TREC

EVOLVING BUSINESS MODELS

For Renewable Energy Co-operatives

Spotlight on Energy Efficiency

May 2019

About TREC

TREC Renewable Energy Co-operative is a non-profit organization that advocates for and supports the transition to 100% renewable energy. Founded in 1998, TREC built the first co-operatively owned wind turbine and founded one of the largest solar co-operatives in North America. TREC believes our energy future must involve Community Ownership by the local residents to build community resiliency and enable sustainable economic practices.

TREC works closely with others in the co-operative and environmental sectors as well as with Indigenous community groups to support their renewable energy projects. In partnership with our charitable sister organization Relay Education, we promote and support knowledge sharing, skills development and training for youth and leaders.

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Acknowledgements

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We also wish to acknowledge, recognize and thank the many individuals who shared their project experiences. We can begin to understand best practices and share information between all who believe in building a renewable energy future. We thank all those individuals for sharing their perspectives and lessons learned so we can help shape effective policies and programs across Canada going forward.

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Disclaimer

The information in this report is intended to help co-operatives and potential partners in the understanding of the potential benefits and challenges in renewable energy project development. It should only be used as a supplementary guide when considering whether to devote time and resources toward developing a project. It is not a legal interpretation of any policies, programs or regulations, nor does it intend to provide detailed program and eligibility criteria. Links to government legislation, policies and programs have been provided, however the authors are not responsible for outdated information or changes that have occurred since the writing of this report.

List of Acronyms

BIA	Business Improvement Area
BOMA	Building Owners and Managers Association
CMHC	Canada Housing and Mortgage Association
EC	Efficiency Capital
EE	Energy Efficiency
ESCo	Energy Service Company
ESI	Efficiency-related split incentives
ESI	Efficiency-related split incentives
ESPA	Energy Service Performance Agreement
ESPC	Energy Service Performance Contract
FCM	Federation of Canadian Municipalities
GC	Green Communities
GHG	Greenhouse Gas
HELP	Home Energy Loan Program
HVAC	Heating, Ventilation and Air Conditioning
IESO	Independent Electricity System Operator
IFRS	International Financial Reporting Standards
IPMVP	International Performance Measurement and Verification Protocol
LDC	Local Distribution Company
LED	Light Emitting Diode
LIC	Local Improvement Charges
LSM	Local Service Manager
M&V	Measurement and Verification
MSI	Multi-tenant, multi-owner split incentives
MURB	Multi-unit Residential Building
MUSH	Municipalities Universities, Schools, and Hospitals
NRCan	Natural Resources Canada
O&M	Operations and Maintenance
O&M	Operations and Maintenance
PM	Property Manager
RE	Renewable Energy
REC	Renewable Energy Co-operative
RFP	Request for Proposals
RFQ	Request for Quote
RGI	Rent Geared to Income
ROI	Return on Investment
SHP	Social Housing Provider
SNAP`	Sustainable Neighbourhood Action Plan
TAF	Toronto Atmospheric Fund
TRCA	Toronto Region Conservation Authority
TSI	Temporal Split Incentive
USI	Usage-related split incentives

Executive Summary

As Ontario's electricity grid has become relatively decarbonized over the last decade our attention has turned to the building sector, which accounts for the second highest GHG emissions behind transportation. Improving **energy efficiency** (EE) in our buildings, fuel switching and onsite renewable energy (RE) generation have been the primary methods to achieving significant reductions. While energy efficiency and GHG reduction for new builds is being addressed through increasingly stringent building code standards, it is our existing building stock in **urban and suburban settings** that is the primary challenge we must address. Built with 1960-era lower energy standards yet with 80 -100 year design lifetimes, they will continue to emit GHGs for decades to come. **Unless we act now**.

