Using Local Improvement Charges to Finance Building Energy Efficiency Improvements
A Concept Report

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About the Pembina Institute

The Pembina Institute is an independent, citizen-based organization involved in environmental education, research, public policy development, and client confidential environmental consulting services. Its mandate is to develop and promote policies and practices that lead to environmental protection, resource conservation, and environmentally sound and sustainable energy and resource management. The mission of the Pembina Institute is to implement holistic and practical solutions for a sustainable world. Incorporated in 1985, the Pembina Institute's head office is in Drayton Valley, Alberta with offices in Ottawa, Calgary, Edmonton, and Vancouver, and research associates in other locations across Canada.

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Introduction

Local Improvement Charges (LICs) have long been used by municipalities to help cover the costs of infrastructure improvements (roads, sidewalks, etc.) deemed to benefit a specific neighbourhood. The benefiting landowners are assessed the LIC on their property taxes until their share of the improvements have been paid for.

This paper describes an innovative new use for LICs in which they are used to finance improvements in residential and/or commercial building energy efficiency. The paper describes the benefits of such an LIC program to municipalities and building owners, ways an energy efficiency LIC program could operate, the costs associated with it and ways they would be recovered, and potential difficulties and solutions associated with the use of LICs in this way. Finally it proposes a pilot program through which the concept would be tested by one or more municipalities.

The main advantage of using an LIC program over alternative methods of financing energy efficiency improvements is that it associates the repayment of the cost of efficiency improvements with the building property rather than with the current building owner. This means that permanent improvements like high efficiency windows, wall upgrades, heating, ventilation and air conditioning (HVAC) systems, control systems and other features that have long payback periods are more attractive to home and building owners because both their costs and benefits are passed on to new owners. In the case of new buildings, it allows the additional cost of building to the highest levels of efficiency (e.g., LEED Gold or R2000) to be shared by all owners of the building over time.

In addition, the widespread use of LICs for energy efficiency would make it easier for governments to increase building and equipment codes and standards, as the additional cost would be shared by owners over time and not borne only by the original buyer.

This paper suggests that the mechanism of LICs — a financial instrument already very familiar to local government — can be adapted to remove some of the barriers facing energy efficiency improvements in buildings. Remarkably, the use of LICs in this way should enable significant municipal action on energy efficiency at no additional net cost to local government. Using the LIC approach, municipalities are also able to take direct leadership in the way energy is used within their jurisdiction at little or no net cost to the taxpayer. Finally, they are able to take a leading role among their Canadian and international counterparts in bringing about real environmental improvements.

The use of the LIC approach will be most attractive to those municipalities that already have an internal program and staff resources dedicated to energy management, strong council support and success in greenhouse gas reduction and other environmental initiatives, and a low debt level, which will allow them to provide or procure the necessary financing.

The Case for Municipal Action on Energy Efficiency

Why should municipal governments consider encouraging and financing energy efficiency within the community using a tool like LICs? For many years municipalities have directed staff and financial resources towards improving the efficiency of their own facilities — sometimes using innovative financing approaches like performance contracting and the investment of contingency funds in energy management because it provides a high return. For a number of reasons, many municipalities have begun in recent years to look beyond their own facilities to the community as a whole.

The role of local government is changing in response to the new challenges facing communities in the twenty-first century. One of the most pressing, and perhaps the most fundamental, of these challenges is the need for effective local government action to promote sustainable energy practices within the community. Another powerful driver is the increasing cost of energy. Property owners are more and more concerned about the cost and availability of conventional energy sources and are looking to their governments for solutions.

Using LICs to finance energy efficiency improvements makes sense to municipalities on both counts.

Environmental Reasons

A major driver for local government concern regarding energy use is global climate change, as most greenhouse gas emissions accelerating climate change come from the combustion of fossil fuels. Although the effects of climate change on Canada's municipalities are inherently long-term and incremental in nature, a great many local governments in Canada recognize that climate change will have pervasive and profound effects on their communities. For this reason they have formally taken action to reduce the severity of this threat.

For example, many Canadian municipalities have made commitments to improve the environmental performance of their communities through the Federation for Canadian Municipalities (FCM) *Partners for Climate Protection (PCP) Program.* At present, 114 local governments across Canada — including 11 communities in Alberta, 39 in British Columbia, and 1 (Whitehorse) in the Yukon — have become members the PCP Program. It should be noted that, in joining the PCP Program, municipal councils commit to the development and implementation of a "local action plan" with a recommended target of reducing overall greenhouse gas emissions from the overall community by 6% within ten years.[1] While this target is ambitious, it is in line with the federal government's national commitment to reduce Canada's total greenhouse gas emissions to 6% below 1990 emission levels by 2010. Furthermore, it is well-recognized that both of these targets fall well short of the 60–80% reduction in global emissions that scientists believe is required to stop further accumulation of greenhouse gases in the atmosphere. Having stepped forward to take up the huge new challenge of addressing climate

[1] *Milestone Two: Setting an Emissions Reduction Target*. Partners for Climate Protection Milestone Framework. http://kn.fcm.ca/

change, local governments have a real need to adopt effective policy approaches that reduce fossil fuel consumption within their communities.

The use of LICs to finance energy efficiency improvements in existing and new buildings would be a powerful new tool that municipalities could use to generate other significant long-term health and environmental improvements such as reduction of smog and air pollution. All of the eligible improvements proposed for an energy efficiency LIC program are more energy efficient than those typically made at present. Reduced energy demand translates into fewer emissions from fossil fuel consumption and makes it possible for renewable energy options to assume a more significant share of that supply.

Cost Reasons

For many decades, energy was both inexpensive and plentiful. The consumption of more energy was long perceived both as a positive good for society, and as a reasonable objective for policy makers. There is now a widespread apprehension — certainly among traders in oil futures — that we have entered a new period when politics and warfare may once again result in supply disruptions of oil. Increasing numbers of energy analysts also believe Canada's production of natural gas is now in permanent decline[2] and the world may soon experience declining production of conventional oil.[3] While Canadians cannot realistically task their municipal councils with resolving overseas turmoil, they certainly will expect their local governments to foresee and forestall the negative impacts of a new energy crisis for the community. A permanent and intensifying supply shortage of oil and gas will have obvious economic impacts for any community that has not already reduced its dependency on the consumption of conventional fossil fuels.

