their native tongue (Maynes, *supra* note 18 at 10).

for an LIEEP to reduce administration and application time and costs.²⁷¹ It may also be suitable to vary income thresholds by location, community size, and/or household size.

- **Fully facilitated instead of participant-driven:** LIEEPs should fully facilitate (offer “turnkey”) services for customers, including booking appointments, arranging and paying for contractors, coordinating funding, and recovering applicable incentives (such as federal EcoENERGY funds). The full-service approach helps to overcome the various barriers faced by the most vulnerable LIHs.²⁷² Using a one-stop-shop approach, which mitigates participants’ lack of time, knowledge, and/or human resources, should maximize facilitation.²⁷³
- **No costs for households:** LIEEPs should not cost LIHs, because costs act as a barrier to participation. Many LIHs cannot afford the upfront costs, even where savings will be realized in the long-term.²⁷⁴ Where improvements are to be paid off through energy

²⁷¹ Maynes, *ibid.* at 8. One example is the Vermont LISF program, which saves costs by servicing those households already eligible for WAP services. Another example is the U.K.’s Warm Front program, where persons receiving specified benefits are automatically eligible. Nova Scotia’s REAP program also follows this method. It has no application process and instead serves persons from a government list of households preapproved for repairs. Also see Lower-Income Households Energy Efficiency Strategic Framework Committee, *Lower-Income Households Energy Efficiency Draft Strategic Framework*, prepared for the Canadian Council of Energy Ministers, Demand-Side Management Working Group (August 2009) [unpublished, provided by the Natural Resources Canada Library, Ottawa] at 21 [“Strategic Framework”].

²⁷² Maynes, *ibid.* at 9. Also see “Quebec Plan”, *supra* note 120, where turnkey service is recommended (slide 12). One example of how that is done is by having program providers recover available federal funding incentives, instead of having participants pay and then apply for the funding. Another example is the Ontario SHRRP, which provides a fully funded administrator to facilitate social housing upgrades (“SHRRP”, *supra* note 162). Vermont’s LISF program is also full serve, including contract management for major renovations. Vermont’s Multifamily Low Income Program assists in implementation by reviewing building designs with developers and conducting site visits, both free of charge.

²⁷³ These are recognized as barriers to participation by Abbott, Dauncey & Juchau, *supra* note 11 at 19.

²⁷⁴ See Maynes, *supra* note 18 at 10; Janigan, *supra* note 144 at 8; and “Quebec Plan”, *supra* note 120 at slide 11 (which refers to a failed Quebec pilot project that asked LIHs for upfront costs, as well as “pretty clear” experiences elsewhere, and recommends the new Quebec LIEEP be free for LI owners).

In further support of this point, the aforementioned EU sponsored pilot project in Mediterranean countries (discussed at 77-78 of this paper) found that upfront costs, lack of education or awareness and uncertainty about the reliability of new technologies can make builders and owners unable or reluctant to engage. This is also true for housing authorities under mandate to produce a high number of housing units at a low cost. This lack of

savings, program providers should still cover the upfront costs through mechanisms such as loans.²⁷⁵ For example, Manitoba's latest LIEEP provides loans to purchase replacement

furnaces, and those loans are then paid off using monthly savings on energy bills.²⁷⁶

Germany's LIEEP pilot program had a similar payment program for its refrigerator and freezer replacement components.²⁷⁷

- **No/low costs and tenant-protection measures for rental building owners:** Co-payments and in-kind contributions by property owners are recommended for private rental properties (particularly Multi-Unit Residential Buildings), along with agreements limiting rent increases. Owners realize benefits such as lowered energy costs, reduced maintenance fees, and higher building and resale value. Contributions in recognition of these benefits are therefore suitable, but should be kept low until retrofit programs and the value they bring are well entrenched in the market. Building owners should sign agreements to limit rent increases and to pass savings onto those renters whose monthly energy bills are lumped into their rent. This ensures savings are passed along to the target LIHs.²⁷⁸ It may also be useful to have housing providers sign an agreement that they will continue to provide

demand can in turn can means there may be little or no supply of energy efficient solutions (Wenzel, *supra* note 257 at 774-775). The report author notes that the gaps in information and awareness and the resulting reluctance to engage can be particularly difficult to overcome in low income or illiterate populations (774). Even where such populations are convinced of the reasons for pursuing energy efficiency, the upfront costs may be prohibitive (774).

²⁷⁵ *Low income energy conservation and assistance: Developing a low income energy conservation and assistance strategy for Ontario*, prepared by IndEco Strategic Consulting Inc. for the Toronto Environmental Alliance (Toronto: IndEco Strategic Consulting Inc., 2004), online: LIEN <http://lowincomeenergy.ca/wp-content/uploads/2008/10/low-income-energy-conservation-assistance.pdf>, at 23.