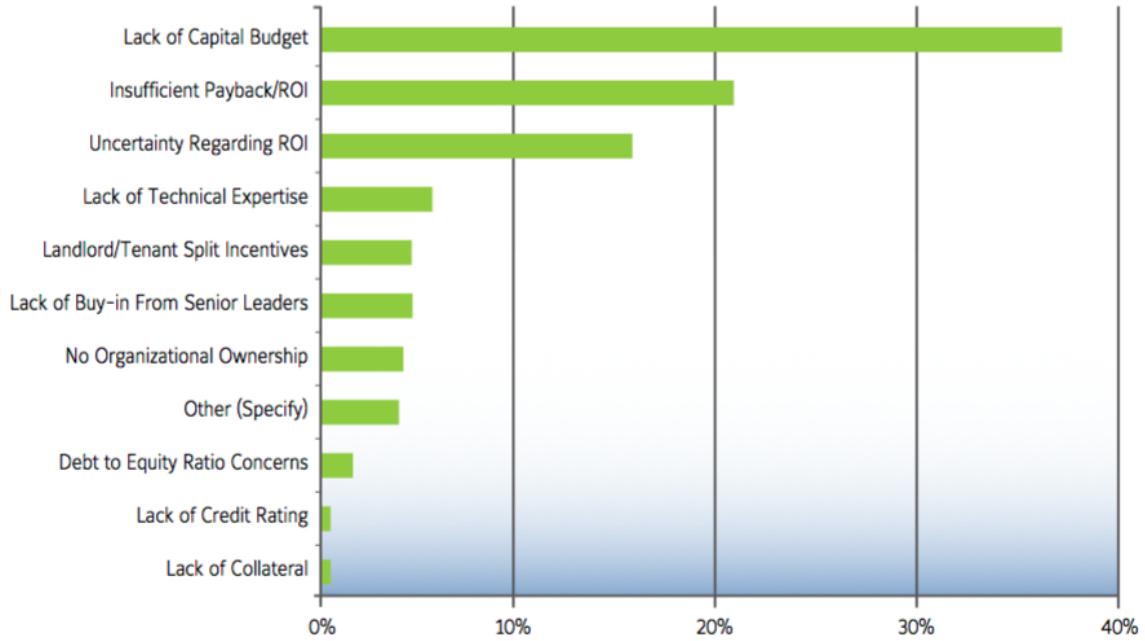
In past years, government initiatives have attempted to increase the uptake of EE retrofits, primarily through provision of incentives, rebates and voluntary energy efficiency standards and tools such as Energy Star and Hot 2000. However, these programs have been only mildly successful and never permanent, making it difficult to achieve any consistency in the industry. So what can be done to change the situation?

Figure 1 presents the most commonly cited barriers to increased investment in EE for the private sector. While some EE measures have short payback times, deeper retrofit uptake is hindered by the high upfront costs and longer payback times as well as capital availability. It is no surprise that the 'low-hanging fruit' is often the extent of our reach.

Energy Service Performance Contracting has emerged as one of the more successful solutions to removing many of these barriers. The service providers (known as ESCos) directly address the lack of capital and lack of technical expertise. In most cases, they transfer performance risk away from the building owner, which is also very attractive.

ESCos have primarily focused on the institutional market, as the scale of these projects make them more profitable. They are also attractive clients due to their tolerance for longer payback times and longer periods of stable ownership. Adoption of the ESPC model has seen limited success in the residential sector, although some companies and non-profit organizations have been able to make headway into the social housing and multi-unit residential sector in more recent years. **What about the commercial sector?**

Figure 1. What is the top barrier to capturing potential energy savings for your company/organization?[1]



The commercial market offers a huge opportunity for GHG reductions – if only it wasn't so complex, so varied, so fragmented, so adverse to change. The ESCo model is totally dependent on the financial return to the building owner and yet it is their tenants who ultimately see the savings. For a large enough project, the stakeholders are motivated to work through the complexity and they always find a way to structure a winning deal.

Can we extend this successful ESCo model down-market to the small-to-mid-size commercial property? Or to smaller municipal-owned properties? **Renewable Energy Co-operatives** (RECs) can offer a potential solution to these 'lack of scale' challenges through their proven ability to mobilize local community support and their access to community financing. RECs can **change** the ownership model. RECs can **aggregate** small projects into larger portfolios. RECs can **educate** and provide technical assurance. And RECs can **partner** with their local municipality to **promote** local action plans.

The REC model of **community ownership of local community assets** places a clear focus on the local neighbourhood – creating a social bond to the initiative alongside a financial return. The commercial property owners and the building tenants ARE our neighbours.

[1] Schulte, D. (2018). Better buildings for a low-carbon future. Report of the Standing Committee on Environment and Sustainable Development

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1. Introduction to Energy Service Performance Contracting

A typical ESPC is a performance-based contract between a building owner and an energy service company (ESCO). The ESCo guarantees a certain level of energy savings over a fixed term as a result of implementing EE measures, fuel switching, and on rare occasion RE installations in a building. The ESCo provides the project capital and is repaid from the resulting cost savings over the period of the contract, which typically lasts 10 to 15 years depending on the specifics of the project, contract and type of ESPC model used.