An LIC program could also make energy efficiency improvements available to those segments of society most affected by rising energy costs, and who otherwise would not be able to afford these improvements. It would also help fixed-income seniors who are not expecting to stay in their home long enough to pay off significant capital investments. The approach would improve the overall quality of buildings and housing in a community; it would allow major structural improvements to the building stock to be made, and would also ensure that new buildings were built to the highest environmental standards. Application of an instrument like an energy efficiency LIC could help all building owners reduce their exposure to the risk of rising energy prices.

[2] New supplies from the Beaufort Sea and elsewhere will not fully offset declines from the currently exploited Western Canada Sedimentary Basin. See *Short-term Natural Gas Deliverability from the Western Canada Sedimentary Basin 2003–2005*, National Energy Board, February 2004, www.neb.gc.ca/energy/EnergyReports/EMAGasSTDeliverabilityWCSB2003_2005_e.htm; and "Gas production to decline: study," Globe and Mail 1 April 2004.

[3] An excellent introduction to this analysis is "The End of Cheap Oil" in the March 1998 issue of Scientific American. A pdf file of this article is available at www.hubbertpeak.com/sciam983.htm. The Association for the Study of Peak Oil and Gas (www.peakoil.net/) publishes a monthly bulletin on peak oil issues.

Current Uses of LICs

Municipalities use LICs to help cover the costs of infrastructure improvements on public property (roads, sidewalks, etc.) deemed to benefit a specific neighbourhood. In the case of the Yukon Territory's innovative program, eligible improvements also include extension of electrical and telecommunication services to isolated properties (see below). In all cases, the benefiting landowners are assessed the LIC on their property taxes until their share of the improvements have been paid for. Municipalities have varying ability and flexibility to utilize LICs as legislated by their provincial government, typically in a municipal governance act. Appendix 1 provides a preliminary review of these Acts in Alberta, British Columbia, and Yukon Territory, with specific focus on the types of projects eligible for LICs in the different jurisdictions.

Conventional Uses of LICs

LICs are normally used when a municipality provides new or replacement services to one or more properties, such as road paving or sidewalk construction. The municipality pays for the improvements (annual capital budgets were the only funding source identified) and arranges for the work to be carried out by municipal services or a contractor. An LIC is then assessed and assigned to each property deemed to benefit from the improvement. A set portion of the improvement's cost is paid back in the form of an additional line item on top of the usual municipal tax over a set number of years by the owner of the property. Examples are common across Canada in all sizes of cities and towns, and in most provinces. A non-exhaustive search revealed LIC bylaws in Whitehorse, Vancouver, North Vancouver, Burnaby, Richmond, Delta, Campbell River, Prince George, Calgary, Edmonton, Medicine Hat, LaCombe, Lethbridge, Winnipeg, Waterloo, Oshawa, Peterborough, Ottawa, and Halifax.

Projects covered by LICs in these cities include the installation of curbs, sidewalks, storm sewers, trees, street lighting, road paving, water mains, traffic calming measures, and any associated landscaping. In Ontario, the Municipal Act has been interpreted to allow LICs to be used to pay for green space acquisition and park construction. To be approved as a local improvement project by the city, a certain percentage of property owners abutting the proposed improvement need to petition the city for the improvement and agree to pay a specified proportion of the cost. Typical requirements were a minimum of two-thirds of property owners, representing at least half of the area's assessed property value. Once the necessary signatures are obtained, the city still needs to approve the improvement, after which all residents abutting the improvement are responsible for a portion of the costs.

The payment periods vary depending on the project and the city in question, but generally range between 5 and 15 years. Most cities allow property owners to pay back the remaining debt early at any point.

The annual charge paid by residents is determined by the municipality, calculated using one or both of two methods[4,5]. In all municipalities the LIC is based on the total cost of the improvement. In some cases, the degree to which the improvement is expected to benefit the abutting property owners versus the general public is also factored into the cost. The total amount owed is typically annualized at 1 to 2 percent above the city's borrowing rate.

The improvements covered by the LIC are normally undertaken by city staff or contractors. In most cases, the cost of improvements will be included in the municipality's annual infrastructure budget. In practice, this means that, in identifying specific projects, the city budgets for a specific, limited amount of LIC improvements in advance, and these LIC programs constitute a relatively minor component of overall city engineering and construction expenses. The funds required for LIC programs have been provided by various provincial agencies (e.g., the Yukon Government, the BC Municipal Finance Authority, the Alberta Capital Financing Authority) or general municipal revenues. However, there do not appear to be many examples of a municipality raising funds through loans from private financial institutions, or bond issues.

The long-established and widespread use of LICs by local governments across the country indicates that municipalities are comfortable with this approach to implementing improvements that benefit (at least in part) individual property owners, and that the transaction costs to the municipality associated with their application are manageable.

Problems have sometimes occurred with the transfer of LICs in cases where a capital improvement project is still underway when a house is sold. In these cases, the LIC charges have not always been assigned to the affected properties by the time of the property transfer, and do not show up on the property tax records when they are accessed by prospective buyers. In these cases, the inclusion of the new LIC on the property tax bill can be a surprise to the incoming property owner. This conflict has led to litigation between the seller and buyer that can potentially involve the municipality; this can be avoided by proper monitoring of the LIC process and requiring disclosure of LIC agreements to prospective buyers.

Defaults on payments of an LIC appear to be rare because of the extensive powers held by municipalities with regard to property owners in arrears on their property taxes.

Using LICs for Power Connections and Alternative Energy Systems in the Yukon

A long-established program in Yukon Territory directly inspired this paper's proposal to use LICs for energy efficiency improvements.[6]

[4] For the first method (used in Halifax or Burnaby for example), the charge is based on a fixed schedule proportional to the length of property abutting the improvement. In this case the exact amount of the LIC can be calculated in advance. The second method (used in Richmond or Oshawa for example) assigns a proportion of the actual total improvement cost to the affected property owners (ranging from 25 to 75 percent), which is then divided proportionally based on abutting property length . In this case, the cost cannot be determined exactly until after the work is complete (although the city will provide an estimate, and in some cases a maximum value).