²⁷⁶ "Manitoba's Low Income Efficiency Strategy", *supra* note 106, and Manitoba Hydro, "Lower Income Energy Efficiency Program", online: Manitoba Hydro http://www.hydro.mb.ca/your_home/lower_income.shtml.

²⁷⁷ See Seifried, Richter & Schüle, *supra* note 248 at 402.

²⁷⁸ See Maynes, *supra* note 18 at 10 and "Quebec Plan", *supra* note 120 at slide 11 (which recommends testing 0-25% contributions from owners of LIH rental buildings). New Brunswick's LIEEP is an example of a program using such agreements with rental building owners. See "New Brunswick Program", *supra* note 90.

affordable housing for a certain period of years, to ensure retrofits benefit LIHs (for example, this is done under Ontario's SHRRP).²⁷⁹

- **Address barriers specific to rental units:** The B.C. Sustainable Energy Association (BC SEA) recently published a comprehensive paper with recommendations for LIEEPs targeting rental buildings. Recommendations include:
 - Implementing mandatory rental-building labelling requirements, including for high-rise apartment buildings. This is a cost-effective way to educate and raise awareness, allows tenants to compare properties on the basis of energy efficiency, and rewards “green” landlords;²⁸⁰
 - Creating an accessible, understandable, and independent calculator of costs, benefits, and payback times to generate landlord and investor confidence in retrofit programs;²⁸¹
 - Improving financial incentives, such as subsidies and grants, tax holidays, property tax discounts, and tax credits;²⁸²
 - Facilitating better financing options;²⁸³

²⁷⁹ “SHRRP Program Guidelines”, *supra* note 163.

²⁸⁰ Abbott, Dauncey & Juchau, *supra* note 11 at 21-22. Note that relevant legislative models for such schemes are in place in the EU's Directive and, to some extent, Ontario's new *Green Energy Act* (GEA). The GEA provides for mandatory labelling, but allows a purchaser to waive the requirement. The relevant regulation is currently being developed, and may be in place by the end of 2010. It will likely focus on single family homes, rather than apartment buildings, and may or may not include rental homes (phone conversation with Robert Tmej, Senior Policy Advisor, Renewables & Energy Efficiency, Ontario Ministry of Energy and Infrastructure [March 26, 2010]).

²⁸¹ Abbott, Dauncey & Juchau, *ibid.* at 23. The report notes that such a calculator could be based on the existing RETScreen analysis software provided by Natural Resources Canada.

²⁸² *Ibid.* at 24. Specific measures recommended include making retrofit costs fully tax deductible against rental profits, exempting energy efficiency upgrades from increases in municipal property valuations, and offering discounts on property taxes based on the level of energy efficiency.

²⁸³ *Ibid.* at 25-28. BC SEA recommends two specific financing options: Utility Bill Financing, in which repayments are made through the utility bill of the energy payer, are tied to the meter not the individual, and are less than the cost of the energy savings achieved by the improvements; and Local Improvement Charges, in which repayments are made through an additional charge on property taxes, and which are linked to the property not the individual. Both would require legislative changes. See report for details.

- Creating a one-stop-shop for rental housing HEEPs (a “Green Landlords’ Concierge”), i.e., a collaborative agency in charge of promotion, education, outreach, administration, and performance or contracting of HEEP measures;²⁸⁴
- Strengthening and managing workforce capacity. This includes funding new training programs, expanding existing ones to include training in energy audits, window installation and/or other retrofit measures, and creating a registry of contractors for HEEP projects. It may also include phased implementation of LIEEPs to match the developing workforce capacity;²⁸⁵
- Behavioural education, including guidance on best practices for maintenance, re-commissioning, and certification schemes, and tenant outreach and education;²⁸⁶ and
- Unified promotion of rental building HEEPs.²⁸⁷

Addressing the unique circumstances of apartment buildings is an important component of a successful LIEEP, as they make up 59% of B.C.’s rental housing.²⁸⁸

- **Partnerships with and delivery by nonprofits and community organizations:** LIEEPs should engage nonprofits and trusted community organizations, particularly those already engaged in assisting LIHs, to help deliver the programs. This increases customer outreach, awareness and participation.²⁸⁹

²⁸⁴ *Ibid.* at 28-30. A leading model for this is the Green Homes Concierge Program in London (see <http://www.greenhomesconcierge.co.uk/>).

²⁸⁵ Abbott, Dauncey & Juchau, *ibid.* at 31-33.

²⁸⁶ *Ibid.* at 33-34. One recommended model program for tenant education is the Brahms Energy Saving Team project in Toronto (see <http://www.torontoenvironment.org/campaigns/climate/brahmsenergy>).