ESCO's typically provide the following services in a performance contract:

- Identify and evaluate project opportunities
- Propose a project with a cash flow from savings to pay all costs
- Educate about project financing
- Design, commissioning, installation, and construction management
- Train staff members
- Provide ongoing Operations & Maintenance (O&M) services
- Provide Measurement and Verification (M&V) of savings

A formal Measurement and Verification (M&V) plan that is identified from the beginning of the project is integral to ESPC as it forms the basis of identifying whether or not the guaranteed savings have been achieved or exceeded.

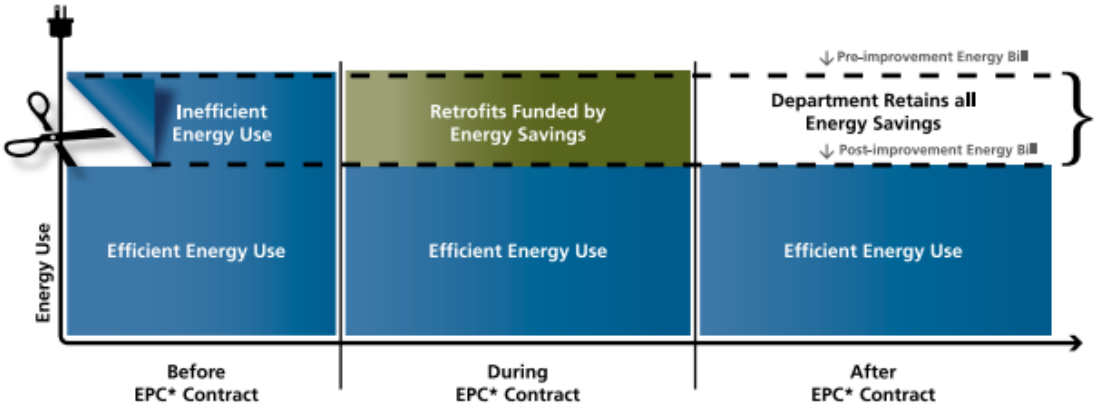

Figure 2. ESPC Funding Model

Figure 2 demonstrates how energy savings are allocated to generate positive cash flow for the building owner, generate profits for the ESCo and to repay the debt. Two key

selling features of ESPC are that they require no money down on the part of the building owner and the performance guarantee transfers the performance risk away from the building owner to the ESCo. The primary types of ESPC models include:

a. **Guaranteed Savings (Figure 3):** The ESCo guarantees minimum energy savings and receives a fixed periodic payment over a fixed term. If savings in any period are not enough to cover the debt service then the ESCo must pay the difference to the building owner. Depending on the contract, if savings exceed expectations then the ESCo can receive an agreed upon portion of those savings.

   Building owners usually expect higher energy savings in this model since they are taking the financial risk. The ESCo takes all performance and design risk. Project capital is typically provided through a third-party financer such as a financial institution or other investor. The creditworthiness of the building owner is a determining factor in the loan terms.