[5] Some municipalities (Calgary, for example) will use both methods depending on the exact nature of the LIC.

[6] Much of the information in this section was provided by Clare Robson and Dave Dowie of the Yukon Government's Property Assessment & Taxation Unit.

The Yukon Government (YG) provides local services to all residents living outside of incorporated municipalities. Starting in 1984 YG initiated a new LIC-based program to assist residents living in rural areas to receive services by extending the electrical grid and landline telephone service to their properties. The costs to YG of providing these services are recovered by way of LICs. As a result of the popularity of the program, it was expanded in 1998 to fund individual off-grid alternative energy power systems, and telecommunication (satellite-based phone and Internet) systems. In the case of these off-grid improvements, 100% of the costs of the system are borne by the property owner; the LIC serves as an effective means of recovering the initial capital cost of these services. YG is considering further extending this program to provide for the drilling of domestic water wells. These programs are authorized for recovery as LICs under the Assessment and Taxation Act of Yukon, which defines a local improvement and outlines ways it may be recovered when carried out by YG.

There are two innovative aspects to this added component of the Yukon program, which distinguish it from all other conventional LIC programs known to the researchers of this paper:

- These systems are entirely contained on the resident's private property and do not provide direct benefits to other residents.
- Once paid for, these systems are fully owned by the resident — they are not municipal property.

As with other LIC programs, the payments are tied to the property rather than to current property owner; the LIC is transferred with the property to the new owner when it is sold.

The salient features of the off-grid power or telecommunications LIC program are as follows:

- Recoverable capital funds are a line item in the YG annual budget for the provision of the service.
- The amount of funding available to a property cannot exceed 25% of the property's assessed value, less all existing LICs.
- The applicant chooses a payback term of 5, 10, or 15 years, with interest calculated at the Bank of Canada daily rate at the time the LIC agreement is signed.
- The property owner applicant first obtains a quote for the cost of the service from a contractor. Once a level of funding has been agreed to by YG, the applicant and the contractor, the LICs must be approved by an Order-In-Council of the Yukon Government. In 2003, the government approved 60 LIC funding projects in total.
- Once the alternative power or telecommunications project is completed, the LIC is attached to the relevant property as an LIC on the property tax bill.
- During installation of the project, the contractor submits invoices to YG followed by a final bill. YG pays the contractor directly after final inspection of the improvements, and having received from the property owner a statement of satisfaction with work done.
- If a project goes over budget, YG obtains the approval of the applicant before approving any changes.
- Prior to mailing the first property tax notice, which lists the LIC charge as a distinct line item, staff contact the property owners to remind them of the LIC charge, and to notify them of the cost.
- Once the property owner (or successive owners) has fully repaid the cost of providing the service, the LIC is removed from the property tax bill.

As noted above, the YG LIC program is designed to serve property owners living outside of incorporated municipalities who pay property taxes directly to the territory. However, the City of Whitehorse has also now started to use LICs in a similar manner to finance grid extension. The first bylaw authorizing an LIC for this purpose is attached in Appendix 2. This bylaw could potentially be used as a model for a bylaw in an energy efficiency LIC program.

Benefits of an Energy Efficiency LIC Program

The LIC mechanism is distinctive from other financial instruments in several respects:

- Like a loan, an LIC provides a mechanism for gradually paying off a large one-time improvement to a property.
- Unlike a loan, LICs are not assigned to individuals, but to properties.
- Like a tax, LICs are levied as a separate line item on property tax bills.
- Unlike a tax, LICs are generally voluntary in nature — they are requested by (a majority of) property owners.
- LICs can be easily structured to recover all funds invested by a municipality for improvements.
- LICs are already levied by most municipalities in Canada.

As noted above, the main advantage of financing energy efficiency improvements using an LIC program over alternative methods is that it associates the repayment of the cost of the improvements with the property rather than with the current property owner.

In the case of existing homes or commercial buildings, where energy efficiency improvements provide long-term cost benefits, the rate of LIC repayment would be set at less than the annual energy savings realized through the improvement. The owner of the property will then receive an economic benefit from the very first year of installation. Moreover, owners can sell their property at any time after installation of the improvement, without stranding any of their investment in these improvements. No matter when they sell, they will have paid less for the improvement than they have saved in reduced energy costs. Similarly, purchasers of properties with energy efficiency improvements and outstanding LIC charges will simply pay off the remaining amount of the LIC on an annual basis, receiving a net cost benefit from the improvement each year.

In the case of new homes or buildings, allowing the additional cost of energy efficiency improvements would be included in the LIC. This removes the capital cost of these efficiency measures from the sale price of a new home — which has long been the basis of opposition by the home construction industry to improved energy efficiency standards for new homes. Instead, the LIC approach would allow a new homeowner to pay off the outstanding investment in annual instalments. Because these payments would be less than that of the actual energy savings achieved by the improvements, the new owner would receive immediate benefits from the energy efficiency improvement. Indeed, by removing the existing disincentive for new homebuyers to invest in homes built to higher energy efficiency standards, a successful energy

efficiency LIC program should allow local governments to more aggressively pursue stricter energy efficiency codes for new construction.

Similarly, the proposed use of LICs for energy efficiency improvements provides landlords with an incentive to invest in the energy efficiency of their buildings. Since they would enjoy a net reduction in total costs during the first year of installation, the cost savings generated by the targeted energy efficiency improvements would allow landlords to either lower their rents to attract tenants, or simply leave rents unchanged and earn a greater profit on their property.

The use of LICs explicitly addresses several barriers that prevent investments in energy efficiency:

1. *Hesitancy to Accept Long Paybacks*. Many improvements that have the potential to significantly reduce energy use in buildings do not pay for themselves for several years. Current owners have little incentive to make these investments if they will own the building only for a few years. By tying payments to the physical property though an LIC, rather than to the owner, these investments become attractive to a much wider range of property owners. If a property is sold before the savings have paid for the initial investment, the departing owner will have paid for only a portion of the investment but will still have been able to realize part of the resultant savings.

