

NOVEMBER 2019

INNOVATIVE FINANCING

Reducing greenhouse gases in Ottawa's built environment

ECOLOGY OTTAWA

Photo: Emilie Grenier

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Acronyms

| | |
|---------------|---|
| ESA | Energy Savings Agreement or Energy Sales Agreement |
| ESCO | Energy Service Company |
| ESPC | Energy Savings Performance Contracting |
| LIC | Local Improvement Charge |
| HELP | Home Energy Loan Program |
| Hi-RIS | High-rise Retrofit Improvement Support Program (Hi-RIS) |



1 INTRODUCTION

When we think about our city, we often think about our built environment – the network of sidewalks, bridges, sewers, roads and buildings that make up so much of Ottawa’s urban footprint. As a major part of the built environment, buildings are integral to how we live, work and interact with one another in our city.

Buildings are also a major source of greenhouse gas pollution in Ottawa. In fact, at 47% of Ottawa’s community emissions, buildings make up the largest-emitting sector in our city.¹ This has clear implications for municipal climate action. If Ottawa wants to meet its greenhouse gas reduction target of 80% below 2012 levels by 2050,² emissions from buildings must be a major target.



Photo credit: Emilie Grenier

¹ City of Ottawa (2018). Memo to Chair and Members of Environment and Climate Protection Committee: 2012 and 2016 Greenhouse Gas Emission Inventories.

² City of Ottawa (2017). Energy Evolution: Ottawa’s Community Energy Transition Strategy – Phase 1. Retrieved November 2, 2018 from: https://documents.ottawa.ca/sites/default/files/energy_evol_phase1_en.pdf.



1.1 THE CHALLENGE

In short, improvements to how we heat, cool and electrify our homes, offices and other buildings will have a major impact on municipal action on climate change. And time is ticking. If we wish to succeed, we must invest in making Ottawa's buildings vastly more efficient and powered by renewable energy.

Ottawa needs retrofits - improvements to the condition and functioning of our city's building stock in order to reduce greenhouse gas pollution while tackling issues such as efficiency and renewable energy generation. And this need is substantial. According to Ottawa Energy Collective Impact, a group of local non-governmental organizations (including Ecology Ottawa) working to hasten Ottawa's building retrofit transition, substantial changes are needed at many levels if Ottawa seeks to hit its emission reduction targets. According to the preliminary calculations from this group and others, the vast majority of existing buildings will need to be retrofitted by 2050, while new buildings will need to be increasingly built to exacting standards – as either fully carbon neutral or carbon sinks by 2050.³

But improvements cost money. Even in cases where energy efficiency investments yield profit over the medium-term, many homeowners and large institutions like governments, hospitals, universities and schools find it hard to prioritize these investments over competing demands.

The challenge lies in creating the right set of incentives in order to engage consumers in investments that can dramatically improve Ottawa's emission performance. According to Sustainable Prosperity, there are three main market barriers facing consumers who would otherwise invest in energy retrofits:⁴

³ Stonehouse, K. (2019). Collective Impact Strategy Session. Slide presentation.

⁴

<https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>



- **Access to capital.** Energy retrofit investments require many upfront costs, and consumers often don't have the money to invest up front.
- **Information barriers.** To make a smart retrofit investment, you need to understand energy costs and potential savings. Unfortunately, energy costs are not always clear. Also, sometimes the consumer who has the strongest incentive to act has the least power to make a decision on retrofits. For example, a landlord might not see the logic of a retrofit investment, especially when costs are mostly borne by her tenants.
- **Uncertain payback periods.** Investments in energy retrofits are not quite like 'regular' investments. Due to the large number of variables at play (e.g., long term energy prices), consumers may be unwilling to invest because they're uncertain when the money will be paid back.

1.2 THE OPPORTUNITY

How can Ottawa achieve energy retrofits at the speed and scale required to tackle climate change? One possible solution is to come up with new and innovative financing mechanisms that make building retrofits more viable. Financing solutions are useful because, depending on their form and the set of incentives they bring forward, they can allow a range of actors to take action.

This particular challenge also represents a massive opportunity. In tackling the retrofit challenge at hand, we have an opportunity to create a local "retrofit economy" – a series of opportunities for public and private actors to develop retrofit lending products and contracts that help foster building owner and financier confidence in deep retrofit projects. If done well, Ottawa could be part of a market and cultural shift, where building owners are disclosing and targeting building energy performance, sharing data and working towards innovative financing solutions. This could lead to a boom in green jobs focused on tackling the retrofit challenge at all levels - from skilled tradespeople to energy-conscious developers.



To do this at scale in the Ottawa area, many actors are required. This could include:

- **Governments** at all levels, through grants, programs, procurement and green bonds;
- **Public utilities** such as Hydro Ottawa;
- **Local energy co-operative enterprises** such as CoEnergy Ontario Cooperative (which focuses on pooling community investments in energy efficiency projects);
- **Privately-held Energy Service Companies (ESCOs)** such as Siemens Canada, that have the capacity to invest large amounts of capital while providing a range of energy services to manage their investment (e.g., retrofits, risk management, design and implementation of energy savings projects, etc.);
- **Building owners**
- **Private financiers;** and
- **Commercial investors.**⁵

Ottawa is well-positioned to lead in implementing innovative financing approaches. Ottawa has been the site of recent instances of innovative financing, demonstrating a local appetite for new approaches among institutions such as the City of Ottawa, Hydro Ottawa and Algonquin College, which has been working closely with Siemens Canada on an ESCO project.