²⁸⁷ Abbott, Dauncey & Juchau, *ibid.* at 34-35.

²⁸⁸ *Ibid.* at 15.

²⁸⁹ Janigan, *supra* note 144 at 8; Maynes, *supra* note 18 at 10; Kushler, York & Witte, *supra* note 212 at 5; Stewart & Fry, *supra* note 266 at 28-29. This approach has been one of the keys to the success of New England’s Appliance Management Program.

- **Coordinated partnerships:** LIEEPs should leverage funds and services from a variety of sources to maximize the value to customers. Manitoba’s LIEEPs have been successful with this and as a result are exemplary. Coordination with available HEEP programs also pools resources and reduces delivery costs.²⁹⁰
- **Workforce development and support:** As discussed in the context of rental buildings, LIEEPs require extensive infrastructure and specific skills that may not currently be supplied by the market. Programs should ensure contractor training is an essential and ongoing component, and invest in skill development as needed.²⁹¹ Programs can create extra economic and social benefits by training low-income persons from target areas to assist in delivering program audits and basic retrofit services.²⁹²
- **Significant education component:** Again this is discussed above in the context of rental buildings. Education increases awareness of, receptiveness to, and demand for energy efficiency programs. This links to the concept of mandatory energy labelling for buildings. Education is also needed on use of retrofit measures and customer behaviour to ensure energy savings are met.²⁹³
- **Advanced analytical and tracking approaches:** LIEEPs should select energy conservation measures for each household on the basis of their cost-efficacy and diagnostic testing of that households’ energy use. The performance of selected measures should be monitored to ensure that installations are cost-effective and that a measure-performance database can

²⁹⁰ “Strategic Framework”, *supra* note 271 at 20.

²⁹¹ Maynes, *supra* note 18 at 11.

²⁹² Stewart & Fry, *supra* note 266 at 28, and “Strategic Framework”, *supra* note 271 at 21. For examples, see programs implemented in Manitoba.

²⁹³ See Kushler, York & Witte, *supra* note 212 at 5; Stewart & Fry, *ibid.*; and Wenzel, *supra* note 257 at 774-775.

be progressively updated. Rigidly prescriptive guidelines and artificial dollar-value caps for measures are to be discouraged.²⁹⁴

- **Hard targets:** LIEEPs should set specific timelines and targets for units retrofitted and energy saved. This increases program accountability and creates a benchmark for measuring performance.²⁹⁵
- **Quality Assurance:** LIEEPs should integrate quality assurance into program design. Mechanisms for doing so include: distribution of clear, easy-to-use guidelines; multiple checks for customer feedback and data integrity; random sampling; and third-party inspections to ensure installation and quality.²⁹⁶ Certification requirements for energy auditors or retrofit technicians may also help maintain quality standards.²⁹⁷ Reductions in incentives where contractors or retrofitters fail to comply with incentive terms may also be beneficial (this is done, for example, in Vermont’s Multifamily Low-Income Program).²⁹⁸ Regular reporting and auditing requirements for social and affordable housing projects will also facilitate quality assurance and evaluations among that target group (as done, for example, in Ontario’s SHEEP).²⁹⁹
- **Formal impact and process evaluations:** LIEEPs should incorporate formal impact and process evaluations to identify opportunities for improvement and validate performance.³⁰⁰

²⁹⁴ Longland, *supra* note 15 at 15.

²⁹⁵ Maynes, *supra* note 18 at 8.

²⁹⁶ Stewart & Fry, *supra* note 266 at 29. See also “Quebec Plan”, *supra* note 120, where random sampling was recommended as a method of quality assurance (slide 12). Another example is the New York Assisted Multifamily Program, under which NYSERDA addresses quality assurance goals through thorough documentation requirements, a detailed Policy & Procedures Manual, and firm underwriting standards.

²⁹⁷ Abbott, Dauncey & Juchau, *supra* note 11 at 32.

²⁹⁸ Kushler, York & Witte, *supra* note 212 at 85. Note that the recast EU Directive actually proposes penalties for noncompliance with building energy-efficiency standards.

²⁹⁹ “SHRRP Program Guidelines”, *supra* note 163 at 15.

³⁰⁰ Kushler, York & Witte, *supra* note 212 at 6; “Strategic Framework”, *supra* note 271 at 25-26; and Stewart & Fry, *supra* note 266 at 29.

A harmonized calculation system should be developed—for example, as required under the EU Directive—along with evaluation protocols.

Recommendations

In light of the key elements of successful LIEEPs and best practices reviewed above, we make the following recommendations for policy, program, and legislative reforms in B.C.