2. *Preference for Low First Cost Improvements.* The high upfront capital costs of many major energy efficiency improvements mean that many owners opt for low-cost improvements instead. This approach effectively makes the implementation of the major improvements more difficult, because the benefit gained is often too low to justify further action. For example, if a homeowner spends money to weather strip and seal their windows, they are less likely to replace them with more efficient windows because of the time and money already invested. In these cases, the opportunity to make major efficiency gains can be lost for many years. With an energy efficiency LIC program targeted at larger investments, property owners will have the financial flexibility to opt for higher-cost, higher-efficiency investments instead of low-cost options.

3. *Lack of Access to Capital to Improve Existing Buildings*. Lack of access to capital and high debt loads often mean that building owners and homeowners cannot borrow the additional capital needed for major energy efficiency improvements. Financing an improvement through an LIC does not add to the owner's personal debt because the LIC is tied to the property, and the improvement costs are paid for out of the resulting energy savings.

4. *Lack of Access to Capital to Build Efficient New Buildings*. New buildings built to LEED[7] Gold or R2000[8] standards may cost more to build than conventional buildings, but these costs are recovered many times over during the life of the building. However, the additional up-front cost of these buildings can dissuade many buyers who are either unable or unwilling to take out a larger mortgage. By including the additional

[7] http://www.usgbc.org/leed/leed_main.asp
[8] http://r2000.chba.ca/index.php

construction cost of the energy efficiency improvements in an LIC, all owners of the home or building benefit from the improvements — and the energy savings can pay for this investment over a period of years.

5. *Construction Industry Resistance.* Builders and equipment suppliers are commonly opposed to stricter energy efficiency codes and standards because they perceive that the changes will decrease sales (as per point 4, above). Allowing the additional cost of energy efficiency to be included in an LIC reduces the first cost of choosing energy efficiency, which will encourage sales, thereby alleviating contractor concerns and allowing governments to increase efficiency codes more rapidly.

For a more detailed assessment of the barriers to energy efficiency, see Appendix 3.

The next two sections describe how an LIC program to finance building energy efficiency improvements could be designed and implemented, including the key decisions that will need to be made at each stage of program development. Because this use of LICs has not been tested in practice, there are several options that can increase program flexibility and hence offer a good chance of success.

Designing an Energy Efficiency LIC Program

The following issues should be considered when designing an energy efficiency LIC program:

1. *Legal Backing.* Before any municipality can begin to use LICs in the manner described in this paper, it needs to ensure this is permitted by the relevant legislation regulating local government in its Province or Territory.

   A preliminary review shows that this appears to be the case in Yukon, Alberta, BC (when governed by the new Community Charter), and the City of Vancouver (governed by the Vancouver Charter) (see Appendix 1 for more details). Municipal governments in Yukon, Alberta and BC should be able to implement an energy efficiency LIC program without the Province or Territory modifying existing acts or bringing in new enabling legislation. It should be noted that while the original intent of LICs was to finance improvements on public property that benefit a small number of property owners, the Yukon and Whitehorse have used LICs for improvements on private property as well (see the Conventional Uses of LICs on page 4, above).

2. *Financial and Staff Resource Capacity.* The municipality must assess its ability to carry out a successful energy efficiency LIC program. The capital financing for the improvements will need to be secured. These funds could potentially come from the existing municipal budget, higher levels of government, or issuing bonds. Provincial agencies like the BC Municipal Finance Authority exist to provide this type of financing and many municipalities are familiar with the annual process of using this source. Indebtedness of individual municipalities will vary, but in most provinces local governments should be able to borrow the additional capital required to offer an energy efficiency LIC program and recover all

costs of borrowing through selection of the interest rate applied (see point 9, Financing Structure, below). In British Columbia, a municipality is allowed to spend up to 25% of total revenues on principal and interest (not including one-time grants). However, it is not recommended that municipalities have a debt payment that is more than 15% of total revenues.

The staff needed to administer the program will need to be assigned from other tasks and/or hired depending on the anticipated size of the program and related workload. If municipalities already have staff resources engaged in energy management improvements in municipal facilities, they could be used to provide technical assistance to LIC staff. This may reduce set-up and LIC processing costs. The types of transaction costs associated with the implementation of an LIC program are reviewed in the next section of this paper. Sufficient staff resources must be allocated for administration of the LICs.

3. *Administrative Unit.* An energy efficiency LIC program would best be managed by a separate administrative unit because, although the same familiar LIC mechanism is used, the application would be significantly different. In some cities, where LICs are processed by multiple departments according to the specific nature of the improvement (drainage LICs, road LICs, etc.) energy efficiency LICs would not be a good fit into any existing program.

4. *Council Support.* Every LIC put in place by a municipality must first be specifically authorized by a municipal bylaw approved by Council (see Operation of an Energy Efficiency LIC Program below). However, it is advisable to have the general concept of using LICs to finance energy efficiency improvements approved in principle by the municipal council as a first step in designing and implementing a municipal program.

   A particularly strong rationale for council approval of a municipal energy efficiency LIC program would be the council's existing commitment to reducing energy costs or greenhouse gas emissions from the community as a whole. Municipalities that are members of the FCM PCP program have already committed to achieving community-wide reductions of greenhouse gases. An energy efficiency LIC program can be reasonably justified as an effective means by which the city can assist the community as a whole in achieving reductions. A similar rationale is available to those municipalities that have committed themselves to a Community Energy Planning process.

   There is a potential that some municipalities will be averse to taking on extra debt to finance an energy efficiency LIC program, even though full-cost recovery is anticipated and the risk of default on LICs is very low. This may be particularly true for cities that already have large loans to finance conventional LICs.

5. *Public Support.* Because the application of the LIC tool for household energy efficiency improvements constitutes a significant and novel extension of traditional civic functions, it is also strongly recommended that the municipality clearly present its rationale for the use of this tool to the public. In particular, municipalities should ensure that the program is not perceived as a new tax on energy efficient properties. To overcome this issue, municipalities

can stress the voluntary nature of the program, and the financial savings resulting from these improvements.