Ottawa also has the potential to implement efficiency projects at scale because of the federal government's building footprint. Approximately 25 percent of the buildings in Ottawa's downtown core are owned by the federal government, meaning an efficiency partnership with a single property owner – the federal government – could make a substantial difference in Ottawa's overall emissions profile.

⁵ Modelling Optimization of Energy Efficiency in Buildings for Urban Sustainability (2016). New ESCO business models and energy management strategies report released. Retrieved January 9, 2019 from: <https://www.moeebius.eu/286-new-esco-business-models-and-energy-management-strategies>.



2 FINANCING MODELS

Although there are numerous types of innovative financing models for building retrofits, we have focused this report on those most well-established at this time in order to provide a toolkit for solutions that could be immediately implemented.

Despite the high level of complexity of individual financing arrangements, they fall into a small number of broad categories. There are three main categories of financing instruments. These are:

1. Utility On-bill Financing;
2. Local Improvement Charges (LICs); and
3. Energy Savings Performance Contracting (ESPC).

While less novel and innovative, we will also take a quick look at two other tools that can help with Ottawa's retrofit transition:

4. Equipment leases and soft loans.

2.1 UTILITY ON-BILL FINANCING

Utility on-bill financing is a technique that facilitates payments for loans on energy projects. The loan is typically provided by the utility to a customer to finance upgrades. The loan is then recovered through repayment on bills.⁶

First, the property owner identifies a potential energy upgrade, such as fixing an air conditioner or adding insulation. The local utility loans him money by financing the upgrade. The property owner then repays the loan through the utility's normal billing process, with the loan either tied to the property owner or to the property itself. The result

⁶ Sustainable Prosperity (2013). Financing Residential Energy Savings: Assessing Key Features of Residential Energy Retrofit Financing Programs. Retrieved January 11, 2019 from: <https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>.



benefits all parties: the utility gets added efficiency in its energy system, the customer sees reduced energy expenses, the customer's property value goes up and greenhouse gas emissions go down.

What's the difference between utility on-bill financing and a simple loan from a utility?

First, with utility on-bill financing, the loan can be tied to utility service. This means the utility has more power to ensure the customer repays the loan. This makes the loan safer from the perspective of the utility.

Second, utility on-bill financing can be set up in such a way that longer-term savings and the shorter-term costs experienced by the owner can “zero out.”⁷ This addresses a key challenge from the customer's perspective, by essentially eliminating the up-front cost of an energy retrofit.

This advantage of “zeroing out” a property owner's bill explains why most on-bill financing programs take the form of low- or zero- interest loans. In cases where loans are tied to the property owner, the customer must pay off the balance if he moves. Alternatively, the loan can be tied to the property (or meter) itself, meaning that the next building occupant must pay off the bill left behind by the last one.⁸

Overall, a well-designed utility on-bill financing scheme helps broaden customer eligibility by lowering the barriers to entry for customers who might not be interested or eligible for commercial loans with high upfront costs. On the other side of the transaction, it allows utilities to leverage their deep understanding of efficiency improvements to target their financing investments in an efficient and effective way. And while we talk about an individual property owner in the example above, an effective utility on-bill financing

⁷ Natural Resources Defense Council (2013). On-Bill Financing: Overview and Key Considerations for Program Design. Retrieved January 11, 2019 from: <https://www.nrdc.org/sites/default/files/on-bill-financing-IB.pdf>.

⁸ Capital E. (2011). *Energy Efficiency Financing – Models and Strategies: Pathways to Scaling Energy Efficiency Financing from \$20 Billion to \$150 Billion Annually*. Retrieved January 9, 2019 from: http://newbuildings.org/sites/default/files/EnergyEfficiencyFinancing_ModelsStrategies201110.pdf



scheme can be used by other owners such as city governments, schools, small businesses, and commercial tenants.⁹

2.1.1 Keys to success

Like any financing scheme, utility on-bill financing works best when the business case is strong. Ideally, energy cost savings are quickly apparent, the interest cost of the loan is competitive, and the administrative process is clear and streamlined.¹⁰

Another key consideration is about the source of financing for utilities themselves. Ultimately, it takes some funding to kick-start the process. Depending on the regulatory context, utilities face the challenge of securing funding from sources such as government, financial institutions or private lenders. For utilities, it is critically important that funders are familiar and comfortable with the financing scheme.¹¹

A key challenge with this scheme boils down to appetite for risk. One common challenge observed with schemes of this kind is that utilities and regulators are reluctant to take on the risk of providing loans. In some cases, they could even be afraid of program success, since successful programs might become oversubscribed relative to access for funds and the costs of administrative overhead.¹²

2.1.2 Case Studies for Utility On-bill Financing

Manitoba Hydro – Home Energy Efficiency Loan

Manitoba Hydro's Home Energy Efficiency Loan program provides financing for home energy efficiency upgrades. The monthly payment is incorporated into the customer's

⁹ <https://www.nrdc.org/sites/default/files/on-bill-financing-IB.pdf>

¹⁰ Energy and Mines Ministers' Conference (2016). *Financing Energy Efficiency Retrofits in the Built Environment*. Retrieved January 9, 2019 from: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Financing%20Report-acc_en.pdf.

