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Executive summary

First Ministers have committed to develop a pan-Canadian framework on clean growth and climate change. To date, financial incentives have been a common policy instrument to encourage energy efficiency retrofits in the built environment. However, achieving significant emissions reductions in a cost-effective manner to governments will require an expanded use of financing mechanisms.

This study examined different innovative financing mechanisms used to promote energy efficiency upgrades in the housing and buildings sectors with a focus on various initiatives in Canada, the United States (U.S.) and the United Kingdom (U.K.). Best practices were identified for models that align savings with the cost of loan repayments through repayment on utility bills or property tax bills, as well as traditional credit sources from financial institutions, other suppliers and governments and their agents.

This study found that across Canada, experience with energy efficiency financing is varied. While a few programs have an established track record of success, many are relatively recent. Some approaches, such as on-bill financing, have been successful in some jurisdictions but have gained little traction in others. Other approaches, such as local improvement charges, have had mixed results but show promise. Given this diversity of experience, it is likely that maintaining flexibility in program delivery will be important so that jurisdictions are able to leverage successful initiatives and lessons learned to develop successful programs for the future.

Research also suggests that successful financing programs need to be complemented with program support and other tools to address the range of barriers that home and building owners face in undertaking efficiency retrofits. Many jurisdictions have indicated that more expertise is needed to identify retrofit opportunities, see retrofit projects through, and deliver effective programs. While some supporting tools already exist in Canada, additional tools are needed, including those to improve confidence in project energy cost savings and to lower the cost of capital. Finally, by placing a priority on public sector infrastructure, governments can demonstrate leadership and ensure early action in areas under their direct influence.

Financing tailored to energy efficiency projects, when combined with other support mechanisms, could be expanded to become an important tool in a pan-Canadian framework for clean growth and climate change by providing homeowners and building owners with a route to investing in energy efficiency retrofit improvements for their properties. To support the expansion of energy efficiency financing in Canada, federal, provincial and territorial governments can use the following to guide their activity:

- **Maintain flexibility in program delivery.** Each jurisdiction faces different challenges in delivering financing programs and therefore, may need to implement different programs to respond to the diversity of experience, utility models, and carbon-reduction priorities across Canada.
- **Complement financing programs with other tools.** Financing has been most effective when used in conjunction with other tools (e.g. advice, grants/rebates, mandatory information such as labelling) to address the range of barriers that homeowners and building owners face in undertaking efficiency retrofits.
- **Follow best practices in designing initiatives.** Good program design principles, as outlined in this report, have emerged through financing experience in various jurisdictions and should be considered when developing financing initiatives.

- **Develop supporting tools to increase uptake.** Jurisdictions could collaborate to improve investor confidence through research and the development of new tools that predict and verify outcomes from energy efficiency upgrades and through capacity building by improving training and support for key advisors and program coordinators. Tools to lower the cost of capital should also be explored further.

While financing could be used to support retrofits in all areas, a focus on improving energy efficiency in public/not-for-profit housing and public buildings, as well as on energy efficiency retrofits paired with fuel switching away from carbon sources of heating, could be considered for early action since programs in these areas have seen the greatest participation to date. In addition, further testing of local improvement charge financing could support municipal interest in this model.

Introduction

Since the 1970s, energy efficiency has received significant policy attention from various levels of government across Canada as an important tool for encouraging conservation and reducing the cost of energy bills while also stimulating economic growth. In recent months however, renewed emphasis has been put on energy efficiency as a result of commitments made at the international and national level to address climate change.

In particular, in March 2016, First Ministers signed the Vancouver Declaration, which committed them to jointly develop a pan-Canadian framework on clean growth and climate change and implement it by early 2017. Under the Declaration, First Ministers also agreed to undertake a number of actions, including fostering investments in energy efficiency, identifying measures to reduce emissions from the built environment and collaborating to advance work on energy efficiency under the Canadian Energy Strategy. Finally, the 2016 Federal Budget, which provides significant new funding for efficiency and investment in federal buildings and social housing, and the numerous provincial and territorial initiatives related to energy efficiency demonstrate strong pan-Canadian efforts and interest in this area.