Recommended Policy Reforms

If B.C. wishes to follow the lead of jurisdictions such as Manitoba, the U.K., and Vermont, in forging a complete, responsive, cutting-edge, and efficient campaign to alleviate Energy Poverty, it should establish an overarching approach as well as specific policies:

1. **Commit to the total eradication of Energy Poverty** in the Province by a set date (as the U.K. has done, by committing to the total eradication of its Energy Poverty by 2018).
2. **Formulate a strong, collaborative “package of measures” involving all relevant Ministries** (such as the Ministries of Health; Energy, Mines, and Petroleum Resources; Housing and Social Development; and Labour and Citizens Services) **to combat Energy Poverty from all sides**. This will entail policy, program, and regulatory reforms that address the other two legs of the energy-poverty tripod: high fuel prices and low household incomes.
3. **Commit more funding to reducing Energy Poverty**. Between Warm Front, DHP, CESP, and CERT, the British government has directly allocated £5.4 billion (\$8.37 billion!)³⁰¹ to fight Energy Poverty over 2008-2011.³⁰² Given the U.K.’s estimated 2009 population of 61.7 million, the three-year British fuel-poverty budget amounts to \$152 per person. With its

³⁰¹ XE – The World’s Favorite Currency and Foreign Exchange Site, online: XE <http://www.xe.com>. The GBP-CAD exchange rate on April 27th, 2010, was £1 to \$1.55029.

³⁰² This does not take into account the expenditures that utility companies must make on LIEEPs under CERT.

estimated 2009 population of 4.42 million, B.C. would have to invest approximately \$672 million to proportionally match the U.K.'s per-capita financial commitment to eradicating Energy Poverty over a comparable three-year period. In contrast, even the sum of all of B.C.'s past and current Energy Poverty initiatives falls far short of that expenditure.³⁰³

4. **Launch a comprehensive program to specifically enhance social housing and energy efficiency in social housing.** The Decent Homes Program, underpinned by the U.K. statutory requirement that housing offer a “reasonable degree of thermal comfort”, could be used as a model.
5. **Similarly, launch a comprehensive HEEP program targeting rental buildings,** implementing recommendations from the recent B.C. Sustainable Energy Association report.
6. **Spearhead an energy-efficiency-information campaign with the help of public and private utilities.** Following the U.K. “Save Money, Save Energy” example and expanding on previous B.C. efforts, the campaign could highlight residential energy-efficiency tips and offers in press, radio, and television advertisements, and in letters to every domestic energy customer in the Province. Campaigns should provide both behavioural education and program outreach.
7. **Work with banks, utilities, nonprofits and/or the federal government to create more competitive LIEEP deals and financing options.** Better financing options will be particularly helpful to large-scale, social-housing LIEEPs in the province. New York’s AMFP provides a

³⁰³ As a further example, even the small state of Vermont outpaces B.C. in LIEEP funding, spending US\$6.3 million over two years on its (2008) population of 621,270 (U.S. Census Bureau - Vermont, “State & County Quickfacts”, online: U.S. Census Bureau <http://quickfacts.census.gov/qfd/states/50000.html>). This amounts to US\$10.14 per person. Applying this same per-person expenditure in B.C. would amount to \$44.8 million in provincial investment over two years, a significantly larger figure than LSLIP’s \$17 million over three years.

good example, offering multi-unit residential buildings low-interest loans with a lending instrument that allows the new energy savings to finance the loans.

8. **Explore options to stabilize the price of energy.**
9. **Empower a statutory consumer-rights organization to enhance debt- and disconnection-protection for LICs.** The organization would aim to protect vulnerable consumers by recommending best practices to prevent debt and disconnection. This will require collaboration with relevant Ministries to conduct joint reviews of utilities' practices.
10. **Use a more inclusive standard for eligibility in LIEEPs.** The federal Low-Income Cut-Off standard may be too conservative. To illustrate, the eligibility-standard for participation in LIEEPs in Massachusetts is 60% of the pre-tax median state income, or a C\$28,278 cut-off for single-person households and a C\$71,836 cut-off for six-person households.³⁰⁴ Aside from differences in purchasing power parity between the jurisdictions, Canada's LICOs are approximately 48%-75% of Massachusetts' cut-offs.³⁰⁵ The Californian cut-off for single-person households is C\$30,193,³⁰⁶ or about 47-107% more than the Canadian equivalent.³⁰⁷ Many LIEEPs in other Canadian provinces also have thresholds set above the LICO.³⁰⁸

³⁰⁴ These cut-offs in Canadian dollars were calculated by applying the USD-CAD exchange rate as of April 27, 2010 (\$1 to \$1.01516: see XE *supra* note 301), to the USD-value cut-offs listed at U.S. Government Benefits, "Massachusetts Low Income Home Energy Assistance Program", online: U.S. Government Benefits http://www.govbenefits.gov:80/govbenefits_en.portal?nfpb=true&locateStateFlow_1_actionOverride=%2FLocateStateFlow%2Freport&_windowLabel=locateStateFlow_1&locateStateFlow_1bid=1576&locateStateFlow_1_code=MA&pageLabel=gbcc_page_locate_state.