Public promotion should also highlight the fact that energy efficient LICs are designed to finance longer payback improvements that are traditionally not financed by conventional loans from financial institutions. The improvements being targeted by LICs are those not normally targeted by banks that focus on conventional loans for shorter-term investments.

6. *Eligible Energy Efficient Technologies*. The municipality needs to decide on which energy efficiency improvements and technologies are eligible under the LIC program. In principle, LICs could be applied to energy efficiency improvements for any new or existing property. Depending on the types of properties/owners the municipality wants to target/deal with, council could limit the program to a particular type or vintage of building, or restrict the types of property eligible (i.e., those properties zoned for commercial or residential buildings).

   Beyond these limitations on eligibility, this paper recommends that energy efficiency LICs should be limited to only those improvements in building energy efficiency that a) cannot be easily removed from the house or building, and b) are easily recognized as energy efficiency measures. Examples of these energy efficiency measures include
   - building shell insulation, air sealing, and new windows — including re-siding and other outside renovations that would allow significant energy efficiency improvements to be made at the same time
   - new high efficiency HVAC, air conditioning, heating systems and water heaters, including permanently installed solar water heaters
   - permanently installed solar PV systems and associated inverters, grid connections and meters
   - built-in water efficiency measures such as water efficient toilets
   - many of the components relevant to attainment of LEED Gold and R-2000 certification (in commercial and residential buildings respectively).

   It should be noted that the improvements listed above have longer payback periods because of the higher levels of capital investment involved, and as such are subject to the types of barriers that the LIC program addresses.

   It is further recommended that the city restrict eligibility for the energy efficiency LIC program to a specific set of measures known to produce significant benefits for the buildings in question. Technologies that are ineffective for the climate zone of a particular municipality, or measures that are not optimized for the size, function and load of the proposed building, should not be made eligible.

7. *Coordination with Financial Incentive Programs.* Several of the proposed energy efficiency improvements listed above will be eligible for federal or provincial incentive grants. These include Energy Star sales tax rebates on home heating systems, EnerGuide for Homes retrofit grants, and CBIP and Energy Innovators grants for commercial buildings. The LIC program could be structured so that these grants can be taken advantage of when the improvements

are made. Alternatively, the municipal LIC program could be limited to those energy efficiency improvements not covered by these programs. In both cases, the objective would be to coordinate the LIC program with these grants, minimize duplication of effort, and prevent any confusion in building owners' minds as to how these programs operate.

Some building owners will also be eligible for non-energy related investment tax credits. These would need to be preserved in the application of an energy efficiency LIC.

8. *Eligible Installers.* The municipality should design its energy efficiency LIC program to ensure, as far as possible, that installation is done in a professional and cost-effective manner. To achieve this, it is recommended that the municipality set out criteria determining the eligibility of contractors to carry out the improvements and provide an estimate of the savings that would be realized from the improvements. Because these types of investments are unfamiliar to many property owners and contractors, it will be important to ensure the contractors are familiar with their installation and performance, can undertake an energy audit of the building, and can accurately estimate the costs and savings from the upgrade recommended.

   In many cases, professional organizations and accreditation programs that certify members' proficiency in installing various types of energy efficiency improvements already exist (e.g., R-2000, EnerGuide for Homes, and LEED accreditation programs). Technology-oriented professional associations (e.g., Canadian Earth Energy Association, Canadian Solar Industries Association) also have codes of conduct for members, which could be adopted with a minimum of effort for use by municipalities.

9. *Financing Structure*. The municipality also needs to decide on the financing structure for the LICs. It is recommended that the LIC program operate on a cost-recovery basis, because the improvement is beneficial to both the property owner (financial benefits) and the community as a whole (environmental benefits).

   In order to overcome the aversion to long payback type investments, and to provide modest reductions in energy costs from year one, it is strongly recommended that the LIC payments be structured so that, in an average year, the LIC repayment is less than the energy cost savings achieved. As such, the optimal LIC repayment term should be somewhat longer than the time estimated to achieve a simple payback through energy savings. This said, it is also prudent to offer property owners the flexibility of a shorter payback term, as well as the option of full early payback without financial penalty, as with traditional LICs. The longest available term for repayment would likely vary across municipalities because of different energy needs, technologies, and prices but could be in the range of 15 to 20 years. This is comparable to the longest available terms in traditional LIC programs.

   It is recommended that the interest rate for the LIC be set to cover all of the additional transaction and processing costs incurred by the municipality to run an LIC energy efficiency program. The anticipated costs are detailed below, but the exact amount will depend on the staffing and borrowing costs of each municipality, and the nature of the program they choose to pursue.

In terms of cash flow, local variations in LIC rules that allow deferral of property taxes need to be taken into account. For example, in Vancouver, residents over 65 years of age can defer taxes until the property is sold.

Minimum and maximum cost limits for improvements need to be set by the municipality. It is recommended that the minimum limit be relatively substantial (i.e., $3–5K) in order to avoid the high relative transaction costs that would apply to management of smaller sums, and to avoid interference with existing programs that already adequately finance lower-cost and shorter-term energy efficiency improvements. As noted above, the energy efficiency LIC mechanism is particularly well suited to more expensive improvements that have longer-term paybacks.

Maximum funding limits are prudent to ensure that available funds can be applied to a large number of applicants, and to prevent possible abuse of these funds. Maximum funding limits would be capped at a modest percentage (e.g., 25%[9]) of the total assessed value of the property. Within this overall cap, more stringent maximum funding limits could be set for each technology, based on discussions with qualified contractors experienced with these technologies. There is no need to check an applicant's personal financial background because of the property-based nature of an LIC, thus saving what can be a significant part of total transaction costs in a conventional loan program.

10. *Program Advertisement*. The municipality must announce and advertise the program. Depending on the number and proximity of participating municipalities, and the extent of the municipality's cooperation with professional organizations in structuring the program, this step could be accomplished by the local government alone, or through a collaborative campaign with local contractors or other participating municipalities. Regardless of the model selected, making people aware of the program will be critical.

Operation of a Energy Efficiency LIC Program

The following describes steps in the application for and implementation of a typical energy efficiency LIC.

1. A property owner decides they would like to investigate having energy efficiency improvements installed in their building. This could be as a result of an energy audit of an existing building, or an interest in constructing a high-efficiency building such as R2000 or LEED Gold.