To date, financial incentives have been a common policy instrument to encourage voluntary energy efficiency retrofits. However, achieving significant emissions reductions in the built environment in a cost-effective manner to governments will require an expanded use of financing mechanisms. For example, a federal home retrofit program spent nearly \$1 billion to encourage retrofits in 5 percent of all Canadian homes and was complemented by additional provincial, territorial and utility incentives in many jurisdictions.

In light of these commitments and challenges, this report identifies best practices and the most effective innovative financing mechanisms to accelerate the uptake of energy efficiency upgrades in the Canadian housing and building sectors. In addition to the recommendations on best practices, it identifies actions that can support federal, provincial and territorial governments in their efforts to achieve ambitious greenhouse gas (GHG) reductions in the built environment.

Research suggests that innovative financing approaches may help accelerate investments in efficiency upgrades, but they must be combined with other support mechanisms. Program supports to enhance awareness and knowledge and expertise to support upgrade decisions are imperative. Thus financing comes into play only after participants and investors:

- become aware of the opportunities to improve the efficiency of their building;
- understand the costs and savings that can result from each improvement;
- know who to engage to have the improvements made; and
- know what quality assurance steps must be taken to help ensure results are achieved as planned.

As energy efficiency can be complemented by increasing renewable sources of energy and encouraging consumers to switch from high carbon source fuels to lower carbon sources, programs that contain these elements are also included.

The need for energy efficiency investments in the built environment

The built environment consists of residential homes, commercial and institutional buildings, and the energy-consuming equipment they contain. It accounts for 17 percent of Canada's total GHG emissions as a percentage of total primary energy use. This includes 12 percent of direct emissions attributed to the buildings sector and another 5 percent attributed to the electricity used in buildings.¹ Because this is the third-largest emitting sector in Canada, making buildings more energy efficient is an essential part of the framework to help Canada make significant progress towards its climate change goals. While higher energy efficiency standards for new buildings will be needed, achieving Canada's goal will require a significant increase in the retrofitting of existing buildings, as it is estimated that current buildings will account for 75 to 80 percent of buildings in use by 2030.² Even in jurisdictions where buildings are heated with electricity from renewable or low-carbon sources, improving efficiency can free this electricity to replace less clean energy sources in other sectors or other jurisdictions.

Financing can also be considered a critical tool for market transformation when used as part of a longer-term strategy to move from incentives that encourage voluntary retrofits to regulations that require energy efficiency. As Canada moves to meet long-range emission reduction targets, higher standards and more stringent codes will likely be required. Experience shows that providing financial resources helps to build consumer support and facilitate this transition.

A time to invest

In addition to the ambitious goals set by federal, provincial and territorial governments to achieve a low-carbon economy, there are other factors that make this the right time to promote new financing options in this area. For instance, each year an additional portion of the stock of buildings in Canada reaches a point where reinvestments are required to maintain or improve serviceability. Such renewal work provides an ideal opportunity to cost-effectively build in energy efficiency improvements as other work is undertaken.

Additionally, with current low interest rates, the investment community is looking for new opportunities for long-term investments, and if a strong business case is in place, efficiency upgrades should be attractive. This report examines the factors that influence a business case, including the need for economies of scale, competitive interest rates, and a predictable outcome from investment, such as savings and GHG reductions. The relatively slow economic growth experienced by Canada in recent months also provides an incentive to support innovative financing mechanisms for energy efficiency retrofits, as these would help spur economic growth and job creation.

Barriers to financing

This study has identified a number of barriers that limit the uptake of energy efficiency in the buildings sector in Canada. Some of them relate directly to financing, while others go beyond financing. The barriers include:

- a lack of awareness and knowledge about the benefits of efficiency upgrades, including the benefit to the environment and the potential for energy and cost savings;

¹ Environment and Climate Change Canada, National Inventory Report 1990–2014: Greenhouse Gas Sources and Sinks in Canada and Natural Resources Canada, National Energy Use Database 1990–2013

² Natural Resources Canada estimates

- complex programs delivered by multiple organizations, often requiring significant time and paperwork;
- different interests when tenants pay energy bills and landlords must make the efficiency investments;
- a lack of ability or an unwillingness to obtain financing, given the often large upfront capital investment required;
- a shortage of qualified people, such as energy auditors, project advisors and managers. The scale of these labour shortages varies by region.;
- the cost of low carbon fuels, which can deter investment; and
- limits on debt levels, no matter how attractive the business case may be.