¹¹ <https://www.nrdc.org/sites/default/files/on-bill-financing-IB.pdf>

¹² Capital E. (2011). *Energy Efficiency Financing – Models and Strategies: Pathways to Scaling Energy Efficiency Financing from \$20 Billion to \$150 Billion Annually*. Retrieved January 9, 2019 from: http://newbuildings.org/sites/default/files/EnergyEfficiencyFinancing_ModelsStrategies201110.pdf.



energy bill and no down payment is required. The loan covers upgrades for a range of projects, including windows, doors, insulation, ventilation and electric vehicle chargers.¹³

As of 2016, the then 14-year-old program had provided more than \$317 million in loans to support the efficiency measures of more than 75,000 customers. To address customer resistance to long-term investments, the loan was tied to the homeowner but could be transferred to another customer when the home was sold. As a key part of this scheme, customers could ask their landlord to upgrade the efficiency of their homes and have the loan included on their utility bill.¹⁴

As noted above, this example of utility on-bill financing is seen as advantageous to the utility because Manitoba Hydro has authority to cut service in cases of non-payment. According to an analysis by Sustainable Prosperity, the program has seen “significant success” despite the non-transferability of the loan. In other words, while the feature of attaching loans to individuals rather than property is less than ideal, the Manitoba example demonstrates that a non-transferable scheme can succeed.¹⁵

Nova Scotia Power – Heat Pump Financing

Nova Scotia Power’s Heat Pump Financing program allows for homeowners to pay for a heat pump through on-bill financing in cases where they are renovating their home or building a new one. The financing is available on approved credit, and the homeowner must use one of the program’s participating contractors.

¹³ Manitoba Hydro (2019). Home Energy Efficiency Loan. Retrieved March 21, 2019 from: https://www.hydro.mb.ca/your_home/residential_loan/.

¹⁴ Energy and Mines Ministers’ Conference (2016). *Financing Energy Efficiency Retrofits in the Built Environment*. Retrieved January 9, 2019 from: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Financing%20Report-acc_en.pdf.

¹⁵ Sustainable Prosperity (2013). *Financing Residential Energy Savings: Assessing Key Features of Residential Energy Retrofit Financing Programs*. Retrieved March 21, 2019 from: <https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>.



As of 2016, the Heat Pump Financing program had seen participation from 57,000 homeowners, 13,000 of which took out loans that were paid back on their utility bills.¹⁶ An independent analysis of the program could not be found at the time of writing.

2.2 LOCAL IMPROVEMENT CHARGES (LIC)

Local Improvement Charge (LIC) programs allow homeowners to finance retrofits through the municipality and then repay the loan through their property tax bill. The LIC is also commonly known as a “property-tax financing,” “Property-Assessed Clean Energy (PACE),” or “Property-Assessed Payment for Energy Retrofits (PAPER)” scheme.

In a typical LIC scenario, a property owner identifies a potential energy upgrade to their property. Sometimes, this energy upgrade (e.g., solar panels) is targeted by the municipality and forms the centrepiece of their particular LIC program. As with utility on-bill financing, this might involve simple improvements such as added insulation or a more efficient air conditioner. They contact the municipality, which then loans them money by financing the upgrade or retrofit. The property owner then repays the municipality through property taxes, with the loan tied to the property. In much the same way as the utility on-bill financing example, the municipality (and their utility) achieves greater efficiency while the customer gets reduced energy expenses, property values go up and pollution goes down.

In a typical LIC, the loan is tied to the property and not the person. So, if the property owner decides to sell their property before paying off their LIC loan, the debt and the asset both remain with the property. In other words, while the new property owner would have an additional debt to pay through property taxes, they would also have the energy upgrade asset that was the reason behind the initial financing decision.¹⁷ The fact that the

¹⁶ Energy and Mines Ministers’ Conference (2016). *Financing Energy Efficiency Retrofits in the Built Environment*. Retrieved January 9, 2019 from:

https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Financing%20Report-acc_en.pdf.

¹⁷ Ontario Ministry of Municipal Affairs and Housing (2015). Local Improvement Charges. Retrieved January 9, 2019 from: <http://www.mah.gov.on.ca/Page10226.aspx>.



loan is tied to the property means that property owners can finance measures with payback periods longer than their expected ownership.¹⁸ This provides the owner with an opportunity to finance “deeper” retrofits - with longer payback periods - instead of prioritizing the “low-hanging fruit” which is typical of energy efficiency investments.

2.1.3 Keys to success

LICs are particularly appealing in the Ottawa context for a number of reasons. In terms of policy authority, the City of Ottawa is well-placed to implement a scheme of this kind. This is because, as with all Ontario municipalities, it was granted authority under the Ontario Municipal Act to use LICs for the explicit purpose of promoting energy efficiency, renewable energy and water conservation projects.¹⁹

If the City of Ottawa was to move forward with an LIC scheme, research on best practices indicates that factors such as the simplicity of eligibility and contracting processes are essential for success. As with utility on-bill financing, it’s also important for the municipality to secure low-cost financing for the purposes of implementing an LIC program at scale, possibly with assistance from the province.²⁰ ²¹ Once again, administrative overhead is a key consideration when it comes to sustaining a viable program over time.²²

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<https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>

¹⁹

<https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>

²⁰ Energy and Mines Ministers’ Conference (2016). *Financing Energy Efficiency Retrofits in the Built Environment*. Retrieved January 9, 2019 from:

https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Financing%20Report-acc_en.pdf.