³⁰⁵ These figures are based on the 2006 pre-tax LICOs, which are: \$14,596 vs. \$21,202 for a single-person household in a rural community vs. a community of 500,000+ (52% vs. 75% of the Massachusetts cut-off for a single-person household); and \$34,694 vs. \$50,397 for a six-person household in a rural community vs. a community of 500,000+ (48% vs. 70% of the Massachusetts cut-off for a six-person household). See Canadian Council on Social Development, "Stats & Facts", online: CCSD http://www.ccsd.ca/factsheets/economic_security/poverty/lico_06.htm ["Stats & Facts"].

³⁰⁶ California Department of Community Services and Development, "Income Guidelines – Low-Income Home Energy Assistance Program (LIHEAP)", online: California Department of Community Services and Development <http://www.csd.ca.gov/Programs/EnergyIncomeGuidelines.aspx>. The Canadian dollar equivalent given is based on the USD-CAD exchange rate on April 27th, 2010 (see XE [USD-CAD], *supra* note 304).

11. Institute a public agency to pioneer a concerted, well-funded, province-wide approach to energy efficiency research, development, and marketing, and make LIEEPs a key facet of the agency's work. As discussed under “Best Practices,” this will coordinate and enhance HEEPs and LIEEPs across the province. This agency could also mediate between the Utilities Commission and contractors—as NYSERDA does—and use its concentrated resources, energy efficiency expertise, and non-profit position to mandate standardized, progressive LIEEPs for utilities and contractors to carry out. This agency should work with LIEEP providers to develop and hone policies for operational consistency in all aspects of the LIEEPs, including energy auditing, financing, leveraging with other programs and agencies, procurement and bidding, construction oversight and specifications, cost-estimating, energy management and monitoring, and submetering.

Provided the agency is independent, it could also develop the robust cost-benefit calculator advocated by the BC Sustainable Energy Association. Moreover it could have divisions to address the various “streams” of LIEEPs, thus providing leadership to LIEEPs targeted at social and rental buildings. The institution of this central energy-efficiency body can build on the *BC Energy Plan's* strategy of establishing a province-wide partnership among utilities and governments to coordinate programs (see page 33).

12. Harmonize evaluation and calculation systems. As is required under the EU Directive,³⁰⁹ harmonized evaluation and calculation systems across LIEEPs help ensure consistent and

³⁰⁷ The California cut-off is 47% more than the LICO for a single-person household in a community of 500,000+, and 107% more than the LICO for a single-person household in a rural community (see “Stats & Facts”, *supra* note 305).

³⁰⁸ For example, Manitoba Hydro's Lower Income Energy Efficiency Program sets its thresholds at 125% x the LICO. Also see discussions of income thresholds under Canadian LIEEPs on page 37 of this paper (including note 94), and the review of income thresholds done in the “Quebec Plan” design report (pages 44-45 of this paper). For the full table of 2006 before-tax LICOs see “Stats & Facts”, *ibid*.

³⁰⁹ And the proposed recast of the Directive.

reliable information is generated, and enable better monitoring and compliance. These systems should be subject to periodic updates as technology advances.

Recommended Program Reforms

Exemplary LIEEPs in other jurisdictions provide innovative ideas for ways to improve B.C.'s HEEP and LIEEPs. To make HEEPs more beneficial to those of low income, and to make LIEEPs more accessible, efficient, and effective, the B.C. government and/or utilities should:

1. **Incorporate relevant target-population specifics in LIEEP design and delivery.** For example, LIEEPs should take into account such factors as the target population's first language, tenure type, dwelling type, and family composition. This would require focus on and knowledge of the diverse communities within the low-income sector, including: renters; households with female/senior primary bill-payers; single-person households; households with children; single-family dwellings, duplexes, row houses, and townhouses; and Aboriginal and immigrant groups. For example, promotional materials should cater to particular audiences, be available in multiple languages, and be appropriate for different literacy levels.
2. **Establish an LIEEP specifically for rental multifamily residential buildings and for social housing.** Lead bodies or agency divisions should oversee these targeted LIEEPs (again, the "Green Concierge" concept). The LIEEP for rental housing should implement recommendations made in the BC SEA report. Furthermore, given the major cost of retrofitting entire multi-unit buildings, such a program should—like New York's AMFP—offer financial assistance such as low-interest loans, need-based grants, and lending instruments that use energy savings to finance debt taken on for energy efficiency improvements.