That said, from the perspective of financing efficiency investments, one of the biggest challenges remains establishing a strong business case for both the lender and the borrower. It should be noted that regional and market considerations are also at play. What is considered an acceptable business case may vary from one part of the country to another, as well as from one sector to another. Also, the risk appetites of both consumers and lenders may vary by market.

The key issue in assessing a business case is the expected return on investment (ROI). In other words, how quickly will the energy cost savings outweigh the project costs? The ROI is affected by the cost of borrowing, which in turn is influenced by the security offered on a loan, the credit rating of the borrower, and the level of certainty that the energy cost savings will materialize as predicted. Another key consideration is the cost of the energy that is saved. For example, Canada's most popular source for heating is natural gas, and in the current low price environment in much of the country, the business case for some upgrades is weakened.

Even when the business case is strong, lenders and borrowers alike treat financing as debt. Using public buildings as an example, buildings that are upgraded and included in public accounts are shown as assets and the funds borrowed as liabilities. As a result, proposed efficiency upgrades are included with all other public interest projects requiring borrowing and capital spending such as hospitals and highways. In jurisdictions with limits on the amount of debt to be taken on, this may result in capital allocations that leave little or nothing for efficiency projects.

These barriers can be partially addressed by government action. Public funding to support awareness and education, including financial literacy, can help move some investment decisions forward. It could also be used to develop private sector capacity to ensure that the technical and financial assessments of energy retrofit projects are robust, accountable and verifiable. Setting energy efficiency program design standards, including measures to reduce administration costs and the coordination of program delivery by multiple organizations, all help make borrowing more attractive.

The impetus to deliver relatively quickly on environmental and social outcomes, such as reducing GHGs, also presents a new policy foundation to invest in and finance energy efficiency measures. These new policy justifications for investment could help governments take a second look at capital spending priorities and debt restrictions. Some jurisdictions may see merit in taking on more debt due to efficiency investments because they can be repaid through energy cost savings and the increase in debt is not long-term.

Report findings and best practices on innovative financing mechanisms in the built environment

This study examined different innovative financing mechanisms used to promote energy efficiency upgrades in the housing and buildings sectors with a focus on various initiatives in Canada, the U.S. and the U.K. The Canadian experience was captured through a survey of all provincial and territorial governments, as well as a number of their energy and efficiency utilities. Federal officials and the head of the Energy Services Association of Canada were interviewed, as were academics and government officials in the U.K. The American experience was largely captured through analysis of existing studies.

Financing mechanisms studied included methods that align the cost of loan repayments with energy cost savings through repayment on utility bills or property tax bills. Traditional credit sources from financial institutions, other suppliers and governments and government agents were also studied.

Analysis shows that the various financing options have had varying degrees of success as a result of jurisdictional circumstances, program design, and implementation. Circumstances include the organization of the energy markets (public vs. private ownership and regulated vs. unregulated suppliers). Design factors include the cost of funds, simplicity of administration and the level of market support.

Almost all the financing mechanisms examined have wide application across the built environment. Only the financing of efficiency upgrades through energy performance contracts was limited to a particular sector (large institutional, commercial or multi-residential buildings) because of the need for economies of scale to absorb large upfront costs.

Good program design principles

Simplicity for participants is a major element of good program design. Each additional step in a process to determine the upgrades required, confirm eligibility for financing, contract and complete upgrade work, and undertake post-work measurement adds to the complexity of the project and discourages participation. The availability of qualified local energy evaluators, testing and inspection personnel, contractors, and advisers is also important.