2. The property owner contacts City Hall, which has a list of eligible contractors and technologies that can be financed with an LIC. Alternatively, the property owner contacts these contractors directly.

[9] As in the case of the Yukon program described above.

3. One or more contractors undertake an energy assessment of the building, and discuss possible EE options with the property owner, keeping in mind the eligible technologies listed by the municipality. It may be possible to streamline the audit process by having standard energy reductions for each eligible measure or technology (at least for a particular municipality). It would be prudent for the property owner or one of the contractors to initially confirm the eligibility of the intended improvement with City Hall at this time.

4. The contractor develops a quote for materials and labour that is agreed to by the property owner, along with an estimate of the savings that would be achieved. In cases where the eligible work is just a component of the overall renovation, the LIC would be applied only to the eligible improvements within the larger project. A proper determination of the costs for these components would be made less onerous if the eligible measures or equipment were clearly defined, and applications were assessed in cooperation with relevant professional organizations experienced in installing these technologies.

5. The property owner submits the quote to municipality for approval.

6. Assuming the request for an LIC and the quote are eligible, the municipality then advises the property owner on what their annual LIC payment and term will be, along with an estimate of the annual energy savings. Ideally, the annual payments would be set so that they are less than or equal to the estimated average annual energy savings so that cost savings could be realized immediately. This process requires setting the payback term uniquely for each proposal, but as programs evolve, municipalities may find it more effective to provide fixed terms for different types of improvements. This is how traditional LICs operate.

7. If the property owner agrees to the terms of repayment through the LIC, the municipality then initiates a bylaw for the LIC and gains approval from Council.[10] In practice it would be prudent to combine several LICs into a single bylaw and take these bylaws before the municipal council on a regular basis. In many municipalities, LICs applications are grouped together and approved only two or three times a year. For groups of new R-2000 homes a single bylaw could be used to cover all homes in a subdivision, with the developer being the proponent (as owner of the property). Improvements to large facilities like shopping centres (or a new building) could be covered by their own LIC bylaws.

   The City of Whitehorse bylaw (see Appendix 2) could be used as model for an energy efficiency LIC.

8. The contractor is authorized to initiate work. Since property owners would likely want to proceed quickly with renovations, a streamlined cost estimate and approval process is recommended to minimize the time between application and authorization to proceed. Conventional LICs often involve several property owners and the contracting process can take several months. The processing and approval of an energy efficiency LIC should take less time than for a conventional LIC.

9. Upon completion of the upgrades, the contractor submits an invoice to the municipality.

[10] Provincial legislation normally requires that each new LIC be approved by the municipal council.

10. The municipality or designated authority inspects the work to ensure it has been done satisfactorily, within the cost estimate, and that the work will produce the savings estimated. If the work does not meet the requirements agreed upon with the contractor, the property owner will still be liable for full repayment of the funds advanced by the municipality. In anticipation of this outcome, all contracts will need to clearly communicate the expectations of the property owner and responsibilities of the contractor so that the city can ensure that improvements are acceptable. Having a list of qualified and properly trained contractors will also help mitigate this risk. The need for contractors to be qualified in installation will be strongest with newer technologies, such as solar water heaters that property owners and contractors are less familiar with.

11. The municipality then issues payment for the improvement to the contractor, and applies the LIC to the property tax records. The LIC payment is made annually along with regular property taxes.

    If, because of actions on the part of the property owner, the improvements made do not continue to provide the expected savings for at least the length of the payback period (or are removed through an additional investment for example), the owner would still be responsible for full repayment of the funds advanced by the municipality. Careful selection of reliable technologies, and cooperation with professional contractors and building technology associations, should minimize this problem. Building owners should also be advised to carry sufficient insurance to cover the cost of replacing the efficiency improvements in the case of fire or other loss.

    If LIC payments are defaulted, the municipality has the same extensive rights as they do in the case of failure to pay property taxes. With conventional LIC programs, this problem usually only arises with property owners who voted against a local improvement that was favoured by a majority of their neighbours. In the case of the energy efficiency LIC program described above, LICs would only be imposed on individual properties, and only at the request of property owners, thus substantially avoiding this issue.[11]

12. When a property is sold, the LIC is passed on to the new owner who must be apprised of its existence (and benefits) during the sale. Other features of the LIC, and improvements such as carrying sufficient insurance, should also be passed on to the new owner at this time. Legal appeals of energy efficiency LICs would be expected to be extremely rare because the charge would have been voluntarily agreed to by the property owners.

[11] Opposition to an LIC placed on a single property might still occur in the case of a condominium property, where a minority of the strata council opposed the LIC.

Program Transaction Costs

In order to operate a program as described in the preceding section, a municipality will incur transaction costs, which will vary depending on the size of the municipality, the extent of the program, and the municipality's experience with LICs. The following points help to illustrate some of these costs that are in addition to the costs of the improvements themselves. An LIC program that supports energy efficiency improvements should be run on a cost-recovery basis, so that these transaction costs can be recovered as part of the LIC payment. Realistically, in the program's infancy, many of these transaction costs will be higher than optimum, as various options are experimented with and efficiencies are learned.

- *Interest on Capital Expenditures* — The municipality will need to have funds available to pay for improvements as they are completed and approved. This could be set up as a revolving fund like Toronto's Better Building Partnership, or be borrowed and paid back as needed. Given the long time lag between payment for the energy efficiency improvements, and full repayment of the amount loaned through LICs, some level interest will have to be assessed in any sustainable program.

- *Staff Transactions* — Municipal staff need to devote time to establishing the initial program parameters, dealing with contractors and property owners for LIC requests and approvals, and tracking LIC payments. Given that the number of energy efficiency LICs could be higher than those for traditional applications for such things as sidewalks and street paving, and that a fast turnaround on energy efficient LIC applications may be required, a separate unit to manage LICs may be needed.[12]

- *Council Transactions* — In addition to approving the initial program launch, municipal councils are typically responsible for approving all local improvement charges in the form of a bylaw. If the program is successful, an efficient approval system will be required to minimize time requirements and delays for contractors and property owners.