²¹ Pembina Institute (2004). *Using Local Improvement Charges to Finance Building Energy Efficiency Improvements: A Concept Report*. Retrieved March 6, 2019 from:

<https://www.pembina.org/reports/LICProgramFinal-ReportMay27042.pdf>.

²²

<https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>



On the consumer side, a model LIC program is cost-effective enough to be appealing to property owners. As Smart Prosperity points out, outreach and education to the public - possibly through civil society engagement - are important factors in securing awareness and buy-in into the program.²³ Ideally, a well-designed LIC program also clearly conveys to the consumer the types of energy efficiency technologies available through the program.²⁴

2.1.4 Case studies for Local Improvement Charges (LICs)

Halifax Regional Municipality – Solar City

This program, launched in 2013 was the first in Canada to use the LIC model on a large scale, and remains operational today. The program allows customers access to a range of solar energy options, which are financed through a dedicated account with the Halifax Regional Municipality.²⁵

At its inception, this program was designed to place solar panels on homes for the purpose of hot water heating. Consumers were offered a 3.5% interest rate for up to 10 years, which they would repay through their property tax bills. (The rate is now 4.75% for a 10-year loan.) In terms of financing, the program was kick-started through a low-interest loan provided through the Federation of Canadian Municipalities' Green Municipal Fund. Over the long term, the program was designed to be self-sustaining.²⁶

Solar City's scale is notable. It launched at a cost of \$8.3 million, and was designed to finance up to 1,000 solar thermal systems within the first two years of operation. For context, this goal was set at a time when there were roughly 800 solar systems installed

²³

<https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>

²⁴ Pembina Institute (2004). Using Local Improvement Charges to Finance Building Energy Efficiency Improvements: A Concept Report. Retrieved March 6, 2019 from:

<https://www.pembina.org/reports/LICProgramFinal-ReportMay27042.pdf>.

²⁵ Halifax Regional Municipality (2019). About Solar City. Retrieved March 21, 2019 from:

<https://www.halifax.ca/home-property/solar-projects/about-solar-city-halifax>.

²⁶

<https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>



per year, in all of Canada.²⁷ The program did not hit these ambitious targets; by 2019 it had only financed over 600 installations. However, the program was deemed a success by Halifax regional council. In January 2019, council voted unanimously to make the program permanent.²⁸

City of Toronto – Home Energy Loan Program (HELP) and High-rise Retrofit Improvement Support program (Hi-RIS)

In 2013, the City of Toronto approved a three-year pilot retrofit program for launch in 2014. The program was designed to support residential property owners in carrying out energy efficiency and water conservation improvements through special financing options. The financing was enabled through amendments to the City of Toronto Act's Local Improvement Charge regulation. The program was designed to operate in two streams – one focused on single-family houses, and the other focused on multi-residential buildings.²⁹

This program was the first case of an Ontario municipality using LICs for energy efficiency improvements on private property. Toronto was the first Ontario municipality to seize the policy opportunity provided by a legislative amendment from the provincial government, as part of a broader initiative to improve Ontario's residential housing sector.³⁰

A key element of this program design is its simplicity. Using a 'one-window' service delivery model, the program allows property owners to gain access to financing, utility

²⁷ Sustainable Prosperity (2013). Financing Residential Energy Savings: Assessing Key Features of Residential Energy Retrofit Financing Programs. Retrieved March 21, 2019 from: <https://institute.smartprosperity.ca/sites/default/files/publications/files/Financing%20Residential%20Energy%20Savings.pdf>.

²⁸ Goyette, A. Council ensures future of Solar City program. The Signal. Retrieved March 21, 2019 from: <https://signalhfx.ca/council-ensures-future-of-solar-city-program/>.

²⁹ City of Toronto (2017). Home Energy Loan Program and High-rise Retrofit Improvement Support Program Evaluation. Retrieved February 27, 2019 from: <https://www.toronto.ca/legdocs/mmis/2017/pe/bgrd/backgroundfile-102272.pdf>.

³⁰ City of Toronto (2017). Home Energy Loan Program and High-rise Retrofit Improvement Support Program Evaluation. Retrieved February 27, 2019 from: <https://www.toronto.ca/legdocs/mmis/2017/pe/bgrd/backgroundfile-102272.pdf>.



rebates and incentives for energy assessment and support.³¹ This program has been deemed successful, and in early 2017 Toronto City Council was asked to extend the pilot period for the program to the end of 2018. According to a third party program evaluation, the program has been effective in driving energy efficiency improvements in both housing markets. Further, the LIC mechanism was found to address the primary barriers to the uptake of residential energy efficiency improvements.³²

2.2 ENERGY SAVINGS PERFORMANCE CONTRACTING (ESPC)

Larger residential, commercial and institutional buildings can benefit from financing through a mechanism known as Energy Savings Performance Contracting (ESPC). Here, the scale of the efficiency savings can offset the significant upfront costs of this approach.³³ ESPCs typically involve the establishment of an ESA – variously called an Energy Service Agreement or Energy Sales Agreement – which is executed by an Energy Service Company (ESCO). The ESCO is a company with expertise and resources to handle everything from the initial evaluation to installation of upgrades. In this case, the client seeking improvements can be a large organization (e.g., university, college) or even a level of government.