Experience in Canada and other jurisdictions also indicates synergies between efficiency and small-scale renewables. In jurisdictions that encourage small-scale renewables, linking the two areas in a bundled package may serve to improve attractiveness compared to efficiency measures alone.

Good program design should also consider combining financing and incentive options. Incentives may include buy-down of interest rates and loan guarantees for private sector financing as well as providing grants, rebates and refunds. By bundling incentives, retrofit projects can become more financially attractive and simple to manage by homeowners and property managers.

Program design also includes quality assurance measures and the assessment of outcomes. Although some programs feature strong measurement regimes—including before and after testing and measurement of free-ridership—many do not. Such measurement is important to provide confidence to all parties that the retrofit work was properly done, the investments pay off, and the payoff is lasting. Research should be enhanced to support new technologies and measurement techniques. Ensuring the technical and financial competencies of those

advising building owners and homeowners on energy retrofit projects and ensuring that they continue to perform to a high standard over time, is also critical.

Utility on-bill financing

On-bill financing is usually provided by a utility and often for the upgrade of a heating or cooling system. The utility finances the upgrades and recovers the costs through repayment on the billing system. This effectively positions the energy cost savings as a source of funds for the loan repayment.

Several provinces have had good success with the on-bill financing model. For example, over the past 14 years, Manitoba Hydro has provided more than \$317 million in loans to support the efficiency measures of more than 75,000 of its customers using an on-bill financing mechanism. A new venture called PAYS has also been reasonably successful, providing nearly 600 consumer loans with a total value of \$4 million in over a little more than three years. To address consumer resistance to long-term investments, the loan is transferable and payments are made on the utility bill. Tenants can also ask their landlord to upgrade the efficiency of their homes and have the loan included on the tenant's utility bill.

In Nova Scotia, over the past four years, 57,000 homeowners participated in Nova Scotia Power's heat pump program, and 13,000 of them have taken out loans that are paid back on their utility bills. Ontario recently amended regulations to clarify that electricity utilities can proceed with this model, and it is under consideration. One of Ontario's main natural gas distributors, Enbridge Gas Distribution Inc., offers a service similar to on-bill financing called "Open Bill Access." Through this service, Enbridge Gas Distribution leverages third-party financing and provides third parties, including energy efficiency contractors, access to customer bills. Contractors can use the bill to collect payments from customers. Union Gas Limited will be exploring offering a similar service to its customers.

Not all provinces have had success with this model, however. Saskatchewan ended its on-bill financing efforts for general efficiency upgrades and transitioned to third-party financing. British Columbia utilities achieved very low uptake with their on-bill financing pilots and have since introduced third-party financing as well.

The variance of success and failure appears to be generally attributable to the circumstances of the jurisdiction, the entity carrying out the financing, and program design. Experiences on credit risk and administrative costs are not necessarily transferable from one jurisdiction to another.

This form of financing is also typically treated as an operating expense, which makes it attractive to commercial and institutional entities that can use this accounting treatment. On-bill financing enables a clear link between the cost of energy upgrades and the benefits from the energy cost savings as they are on the same bill. It can also work for housing retrofits where home or property owners do not have the resources to fully fund the replacement of failed equipment (e.g. a furnace or hot water tank) and need access to affordable financing. This way, when replacements are made, efficient equipment is installed.

On-bill financing best practice

This tool works best when the business case is strong: energy cost savings are quickly apparent, the interest cost is competitive, the process is streamlined, administrative and compliance systems can readily adapt to the new billing requirements, and the administration burden is low.

Third-party financing

Third-party financing is usually provided by a commercial lending institution for a wide variety of efficiency upgrades. The financial institution uses normal credit screening tools and recovers the costs through repayment using a billing system separate from a utility. This disconnects the energy cost savings as the source of funds for the loan repayment.

This form of financing remains a choice for a number of jurisdictions. Saskatchewan has a network of efficiency contractors that offer bank financing with a lengthy history of solid success. In Nova Scotia, the efficiency utility offers the option of a buy-down on the interest rate on financing provided by a bank or an equivalent grant (20% of program participants chose the loan). British Columbia utilities have recently adopted the third-party financing model.