3. **Restore the recent BC LiveSmart Low-Income Program (LSLIP) and leverage it with other HEEPs and LIEEPs of public and private utilities and the federal government.** B.C.'s recent LiveSmart Energy Assistance Program, Manitoba's programs, and Vermont's LISF program are exemplars of effective leveraging and for the restoration of LSLIP.
4. **Expand utilities' HEEPs and LIEEPs:**
 - a. BC Hydro should expand the Energy Conservation Assistance Program to beyond B.C.'s Lower Mainland and Vancouver Island.
 - b. Terasen Gas should make its Energy Efficiency and Conservation Program LIH-friendly: the EEC should offer more energy-efficiency measures than major appliance rebates, so as to include LIHs (both homeowners and renters).
Alternatively, Terasen should establish an LIEEP as soon as feasible.
 - c. Fortis should either modify the PowerSense Home Improvement Program or establish a separate LIEEP to provide energy efficiency measures to LIHs.
5. **Increase LIEEP funding.** The U.K. Warm Front programme offers up to £3500 (\$5426) for energy efficiency measures to every eligible household, and a whopping £6000 (\$9302) where oil or new, low-carbon heating technology is recommended.³¹⁰ This is 55% to almost 270% more than even the cancelled Federal EnerGuide for Low-Income Homes' grant limits.
6. **Collaborate with local nonprofits and trusted community based organizations** to market and deliver LIEEPs.
7. **Assess workforce capacity and develop and manage it as necessary.** Consider contracting with local trade schools or nonprofits to provide training and project employment to LICs from target locations (as exemplified by the Manitoba LIEEP model). Where such local

³¹⁰ The Canadian dollar equivalents were calculated according to the GBP-CAD exchange rate on April 27th, 2010 (see XE *supra* note 301).

training and employment programs are used, program deliverers should consider providing additional support or referrals to trainees to help them deal with other difficulties and barriers they might have. This may help maintain a consistent workforce, one of the challenges faced by Manitoba programs.³¹¹

8. **Require utilities/contractors to offer a benefits-entitlement check** to boost LIHs' income and to increase participation in LIEEPs. The United Kingdom's Eaga/ Warm Front may be looked to as a guide in this. Include follow-up calls, as is done in Warm Front.
9. **Investigate opportunities to provide needed health and safety repairs, and to install other energy-efficiency measures.** Programs should link with provincial and federal repair programs and/or program funds to provide more basic upgrades where they are needed (e.g., as is done under New Brunswick's LIEEP). Other potential energy-saving measures should be investigated too, including fuel-switching and microgeneration of power (solar water-heating, small-scale combined heat and power, etc.).
10. **Keep up with advancements in technology.** Governments and utilities should require programs to incorporate the latest energy-efficiency technology, and adjust them as technology advances.
11. **Enrich their LIEEPs by adopting innovative features from exemplary LIEEPs elsewhere.**
LIEEPs should feature:
 - a. Representatives that interview LICs to identify their appliance use and best energy-saving opportunities. Cost-savings estimates should be provided to encourage program uptake. Representatives should also connect LICs with other energy-

³¹¹ "Manitoba Helping the World", *supra* note 100, and "Expand to Brandon", *supra* note 105.

efficiency and community-action opportunities, such as educational prospects and job training.

- b. Smart allocation of retrofit funds to achieve maximum energy savings. As in New Brunswick, program providers should prioritize upgrades for each LIH to achieve maximum savings in that house. Programs should pursue retrofits that generate large savings (e.g., the Quebec Plan suggests that building envelope improvements have the highest energy savings, while a German LIEE initiative found large savings through refrigerator replacements).
- c. Training and employment of low-income persons from target LIHs to assist with retrofits in their neighbourhood (as pioneered in programs in Winnipeg and Brandon, Manitoba).
- d. Whole-building and gap-funding approaches to ensure the complementarity and financial feasibility of energy efficiency measures (see note 238 for a discussion of these). Loans that are paid off in instalments covered by energy cost savings may help cover the costs of larger upgrades or appliances.
- e. Technologies such as appliance audit software, blower-door-guided infrared scanners, and computer modelling to accurately gauge the energy consumption of appliances, buildings' heat and air losses, and projected energy savings.³¹²
- f. Diverse partnerships to facilitate program development and marketing, and customer engagement. For example, the Energy Management Assistance program in California involves community-based organizations, contractors, investor-owned utilities, and the state Utilities Commission.

³¹² These are technologies used by many of the leading programs. See Kushler, York & Witte, *supra* note 212 at 5.