The outline of a typical ESPC scheme is illustrated in Figure 1 below. Under a typical arrangement, the client would enter into an agreement with the ESCO. As part of this agreement, the ESCO would assess a building's energy systems and equipment, identify possible energy savings opportunities, recommend and implement improvements, monitor results and guarantee energy savings. Typically, the improvements and payback

³¹ City of Toronto (2017). Home Energy Loan Program and High-rise Retrofit Improvement Support Program Evaluation. Retrieved February 27, 2019 from: <https://www.toronto.ca/legdocs/mmis/2017/pe/bgrd/backgroundfile-102272.pdf>.

³² City of Toronto (2017). Home Energy Loan Program and High-rise Retrofit Improvement Support Program Evaluation. Retrieved February 27, 2019 from: <https://www.toronto.ca/legdocs/mmis/2017/pe/bgrd/backgroundfile-102272.pdf>.

³³ Capital E. (2011). *Energy Efficiency Financing – Models and Strategies: Pathways to Scaling Energy Efficiency Financing from \$20 Billion to \$150 Billion Annually*. Retrieved January 9, 2019 from: http://newbuildings.org/sites/default/files/EnergyEfficiencyFinancing_ModelsStrategies201110.pdf.



for the ESCO take place over the length of a specified period – and the client organization benefits from all future savings.³⁴

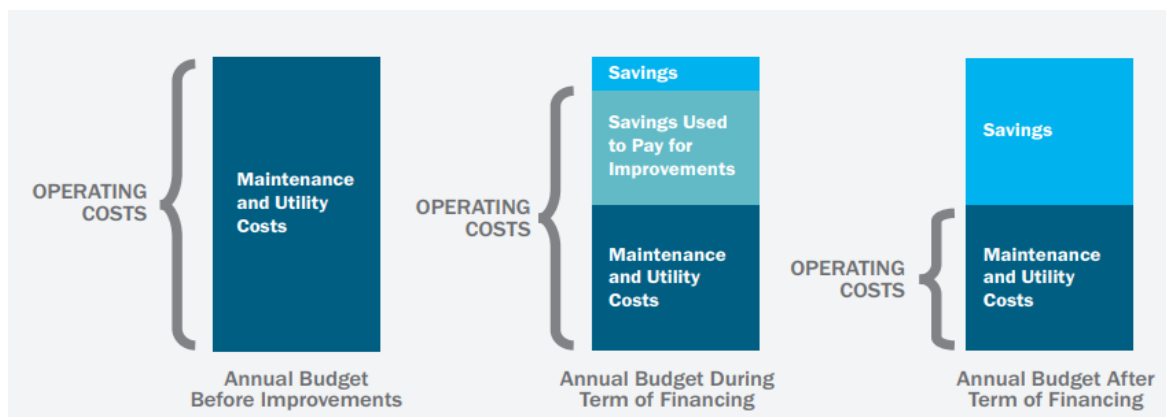
- Partnership between organization (maybe level of gov't) and an energy service company (ESCO)
- ESCO conducts comprehensive energy audit and identifies improvements to save energy
- In consultation with organization, ESCO designs and builds energy savings project
- ESCO guarantees that improvements will generate sufficient savings to pay for project over contract period
- After contract ends, all additional savings go to organization

The rationale behind a typical ESPC scheme is to reduce long-term operating costs. Initial savings from reduced energy consumption can be used to finance infrastructure improvements. In this way, improvements with longer payback periods are paid through savings on improvements with shorter periods.³⁵ Over the course of the project, energy efficiency upgrades occur at no cost to the building owner, and the financing mechanism allows more retrofit improvements to take place than would otherwise occur. The ESPC financing scheme is one viable way for clients to address priorities such as deferred maintenance, manage increasing energy costs, streamline operations and integrate energy resiliency.³⁶ Figure 1 below illustrates the beneficial impacts of an ESCP over time.

³⁴ Natural Resources Canada (2013). Energy Performance Contracting: Guide for Federal Buildings. Retrieved March 6, 2019 from: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeefiles/pdf/communities-government/buildings/federal/pdf/12-0419%20-%20EPC_e.pdf.

³⁵ Natural Resources Canada (2013). Energy Performance Contracting: Guide for Federal Buildings. Retrieved March 6, 2019 from: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeefiles/pdf/communities-government/buildings/federal/pdf/12-0419%20-%20EPC_e.pdf.

³⁶ US Department of Energy (2017). Energy Savings Performance Contracting: Improving Infrastructure & Turning Waste into Wins. Retrieved March 6, 2019 from: https://betterbuildingssolutioncenter.energy.gov/sites/default/files/FL1709_WIP_ESPC%20Fact%20Sheet_FINAL%20VERSION_Jan%202018.pdf.

**Figure 1: Basic illustration of impacts of ESPC over time:**

Source: US Department of Energy (2017). Energy Savings Performance Contracting: Improving Infrastructure & Turning Waste into Wins.³⁷

2.2.1 Keys to success

Typically, ESPCs work best in situations where there is a client with a large building stock. For this reason, ESPCs tend to be an option that works best for companies, governments or other institutions such as colleges, universities or hospitals. Typically, ESPCs thrive in conditions such as these, where facilities are either owner-occupied or leased for long terms, and have a good credit quality.³⁸

Also, as a general rule ESPCs take place over long periods. Generally speaking, projects develop over the course of months or years, and involve complex contracts and relatively long payback periods of ten years or more. Payback also requires long-term planning, since preliminary financial savings from retrofits are usually first directed to the project funder.