- *Advertising* — To facilitate adoption of the program by building owners, the municipality will need to promote the program.

- *Contractor Certification* — The municipality will need to have a list of certified contractors for property owners to approach in order to have improvements made. Certification could be handled by municipalities, a centralized provincial or Territorial agency, or through cooperation with professional industry associations.

[12] For example, the City of Calgary estimated that an energy efficiency LIC program would require several new staff.

Recommended Next Steps

The research reported in this paper shows that there is a real opportunity to use the LIC concept to finance long payback energy efficiency improvements to new and existing commercial and residential buildings. The next steps would be to further elaborate on the work done to date and pilot the LIC concept in several municipalities across Canada.

Discussions should be held with the Federal Office of Energy Efficiency, provincial governments, the Federation of Canadian Municipalities, provincial associations of municipalities, and provincial energy utilities about their interest in supporting this additional work.

Further Research

Additional work is needed in the following areas:

- A more in-depth analysis of Municipal legislation in each Province and Territory to determine whether any modifications would be needed to allow municipalities to use LICs to finance energy efficiency improvements on private property.
- Input from contractors and homeowners in the Yukon to learn from their experiences with the Yukon LIC program for renewable energy systems.
- Analysis of the energy performance contracting experience under the Federal Buildings Initiative (FBI) and the Better Buildings Partnership, particularly the way that energy savings associated with standard improvements are estimated, and how contractors are pre-qualified to undertake quality work.
- Greater scrutiny of the buildings improvements that would be eligible under an LIC program, including a better understanding of their life spans, the amount of energy they save, and the range in energy prices Canadians pay. This would allow a more standardized set of building improvements to be included in energy efficiency LIC programs.

Pilot Programs

The energy efficiency LIC concept should be piloted in a number of municipalities across the country. The pilot programs would test the legal aspects of using LICs to finance energy efficiency improvements in each province and also demonstrate the LIC concept in different-sized municipalities, to commercial building owners and homeowners.

In the short term, it would useful to assign some additional funding from federal or provincial agencies to meet the higher than normal transaction costs that would occur during demonstration of the concept. Once a good model has been proven, the LIC concept should operate on a cost-recovery basis provided sufficient capital investment is available.

Municipalities that would be most suitable to pilot the LIC concept would be

- those that already have an internal program and staff resources dedicated to energy management
- those where there is strong council support for greenhouse gas reduction and other environmental initiatives, and there has already been some success
- those that have low debt levels that will allow them to provide or procure the necessary financing.

Appendix 1: Preliminary Review of Provincial Legislation Governing LICs

The following is a brief synopsis of municipal government acts in the Yukon, Alberta, and British Columbia that govern municipal use of local improvement charges, and a preliminary interpretation as to whether these acts allow a municipality to issue LICs for new applications, such as for energy efficiency improvements.

Yukon — The Yukon Municipal Act provides municipalities with flexible guidelines for LICs. The guidelines should not prohibit a municipality from using an LIC to finance energy efficiency improvements. The approach would be similar to that used for renewable energy systems (see Current Uses of LICs, page 4, above). Under the Act, local improvements are defined as "any capital project or service that the municipality deems to benefit one area of the municipality more than the whole municipality."[13]

Alberta — As in Yukon, the Alberta Municipal Government Act defines local improvements with significant flexibility. Specifically, the act defines a local improvement as "any project that the municipal council considers will benefit one area of the municipality more than the whole municipality."[14] This would allow the application of LICs to be expanded to energy efficiency improvements without necessitating changes to existing legislation.

British Columbia — Under the Vancouver Charter,[15] the City of Vancouver has powers separate and distinct from other British Columbian municipalities. The Vancouver Charter regulates LICs less restrictively than British Columbia's Local Government Act, the definition of LICs being limited only to "those projects that can specially benefit real property in a limited and determinable way." There is no specific requirement for Vancouver to pay maintenance costs for LIC improvements as in the LGA. Based on the Charter, Vancouver appears to have sufficient powers to expand its use of LICs to include energy efficiency improvements.

The Government of British Columbia has now enacted the Community Charter, replacing the old Local Government Act. In general, the Community Charter allows a much greater scope for action by local governments within British Columbia than the previous Act. The Charter explicitly allows municipalities to borrow money to cover LICs and specifies that a municipality does not need additional approval to borrow money if the full costs of the LIC are going to be recovered. This would provide all of the legal means for a municipality to undertake a major energy efficiency LIC program. As such, the Community Charter appears to provide British Columbia municipalities with the ability to use LICs for energy efficiency purposes.[16]

[13] http://www.gov.yk.ca/legislation/acts/municipal.pdf
[14] http://www.qp.gov.ab.ca/documents/acts/M26.cfm
[15] http://www.qp.gov.bc.ca/statreg/stat/V/vanch_00.htm
[16] http://www.legis.gov.bc.ca/37th4th/3rd_read/gov14-3-pt07.htm#section210

Appendix 2: City of Whitehorse LIC Bylaw

City of Whitehorse Bylaw 2003-38

A bylaw to authorize a work of local improvement to provide for urban electrification at Lot 1098, Quad 105 D/11, Plan 93-87.

WHEREAS on May 12, 1989 Council approved the concept of assisting taxpayers to bring electrical service to their property via the imposition of a local improvement charge bylaw; and

WHEREAS sections 267 to 271 of the *Municipal Act* require that a bylaw to provide for and authorize a local improvement will contain specific information pertaining to the local improvement and the procedures to be followed in passing the bylaw; and

WHEREAS the actual cost of the said construction is estimated to be $26,012.00, of which $24,834.70 will be raised by way of a special frontage tax; and

WHEREAS in order to construct and complete the project it will be necessary to fund up to the sum of $24,834.70 from the City; and

WHEREAS the estimated life of the project exceeds ten (10) years;

NOW THEREFORE the Council of the municipality of the City of Whitehorse, in open meeting assembled, hereby ENACTS AS FOLLOWS:

1. Pursuant to section 269 of the *Municipal Act*, notice is hereby given that the Council of the City of Whitehorse hereby authorises a work of local improvement, being the electrification of the property as set out in Schedule "A" attached hereto and forming part of this bylaw.