- g. Bulk purchasing of electric appliances to decrease appliances' per-unit cost, and warehousing and inventory costs. LIEEPs should also competitively select a single vendor for all program deliverers (utilities, contractors, and/or local organizations), so as to maximize their savings.
- h. Leveraging with other LIEEPs and utilities to share costs and maximize service delivery and program participation (e.g., California's EMA and Vermont's LISF).
- i. Targeting of building and/or construction phases. Programs should incorporate incentives into the design and construction phase, where applicable (e.g., the Ontario High Performance New Construction Program), and assist developers and contractors in implementing best practices with guides, site visits, and free construction plan reviews (e.g., Vermont's Multifamily Low-Income Program and the EU's SQUARE project).

12. Form a province-wide "Best Practices Group" for LIEEPs, as exists, for example, in Massachusetts. This can build on the *BC Energy Plan* commitment to create a Partnership for Energy Efficiency and Conservation (see page 33) or be formed as a distinct group. Such a group would be very helpful in connecting LIEEP designers and deliverers across the province, so that they could share their problems, solutions, and ideas, and thereby accelerate the progression of all of B.C.'s LIEEPs. This approach is also being pursued in Europe through programs such as the European Fuel Poverty and Energy Efficiency information sharing pilot project,³¹³ and is recommended (on a Canada-wide basis) in a 2009 paper prepared for the Canadian Council of Energy Ministers.³¹⁴

³¹³ "European Fuel Poverty and Energy Efficiency", *supra* note 255.

³¹⁴ "Strategic Framework", *supra* note 271 at 24.

Recommended Legislative Reforms

Various jurisdictions have pioneered numerous legislative approaches to instituting and strengthening LIEEPs. Following are legislative recommendations that can be adopted to enhance the legal framework that governs B.C.'s LIEEPs. The B.C. Legislature should:

1. **Put energy price support for LIHs on statutory footing**—as planned in the U.K. by 2011, and as legislated by the U.S. government in the form of the *American Clean Energy and Security Act's* energy tax credits and energy rebates to protect low-income households³¹⁵ from higher energy prices expected from mandated carbon-emission caps.
2. **Legislate province-wide energy efficiency targets.** These should encompass actions by all HEEPs and LIEEPs in B.C., including those administered by the provincial government, local governments, utilities, and community or nonprofit organizations.
3. **Legislate hard targets for all utilities' DSM energy-reduction obligations.** For example, the U.K. CERT Order requires that utilities achieve household energy savings of 185MtCO₂ over the lifetime of the program.
4. **Amend the Demand Side Measures Regulation to specify the proportion of DSM and conservation-measure expenditures that utilities should invest in LIHs and rental households.** For example, arts. 3(a) & 3(b) of the U.K. CERT Order stipulate that 40% of energy suppliers' carbon-reduction obligation must come from energy efficiency measures to members of, respectively, disadvantaged priority groups (LIHs and persons over 70), and the rental housing sector.
5. **Institute specific energy-efficiency-measure multipliers to encourage fuel switching, and the delivery of as many measures to as many LIHs as possible.** As an example, the U.K.'s

³¹⁵ Specifically, LIHs in the bottom income quintile.

2009 CESP Order promotes switching from higher-carbon to lower-carbon fuels by providing different multipliers to measures' calculated energy savings, based on each household's fuel type.³¹⁶ The CESP Order also rewards utilities that implement multiple measures per household,³¹⁷ and that install measures to more than 25% of households in a low-income area.³¹⁸

6. **Create a public agency to pioneer a concerted, well-funded, province-wide approach to energy efficiency research, development, and marketing, and make LIEEPs a key facet of the agency's work.** This is discussed above under "Best Practices" and "Recommended Policy Reforms". Legislating the creation of the body will ensure this is done.
7. **Legislate the equitable distribution of HEEP benefits, and the protection of low-income consumers from adverse energy costs, as Massachusetts has done in the 2008 *Green Communities Act*.**
8. **Incorporate the valuation of noneconomic benefits more explicitly in the Demand Side Measures Regulation, as California has done in its *Public Utilities Code*.** The *Code* gauges the effectiveness of LIEEPs not just on cost criteria, but also on how they facilitate LICs' access to other social services/programs. Research shows that LIEEPs achieve important benefits outside direct cost savings and GHG reductions (see, for example, research under the "Quebec Plan", discussed on page 45). This change will help reflect that.
9. **Provide for the extra protection of LICs, as does California's *Public Utilities Code*, which:**
 - a. Requires that LIEEPs reach the "maximum number of eligible participants at a reasonable cost" (s. 381.5(b)).

³¹⁶ CESP Order, *supra* note 201, art. 23.

³¹⁷ *Ibid.*, art. 24.

³¹⁸ *Ibid.*, art. 25.