The rationale for each entity's decision to use third-party financing varies. In some cases, it is chosen because a utility is not able to administer loans without costly system upgrades, or it determines the business risk is not acceptable. In fact, it is the flexibility and reduction of risk that makes third-party financing most attractive. It overcomes potential default issues as the financing is done by entities (banks, credit unions, etc.) that apply normal credit policies. However, these entities use risk screening that depends heavily on previous credit history. Thus it may screen out some who may be acceptable credit risks for repayment when the energy cost savings from the energy efficiency measures are taken into account.

Interest in this option by borrowers appears to be strongest if the interest rate is very low (below comparable commercial terms) and if projects are backed by a strong business case.

Third-party financing best practice

Third-party financing may not be the first choice because of potentially higher borrowing costs and the disconnect between loan repayment costs and energy cost savings, but in many cases, circumstances or necessity make it a strong option. Good design features such as a solid business case for prospective borrowers and simplicity of administration continue to be important. To address the disconnect between loan repayment costs and energy cost savings, consideration should be given to creating an information system to regularly report to borrowers the energy cost savings and the loan payments.

Local improvement charges (LICs)

Local improvement charge (LIC) programs represent the most innovative form of financing. Homeowners finance their retrofits through the municipality and repay the loan through their property tax bill. As an LIC is a lien on the property, the risk of default on the loan is reduced. As a result, the cost of the loan can also be reduced, which encourages uptake. That said, consideration should be given to properties encumbered by existing mortgages or property-secured debt. In addition, legislative changes may be required in some jurisdictions to allow or clarify that LICs can be used for this purpose.

Halifax's Solar City program was the first in Canada to use this model on a large scale. Nearly 400 solar hot water systems have been installed over a two-year period. The program combined LIC with other good design attributes,

namely, widespread awareness and a simple administration. Funding came from the Government of Canada through the Federation of Canadian Municipalities' Green Municipal Fund.

Toronto launched an LIC residential pilot program in 2014, and Guelph is examining design options for a similar program. In Vancouver, a third-party financing pilot was intended to evolve into an LIC model, but closed when applications came in far below expectations. Other municipalities across Canada are also exploring the LIC option.

Local improvement charge best practice

As experience in Canada is limited, more pilots and program design experience are needed to support municipal interest in the model. A successful LIC model will be fully grounded in local municipal commitment and adherence to the design principles outlined in this report. Municipalities should set program criteria to avoid over-investment by residents, simplify eligibility and contracting processes, and seek low-cost financing. Large-scale adoption of such a model at the municipal level would likely require coordination across municipalities to reduce cost and simplify the involvement of other players. Mortgage lenders and insurers should be consulted early in the development process.

Energy service companies (ESCOs)

Larger residential, commercial and institutional buildings can benefit from financing through energy service companies (ESCOs) because of professional service, access to financing and economies of scale. These large projects can support the use of sophisticated evaluation tools to identify attractive efficiency upgrade opportunities and offer guaranteed energy savings as part of a full-package solution. The scale of the efficiency savings may serve to offset the significant upfront costs of this approach. Credit risk is addressed in the services contract on a commercial basis.

ESCOs solve a number of problems for efficiency upgrades. After there is an internal decision to proceed, the ESCO handles everything from the evaluation to the installation of the upgrades. Financing can be provided by the ESCO or the owner, and repayment comes from the energy cost savings. The ESCO approach generally uses private capital. The parties negotiate a relatively complex agreement that captures the nuances of the specific project, including oversight of the building operations (i.e. control of building heating, lighting and other energy-dependent systems).

Canada's Federal Buildings Initiative uses an ESCO model. This initiative is used to systematically upgrade buildings owned by the Government of Canada and its agencies. As of September 30, 2014, there have been more than 80 retrofit projects, attracting \$312 million in private-sector investments and generating over \$43 million in annual energy cost savings. These projects have demonstrated on average 15 to 20 percent energy savings and have also helped reduce the impact of operations on the environment, including cutting GHG emissions by 235 kilotonnes. Interest in the ESCO model started off strong in Canada, but on a per capita basis, annual project totals now lag the U.S.