As with the financing methods examined above, one key consideration is the availability of capital for financing the process as a whole. Typically, ESCOs use private capital to

³⁷ US Department of Energy (2017). Energy Savings Performance Contracting: Improving Infrastructure & Turning Waste into Wins. Retrieved March 6, 2019 from: https://betterbuildingssolutioncenter.energy.gov/sites/default/files/FL1709_WIP_ESPC%20Fact%20Sheet_FINAL%20VERSION_Jan%202018.pdf.

³⁸ Capital E. (2011). *Energy Efficiency Financing – Models and Strategies: Pathways to Scaling Energy Efficiency Financing from \$20 Billion to \$150 Billion Annually*. Retrieved January 9, 2019 from: http://newbuildings.org/sites/default/files/EnergyEfficiencyFinancing_ModelsStrategies201110.pdf.



provide upfront funding in order to carry out the ESPC model with a client organization.³⁹ Depending on the complexity of the project, private funding can be found from a mix of different sources.

Another consideration is the experience and track record of the ESCO itself. In a typical ESPC scheme, the ESCO takes on a wide range of key functions. These include assuming the risk of achieving energy (and financial) savings, providing engineering and energy management expertise throughout the project duration and even providing training for building operating staff on equipment and systems. As noted by the U.S. Office of Energy Efficiency & Renewable Energy, the scale of ESCO services for building staff can vary widely. A smaller program might be restricted to an online education portal, while a more developed program can involve services delivered by experts.⁴⁰

As several researchers have pointed out, not all ESCO markets are created equal. Even in cases where there are various ESCOs with sufficient expertise to deliver on projects, it may be challenging for them to secure private sector loans to make energy retrofit investments as part of the ESPC. Ultimately, ESCOs are part of a broader market ecosystem, one which relies upon access to financing as well as low administrative and transaction costs.^{41 42}

2.2.2 Case Studies for Energy Savings Performance Contracting

Government of Canada – Federal Buildings Initiative

The Federal Buildings Initiative is a program designed to systematically upgrade buildings owned by the Government of Canada and its agencies.

³⁹ Energy and Mines Ministers' Conference (2016). *Financing Energy Efficiency Retrofits in the Built Environment*. Retrieved January 9, 2019 from:

https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Financing%20Report-acc_en.pdf.

⁴⁰ US Office of Energy Efficiency & Renewable Energy (2019). Energy Savings Performance Contracting. Retrieved March 6, 2019 from: <https://www.energy.gov/eere/slsc/energy-savings-performance-contracting>.

⁴¹ Gurzu, A. (2018). "Energy efficiency: The missing link." *Politico*. Retrieved March 6, 2019 from: <https://www.politico.eu/article/esco-clean-energy-efficiency-the-missing-link/>.

⁴² International Institute for Sustainable Development (2010). Energy Service Companies (ESCOs) in Developing Countries. Retrieved March 6, 2019 from: https://www.iisd.org/pdf/2009/bali_2_copenhagen_escos.pdf.



This initiative to upgrade buildings owned by the Government of Canada and its agencies uses the ESCO model. 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, representing 15 to 20 percent in energy savings and reducing greenhouse gas emissions by 235 kilotons.⁴³

Siemens Canada partnership with Algonquin College – ESCO2

Algonquin College partnered with Siemens Canada on a 20-year ESPC in early 2014. This project, known as ESCO2, is the second such contract between Algonquin and Siemens, following on the heels of an earlier contract in 2007.

The contract's aim is to reduce energy use, water use and greenhouse gas emissions from Algonquin College's Ottawa campus. At the same time, the contract is designed to cut Algonquin College's deferred maintenance debt by up to half and provide research opportunities for Algonquin students.⁴⁴

As with many ESPCs, this contract is large in scale. In total, ESCO2 seeks to finance more than \$18 million of energy and water projects on Algonquin's Woodroffe campus. The investment is financed through savings generated by the same process, with close to a million dollars per year saved early in the project for investment in deeper retrofits throughout. ESCO2 project elements include infrastructure replacements and improvements, as well as automation systems and controls (e.g., for lighting) and water efficiency measures.⁴⁵

⁴³ Energy and Mines Ministers' Conference (2016). *Financing Energy Efficiency Retrofits in the Built Environment*. Retrieved January 9, 2019 from:

https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Financing%20Report-acc_en.pdf.

⁴⁴ Algonquin College (2014). Algonquin College gets greener, saves money with Siemens Canada. Retrieved March 6, 2019 from: <https://www.algonquincollege.com/news/2014/01/21/algonquin-college-gets-greener-saves-money-with-siemens-canada/>.

⁴⁵ Algonquin College (2019). Project: ESCO2 Energy Performance. Retrieved April 9, 2019 from: <https://www.algonquincollege.com/physical-resources/projects/esco2/>.