- b. Enshrines the right of all residents of the State to affordable electric and gas energy, and holds CPUC responsible for ensuring LICs aren't unduly jeopardized/burdened by energy expenditures (s. 382(b)).
- c. Authorizes different energy-utility rates and rate-assistance levels for LICs (s. 382(b)).
- d. Compels CPUC, with the help of the Low-Income Oversight Board, to periodically assess whether LIEEPs are adequately addressing LIHs' energy expenditures, language needs, etc.

10. Establish a low-income oversight board to ensure regulatory oversight and fulfilment of LIHs' energy needs. Subsection 382.1(a) of California's *Public Utilities Code* details the kind of responsibilities that such a board would take on.

11. Reform tax and municipal laws to facilitate better financial incentives and finance options for rental building retrofits.

12. Mandate energy efficiency labelling for all residential buildings or units offered for sale or rent.

Conclusion

Energy Poverty is a live issue in British Columbia, affecting the health, standard of living, and environment of our citizens. In 2007, approximately 297,000 British Columbian households, or 16.7% of the provincial population, were living in Energy Poverty. Designing comprehensive LIEEPs to address this problem will improve the wellbeing of affected citizens, reduce healthcare costs, create "green" jobs, and reduce B.C.'s carbon emissions. In the context of meeting B.C.'s

greenhouse gas reduction goals, improving energy efficiency in LIHs is “low-hanging fruit” in that it can substantially reduce emissions at a relatively low cost.

Despite the advantages of LIEEPs, they have been piecemeal and limited in their application and effectiveness in B.C. The province is behind many other jurisdictions in addressing this issue, but can learn from their experiences and the literature derived therefrom. This paper has provided an overview of exemplary low-income energy efficiency initiatives elsewhere, with the aim of raising awareness of the most successful legislative approaches, policies, and program features.

From these initiatives and the related Energy Poverty literature, this paper has enumerated best practices and suggested policy, program and legislative reforms for B.C. These include:

- Setting hard targets;
- Increasing LIEEP funding;
- Creating a central energy-efficiency body to oversee and coordinate provincial HEEPs and LIEEPs;
- Applying multiple energy-saving measures and providing programs to multiple fuel types;
- Developing inclusive LIEEPs that serve a variety of low-income populations in a variety of housing types—including social housing, rental housing, high-rise apartment buildings, and owner-occupied homes—and raising income thresholds for program eligibility above the LICOs;
- Providing fully facilitated rather than participant-driven programs;
- Providing programs at no cost (and at no or low cost to owners of rental buildings);
- Partnering with local, trusted community organizations in delivering programs;
- Coordinating, partnering, and leveraging with governments and industry;
- Developing a LIEEP workforce and employing locally where possible;

- Increasing energy efficiency education in the public and between LIEEP providers;
- Monitoring and evaluating program success; and
- Expanding existing programs.

These and other suggested best practices and reforms are discussed in detail above, and may provide useful guidance to policy makers, program deliverers, and others. By applying these best practices and undertaking suggested reforms, B.C. can embrace the opportunity to be a global leader in tackling both Energy Poverty and climate change.

Appendix I: Carbon Co-efficient Values (Schedule 3 of the U.K.'s 2009 CESP Order)

SCHEDULE 3 Article 18

CARBON CO-EFFICIENT VALUES

<i>Fuel Source</i>	<i>Carbon Co-efficient value¹</i>
Coal	0.2996
Electricity	0.4308
Gas	0.1899
Liquid petroleum gas	0.2140
Oil	0.2493
Wood	0.0249

¹ In kilograms of carbon dioxide per kilowatt hour

Appendix II: Energy-Efficiency Measures Eligible for Individual and Whole House Bonuses (Table 3 of the U.K.'s 2009 CESP Order)

<i>Description of qualifying action</i>	<i>Individual measure adjustment</i>	<i>Whole house bonus</i>
Cavity wall insulation	-50%	+10%
Connection to a district heating scheme	0%	+40%
District heating meter for individual house billing	0%	+10%
Double glazing	0%	+10%
Draught proofing	0%	+10%
Flat-roof insulation	0%	+10%
Fuel switching	0%	+40%
Heat pump	+50%	+50%
Heating controls when provided with a new heating system	0%	+10%
Loft insulation	-50%	+10%
Replacement boiler	+50%	+40%
Solid wall insulation (external)	+200%	+50%
Solid wall insulation (internal)	+200%	+50%
Under-floor insulation	0%	+10%
<i>Microgeneration measures consisting of:</i>		
Biomass boiler	+50%	+40%
Micro combined heat and power unit	+50%	+10%
Micro Hydro unit	0%	+10%
Micro Wind unit	0%	+10%
Mini-wind unit	0%	+10%
Photovoltaic panels	0%	+10%
Solar water heater	+50%	+10%