ESCO best practice

This model is particularly useful when participants are able to execute an operating lease arrangement and wish to transfer risk to a third party. It has wide applicability and can be adapted to use commercial or public financing. A more consistent approach to identifying and applying standard upgrades and creating replicable outcomes would enhance investor confidence in this model.

Tools to support innovative financing

Tools to improve confidence

Investors, participants in programs, and governments who expect positive public policy outcomes all need tools to predict and verify outcomes from efficiency upgrades and to ensure they continue to accrue over time. Investor confidence depends upon knowing that the funds invested will achieve the expected savings in energy costs. The U.S. and the European Union are working to develop standard upgrade methods that result in predictable outcomes. They also have introduced various training and certification programs to improve the quality of energy efficiency upgrades. While some tools already exist in Canada (e.g. EnerGuide Rating System, ENERGY STAR® Portfolio Manager®), tools being developed elsewhere should be examined and considered for adaptation and adoption – especially for the larger building stock.

In the U.S. the work is being done through the U.S. Investor Confidence Project (ICP), a project of the U.S. Environmental Defense Fund®. The project promotes investor confidence in energy efficiency opportunities by assembling existing standards and practices into a consistent and transparent process that promotes efficient markets. Ontario is working with the MaRS Advanced Energy Centre to adopt the U.S.-based ICP standards in Canada and to develop a broader implementation strategy.

Confidence in outcomes can also be improved by developing more cost-effective tools to measure performance and to ensure that energy savings are long lasting. New technologies could be developed to monitor efficiency performance at a lower cost and support good consumer decisions. These technologies represent opportunities for business development and exports under Canada's innovation agenda.

Many jurisdictions in Canada have identified the need for more expertise in identifying and coordinating the priorities for potential upgrades, managing the upgrade process, and carrying out post-improvement audits. Skilled people are needed for small consumer projects and larger building ones, however the skills required differ. Larger projects require sophisticated project managers and experts in building envelope; heating, air conditioning, ventilation and water heating systems; lighting; equipment; and other systems who have engineering degrees or energy service provider qualifications, while smaller projects need energy advisors.

In some cases, there may be a skills gap that could be filled by more funding for training by service providers in the public or private sector. In other cases, there may be staffing limits so it becomes impossible to hire even short-term expertise. In either case, additional funding and new models to engage the appropriate efficiency expertise on a project-by-project basis would help remove a critical barrier to choosing and undertaking the most promising projects and measuring their success. If good projects are chosen, managed well and measured for success, investor confidence will be increased.

Additionally, it is important that behaviour does not adversely affect the outcome of energy efficiency projects. Rather, it can be used to ensure project success. Research on efficiency social marketing initiatives is needed to improve programs designed to raise awareness and help people act on the information. Research into how behaviour changes can be made permanent will also help ensure GHG savings persist and are accurately estimated.

Tools to lower the cost of capital

The cost of capital (loan terms and interest rates) affects the business case for both borrowers and lenders. Lower cost of capital can increase the viability of a greater range of retrofit initiatives that a higher rate puts out of reach.

Risk that the borrower will default on the loan is one critical factor in determining the cost of capital. Loans that have extra security in the form of assets or guarantees have a lower risk and lower costs than loans with no such security. Risk sharing could come from some degree of support from governments. Which tools and approaches would be most cost-effective would need to be explored by governments and the financial sector (e.g. loan insurance or loan guarantees).

The investment horizon also affects the cost of capital. By demonstrating the predictability and stability of the ROI of energy retrofit projects, it should be possible to attract lower cost capital from sources such as pension funds and insurance companies. These investors typically have long-term expectations of reasonable returns and are not motivated by quick payback periods. Energy efficiency projects could be bundled to integrate projects having longer-term payback periods (e.g. re-insulation) with those with shorter payback periods (e.g. lighting and boilers) to offer the predictable returns over a longer term (e.g. 10 to 25 years) that these investors seek.