2.3 EQUIPMENT LEASES AND SOFT LOANS

The innovative financing techniques reviewed above are widely seen as state-of-the-art policy measures with emerging track records. While some jurisdictions have adopted them, there is still policy opportunity for cities like Ottawa to implement them at scale, and seek ways to facilitate widespread adoption through multi-jurisdictional coordination.

That said, innovative financing can also be undertaken with tools that are simpler, more well-known and, in some cases, easier to implement. Here, two tools come to mind: equipment leases and soft loans.

2.3.1 Equipment leases

An equipment lease is a common tool that can be used to finance energy efficiency equipment and improvements. Typically, an equipment lease scheme can be provided by a bank or a private third party. Here, the lessor (i.e., the organization responsible for providing the lease) remains the owner of the leased equipment until the end of a given period. After this time, the individual or organization leasing the equipment (the lessee) can typically either return the equipment or purchase it outright.⁴⁶

Equilease

Equilease is a company – more precisely, an equipment leasing brokerage – that provides financing for equipment. While Equilease does not work exclusively in the area of energy efficiency, its financing can be used for equipment directed energy efficiency retrofits.

Equilease's target market is other private sector actors – businesses seeking a wide range of equipment for short-term or unique needs. As part of their service model, they provide a wide range of leasing options, and customize them to customers' needs. As

⁴⁶ The Atmospheric Fund (2017). A TAF Technical Guidance Note: Energy Efficiency Financing Tools for the Canadian Context. Retrieved March 6, 2019 from: <http://taf.ca/wp-content/uploads/2017/03/Public-Financing-Tools-Guidance-Note-Mar-2017.pdf>.



with standard equipment lease schemes, Equilease provides options where customers can purchase equipment at the close of the financing period.⁴⁷

2.3.2 Soft loans

As with equipment leases, soft loans are basic variations on a simple concept. Soft loans are loans with a no interest or below-market interest rate, or other features such as long repayment periods, interest holidays or other preferential terms. In other words, soft loans are loans specifically designed for easy and rapid user uptake, on terms that would normally be less appealing to the organization providing the loan. Soft loans are part of a broader family of similar concepts under the label “soft financing.”

Typically, a soft loan scheme is designed in cases where there is a clear policy or social rationale behind the uptake of the loan. For this reason, it is perhaps unsurprising that loans of this kind are typically provided by governments, multinational development banks or quasi-public institutions with a mandate to serve the public interest.⁴⁸ On its face, a soft loan would not be immediately appealing to a private actor.

City of Toronto – Energy Retrofit Loans

The City of Toronto has launched a soft loan program designed to help building owners improve the energy efficiency of their buildings. All buildings located in Toronto are eligible for financing of up to 100% of project costs, at a rate equal to the City of Toronto’s cost of borrowing. Repayment terms are up to 20 years. Building owners can use the loans to invest in a range of energy efficiency measures including improvements to lighting, heating, ventilation, air conditioning, building envelopes, heat pumps, automation systems and renewable energy projects, among others.⁴⁹

⁴⁷ Equilease (2019). The Equilease story. Retrieved April 9, 2019 from: <https://equilease.com/the-equilease-story/>.

⁴⁸ It should be noted that soft loans are a commonly used geopolitical tool and, as such, are not necessarily always in the public interest. At the international level, a government could extend a soft loan to another government for the sake of some broader geostrategic interest.

⁴⁹ City of Toronto (2019). Energy Retrofit Loans. Retrieved April 9, 2019 from: <https://www.toronto.ca/services-payments/water-environment/environmental-grants-incentives-2/energy-retrofit-loans/>.



City of Toronto – Sustainable Energy Plan Financing

Another soft loan program launched by the City of Toronto involves the provision of low interest financing to municipal entities, such as social housing providers, to support conservation, energy efficiency and renewable energy projects. As with the Energy Retrofit Loans program, financing is provided at the rate of the City of Toronto's cost of borrowing, and can be repaid at a period of up to 20 years.⁵⁰ Here, the initial loan from the city is financed by debt financing, which is then repaid as program recipients achieve cost savings on their energy retrofits.⁵¹

As of 2018, Toronto Community Housing has been the largest beneficiary of this program, receiving \$35.2 million for deep energy retrofits in nine buildings. Since 2013, \$53 million has been invested.⁵²



Photo: Emilie Grenier

⁵⁰ The Atmospheric Fund (2017). A TAF Technical Guidance Note: Energy Efficiency Financing Tools for the Canadian Context. Retrieved March 6, 2019 from: <http://taf.ca/wp-content/uploads/2017/03/Public-Financing-Tools-Guidance-Note-Mar-2017.pdf>.

⁵¹ Canadian Apartment (2018). "Toronto may extend reach of retrofit financing." Retrieved March 6, 2019 from: <https://www.reminetwork.com/articles/toronto-may-extend-reach-retrofit-financing/>.

⁵² Canadian Apartment (2018). "Toronto may extend reach of retrofit financing." Retrieved March 6, 2019 from: <https://www.reminetwork.com/articles/toronto-may-extend-reach-retrofit-financing/>.



3 BEST PRACTICES

The federal government has summarized a list of overarching best practices for innovative financing in building retrofits. This list is summarized below.