2. The parcel of land benefiting from this work of local improvement is as set out in Schedule "A" to this bylaw.

3. The total cost of the local improvement has been determined by the Yukon Electrical Company Limited.

4. The cost of the work is to be paid for by way of a frontage tax to be levied on the parcel as set out in Schedule "A" to this bylaw.

5. For the purposes aforesaid, the sum of up to $24,834.70 is to be funded by the City at large.

6. The sum of $24,834.70 is to be collected by way of a special frontage tax assessment as provided in Schedule "A" to this bylaw.

7. There shall be levied and raised in each year of the currency of the local improvement hereby authorized the amount necessary to pay the annual amount of interest and principal falling due

in each year by levying a special assessment under the *Assessment and Taxation Act*, and there is hereby imposed on the land set out in Schedule "A" attached hereto and forming part of this bylaw, an annual fee for each of ten (10) years to be computed at the prime business rate on the date of funding. The said special assessment shall be in addition to all other rates and taxes.

(1) The property owner has the option of paying the total property charge prior to its due date, or of paying the equal annual instalments each of ten (10) years, commencing on the due date.

(2) The property owner may also pay off the balance owing at any point during the ten-year life of the bylaw.

8. The provisions of this bylaw shall come into full force and effect upon final passage thereof.

FIRST READING:
NOTICE GIVEN:
SECOND READING:
THIRD READING and **ADOPTION**:

_____
Mayor

_____
City Clerk

Appendix 3: Barriers to Energy Efficiency

The cost barrier to energy efficiency improvements: The local government perspective

As is well known, one of the most significant and beneficial ways to make environmental improvements within our communities is to improve the energy efficiency of existing and new buildings. Because energy has been so cheap for so long, established conventional building practices place little importance on the efficient production, distribution or retention of heat energy. While there are energy efficiency regulations within current building codes, they not only fall far short of what is possible with modern technology, they also fail to include relatively simple and highly cost-effective measures.

While imposing higher energy-efficiency standards within a local government's building codes is one obvious way of increasing a community's overall energy efficiency, it is also clear that this approach requires an uncommon level of political will from councillors, especially when heightened standards also result in higher construction costs for new or renovated buildings. For most local governments, a mandated regulatory approach is not politically possible.

One commonly suggested alternative to using force is to apply persuasion, relying on accurate information about the long-term cost savings that result from energy efficiency measures to elicit voluntary action by property owners. Unfortunately, this approach appears to have had only limited success to date. This approach is also problematic for local governments because it is difficult to quantify the energy efficiency savings that do result from a more educated population, while the costs of a properly resourced education program are both obvious and significant.

A third approach directly addresses the barrier of up-front costs through the use of subsidy and rebate programs. The federal government in particular now has a range of programs to assist businesses and homeowners improve the energy efficiency of both their new and existing buildings. The Government of Alberta also funds several building energy efficiency programs through Climate Change Central, and BC Hydro's PowerSmart demand-reduction program is a utility leader in achieving energy efficiency gains. Clearly, local governments can play an effective role here, by making residents aware of these programs, assisting program staff in reaching out to the community, and tailoring city development processes to encourage greater uptake of these available resources. Unfortunately, while participation in these programs is increasing, the current level of incentives and rebates does not appear to be sufficient to effect the decisions of most building owners — even when an energy efficiency measure is cost-effective without a subsidy. Needless to say, while a higher level of funding might increase results, increasing existing subsidies also calls for a significant level of political will.

While local governments can make use of one or all of the approaches noted above, all require a significant exercise of political will in proportion to the benefits that can clearly be assigned to the implementation of this approach. More specifically, the more effective these measures are in addressing the cost barrier to energy efficiency improvements, the less politically palatable they

are, precisely because of the costs they impose on others (i.e., not the building owner), including the municipality itself. By contrast, a local government policy that effectively removed the high initial cost of installing cost-effective energy efficiency measures, but still ensured that all program costs were paid directly by the beneficiary, would avoid many of these problems.

The cost barrier to energy efficiency improvements: The property owner's perspective

While many energy efficiency improvements have the potential to significantly reduce energy use in buildings over the total expected life of the structure, those with higher capital costs such as high-efficiency windows, wall insulation upgrades, high-efficiency heating, ventilation and air conditioning (HVAC) systems, and electronic HVAC control systems may not return their initial investment for five to fifteen years. These relatively long payback terms create a barrier to investment, since the average term of property ownership is currently seven years. Many property owners are unwilling to make the long-term commitment to a particular property that is implied by these high-capital cost energy efficiency improvements. When energy efficiency investments are made using conventional financing mechanisms, property owners who sell before their improvement achieves payback are obliged to increase the selling price of their properties to recover these stranded costs. In most cases, this upfront cost exceeds the single-year benefits of the energy efficiency improvement, and may dissuade potential buyers from purchasing the property.

In a similar manner, new buildings built to LEED[17] Gold or R2000[18] standards often cost more to build than do conventional buildings. However, these additional capital costs are recovered many times over during the life of the building. Despite the cost-effectiveness of these measures, many builders and equipment suppliers are not in favour of governments enacting higher energy efficiency codes and standards, arguing that the increased cost of constructing new homes will discourage potential new home buyers, and encourage these purchasers to buy (less efficient) existing older homes instead.

Property owners already have mechanisms available to finance energy efficiency, including loans recovered through energy bill payments to financial institutions, governments, or energy performance contractors. These approaches have an important place in energy efficiency policy, but are best suited for lower-cost and short- and medium-payback efficiency measures, where the problems of stranded capital and quick return on investment are minimized. In practice, existing programs for financing energy efficiency retrofits are often not set up to finance larger capital-intensive and longer payback improvements. Worse still, a focus on "picking the low-hanging fruit," effectively makes financing measures with long-term benefits even more difficult. The quick payback measures that might have been used in a package of measures to offset the capital outlay for longer-term investments will no longer be available. As a result, the opportunity to make larger efficiency gains — gains that can often only be achieved through larger, longer-payback capital investments — can be lost for many years.

[17] http://www.usgbc.org/leed/leed_main.asp
[18] http://r2000.chba.ca/index.php