Investor objectives are yet another consideration in the cost of capital. Targeted financial instruments, such as green bonds, have demonstrated that there is a market of investors that is motivated to seek social and environmental returns and is willing to accept a lower financial return as a result. Labeling financial instruments (from the private or public sector or a combination of both) as energy efficiency financing would likely present an opportunity to raise awareness and serve this market. Exploring the value of such an “ethical” investment branding approach with stakeholders and experts would help validate the concept.

Every jurisdiction has its own approach to financing and may choose different tools to meet its needs. In each case though, low-cost financing, made readily and simply available, is an important issue to address in program and policy design.

Conclusions

This study found that across Canada, experience with energy efficiency financing is varied. While a few programs have an established track record of success, many are relatively recent. Some approaches, such as on-bill financing, have been successful in some jurisdictions but have gained little traction in others. Other approaches, such as local improvement charges, have had mixed results but show promise. Greater engagement of financial institutions could bring additional ideas and program delivery options to the table.

Over the years, many programs have been implemented across Canada to promote efficiency upgrades for homes and buildings. However new approaches and tools will be needed to accelerate retrofits across all sectors. Innovative financing is one of those tools that could help address several barriers that inhibit investment in the building sector. Research suggests that successful financing programs need to be complemented with other tools to address the range of barriers that homeowners and building owners face in undertaking efficiency retrofits. While some tools already exist in Canada, additional tools are needed, including those to improve confidence in project energy savings and to lower the cost of capital. This is an area where jurisdictions could collaborate to find solutions that are applicable nation-wide.

Through this report, many jurisdictions have indicated that more energy efficiency expertise is needed to identify retrofit opportunities, see retrofit projects through, and deliver effective programs. Governments could fund training and hiring of expertise directly or provide funding to their chosen utilities and third-party agencies. Entities that receive financing could then use this new expertise to help identify priorities and manage contractors and subcontractors, as well as ensure that proper measurement and accountability regimes are in place.

Finally, governments have an opportunity to show leadership through improvements in their own activities. Governments could develop clear policy mandate statements to support the use of debt financing for capital projects that improve building efficiency. There is clear justification for such short-term increases in debt if policies are put in place to repay the debt through energy cost savings. The increase in debt may also be justified as a way to meet climate change goals while also generating long-term positive cash flows. By placing a priority on public-sector infrastructure, governments can demonstrate leadership and ensure early action in areas under their direct influence.

Looking forward

Achieving significant emissions reductions in the built environment in a cost-effective manner to governments remains a challenge. Financing tailored to energy efficiency projects, when combined with other support mechanisms, could be expanded to become an important tool in a pan-Canadian framework for clean growth and climate change by providing homeowners and building owners with a route to investing in energy efficiency retrofit improvements for their properties. To support the expansion of energy efficiency financing in Canada, federal, provincial and territorial governments can use the following to guide their activity:

- **Maintain flexibility in program delivery.** Each jurisdiction faces different challenges in delivering financing programs and therefore, may need to implement different programs to respond to the diversity of experience, utility models, and carbon-reduction priorities across Canada.
- **Complement financing programs with other tools.** Financing has been most effective when used in conjunction with other tools (e.g. advice, grants/rebates, mandatory information such as labeling) to address the range of barriers that homeowners and building owners face in undertaking efficiency retrofits.
- **Follow best practices in designing initiatives.** Good program design principles, as outlined in this report, have emerged through financing experience in various jurisdictions and should be considered when developing financing initiatives.
- **Develop supporting tools to increase uptake.** Jurisdictions could collaborate to improve investor confidence through research and the development of new tools that predict and verify outcomes from energy efficiency upgrades and through capacity building by improving training and support for key advisors and program coordinators. Tools to lower the cost of capital should also be explored further.

While financing could be used to support retrofits in all areas, a focus on improving energy efficiency in public/not-for-profit housing and public buildings, as well as energy efficiency retrofits paired with fuel switching away from carbon sources of heating, could be considered for early action since programs in these areas have seen the greatest participation to date. In addition, further testing of local improvement charge financing could support municipal interest in this model.