1. **Maintain flexibility in program delivery.** For all of the benefit of identifying best practices from other jurisdictions, it should also be noted that there can be unique attributes that make a program particularly successful or unsuccessful in a given context. Ultimately, flexibility is key; jurisdictions should experiment with one or more program and gauge uptake.
2. **Complement financing programs with other tools.** Financing on its own is not sufficient to spur widespread uptake – especially at the level required for rapid decarbonization of a large city like Ottawa. Historically, financing has been most successful when paired with tools such as information sharing, mandatory labelling, grants, rebates and other incentives designed to address typical barriers to uptake among businesses and the general public.
3. **Follow best practices in designing initiatives.** Some models, several of which have been summarized in this report, are particularly noteworthy, either for their jurisdictional relevance, record or success, or level of innovation. Good policy should be based on lessons learned from examples such as these.
4. **Develop supporting tools to increase uptake.** Jurisdictions can support uptake by investing in areas such as training and support for program administrators, tools designed to predict and verify outcomes from energy efficiency program, and tools to lower the cost of capital requirements for project start-up.⁵³

⁵³ Energy and Mines Ministers' Conference (2016). *Financing Energy Efficiency Retrofits in the Built Environment*. Retrieved January 9, 2019 from: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/Financing%20Report-acc_en.pdf.



4 NEXT STEPS: WHAT CAN THE CITY OF OTTAWA DO?

The Atmospheric Fund (TAF) has analyzed and summarized key benefits of financing tools, including all five tools examined as part of this document. According to TAF's analysis, municipal governments like the City of Ottawa are in a position to lead on the implementation of four of the five financing schemes covered above. In the table below, adapted from TAF, the role of the City of Ottawa and other actors in financing implementation is provided.



Photo: Anthony Walsh

**Figure 2: Roles for key actors in implementing innovative financing, with focus on City of Ottawa:⁵⁴**

| Financing tool | Role of municipal government | Other jurisdictions leading | Other actors |
|----------------------------------|--|--|---|
| Local Improvement Charges (LICs) | The City of Ottawa can lead by: <ul style="list-style-type: none">- creating repayment mechanism through special property tax assessments; and- acting as Program Administrator and possibly as capital provider | The province can co-lead as Program Administrator and may be capital provider for province-wide program (or country wide – LC3) | <ul style="list-style-type: none">- Third party LIC providers and lenders- Manufacturers- Hydro Ottawa- Hydro One- Enbridge |
| On-bill financing | The City of Ottawa can lead by acting as Program Administrator, since Hydro Ottawa is municipally-owned | The province can co-lead since Hydro One is provincially-owned and services parts of Ottawa | <ul style="list-style-type: none">- Hydro Ottawa- Hydro One- Enbridge |
| ESPCs | The City of Ottawa can lead by using ESPCs in City of Ottawa facilities | The province can lead by applying ESPCs in provincial buildings | <ul style="list-style-type: none">- ESCOs- Hydro Ottawa- Hydro One |
| Leases | The City of Ottawa can support by: <ul style="list-style-type: none">- maintaining tax-free status for municipal lease interest returns; and | | <ul style="list-style-type: none">- Third party lessors |

⁵⁴ The Atmospheric Fund (2017). A TAF Technical Guidance Note: Energy Efficiency Financing Tools for the Canadian Context. Retrieved March 6, 2019 from: <http://taf.ca/wp-content/uploads/2017/03/Public-Financing-Tools-Guidance-Note-Mar-2017.pdf>.



-
- setting up Loan Loss Reserves to improve terms

| | | | |
|------------|---|---|---|
| Soft loans | <p>The City of Ottawa can lead by providing capital</p> <p>The City of Ottawa can support by setting up Loan Loss Reserves or a guarantee to lower risk of default</p> <p>The City of Ottawa can leverage federal funding for Low Carbon Cities via the Federation of Canadian Municipalities</p> | <ul style="list-style-type: none">- Province can lead by providing capital- Federal government can lead by providing capital (for example through the already existing LC3) | <ul style="list-style-type: none">- Financial institutions- Other parties can lead by setting quality or performance standards that help financing to be securitized |
|------------|---|---|---|



5 CONCLUSION

Certainly, the challenge of dramatically reducing emissions by 2050, in line with or exceeding City of Ottawa targets, is daunting. The path forward demands unprecedented action – the City of Ottawa has never embarked on a community-wide decarbonisation effort before, and certainly has much to learn from policy experimentation and collected best practices in the years ahead.

With that said, Ottawa also has the potential to benefit from adventurous and ambitious financing policy. As noted above, the tools and techniques of innovative financing are being tried in a number of contexts, including multiple jurisdictions within Canada. In many cases, there is already an accumulated body of evidence in support of the notion that building retrofits can save money while also fighting climate change. In cases where challenges are noted, Ottawa can benefit from the experience of jurisdictions that have trialed ideas, and modified or rejected them in some cases.

In this case, the old expression that “in every crisis there is opportunity” almost certainly holds. The fact that a majority (47%) of Ottawa’s community-wide emissions come from how we heat, cool and electrify our homes, offices and other buildings means there is ample room to benefit from innovative financing techniques while driving down Ottawa’s most significant source of greenhouse gas emissions. Beyond financial returns, a suite of effective financing policies has the potential to deliver more green jobs, more comfortable and resilient building stock, and savings in other areas such as water usage.

Ecology Ottawa urges the City of Ottawa to be bold: embrace the opportunity to build a retrofit economy and tackle climate change. Time is of the essence, and the benefits will go to the jurisdictions that fully embrace the challenge at hand.