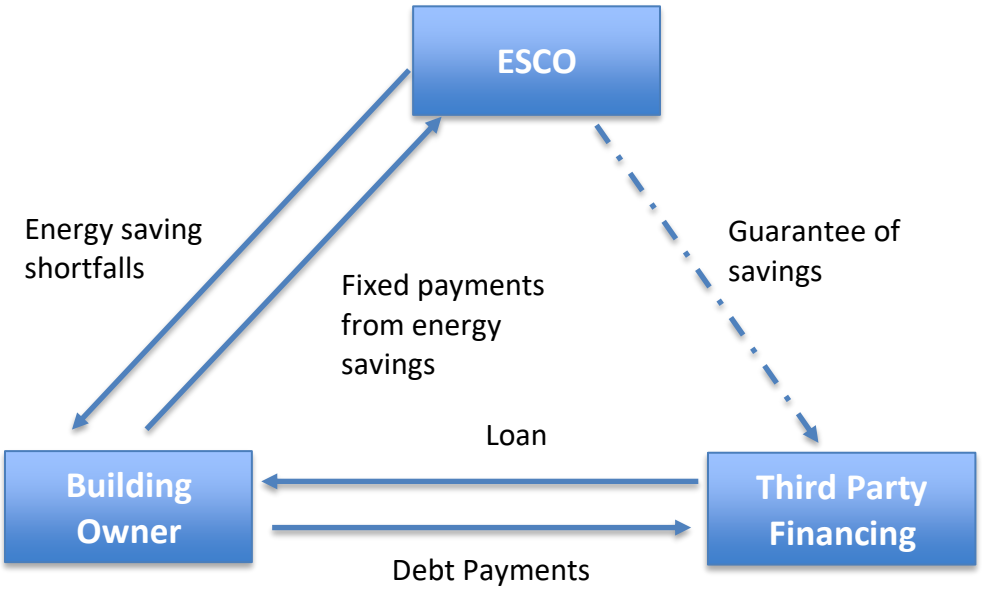

Figure 3. Guaranteed Savings Model

b. **Shared savings (Figure 4):** The ESCo provides financing from their own internal funds or through a lender. The Building owner and the ESCo agree to share savings over specified period at an agreed upon percentage split. Often set as a minimum fee plus a share of savings, or a scaled fee that decreases over time as the ESCo recoups investment.

   The building owner does take some performance risk in this model but generates positive cash flow from beginning of contract. The ESCo bears all of the credit risk

-if the customer goes out of business the ESCo is still responsible for the loan. It is challenging for smaller ESCOs as they may not be able to secure loans or have high debt-ratios.

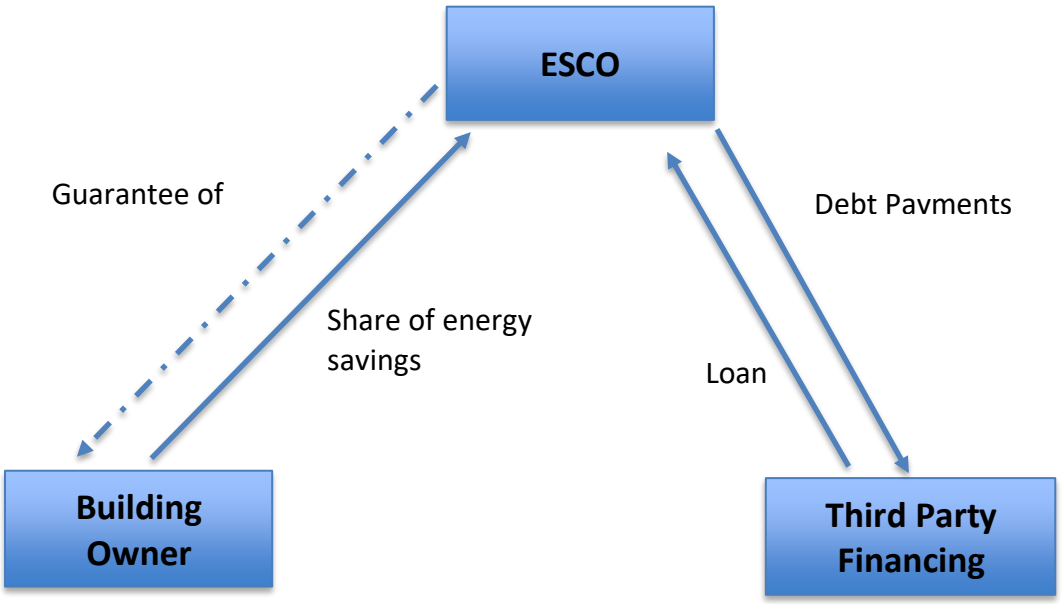

Figure 4. Shared savings model

c. **Equipment leasing (Figure 5) -** Equipment is leasing is necessarily considered an ESCo model but may be offered as part of a suite of EE measures. In an equipment lease the equipment is leased to the building owner by a third-party lessor, ranging from specialized leasing outfits to banks. Tax exempt leases are available to public organizations. There are two main equipment leasing models:

- **Operating lease**: The lessor owns the equipment and leases it to the building owner at a fixed monthly payment. The lease payments are treated as an operating expense and are therefore deductible. At the end of the contract the building owner can purchase the equipment for the remaining value or return it to the lessor.

- **Capital lease:** The Equipment is owned by the building owner during the contract period and can depreciate the equipment as an asset to provide a tax benefit. The lessor typically takes a security interest in the equipment that allows them to reclaim it in the event of a default. A capital lease functions much like a loan and is often referred to as a finance lease, although it offers benefits over a bank loan such as no upfront costs, less paperwork and quicker approvals

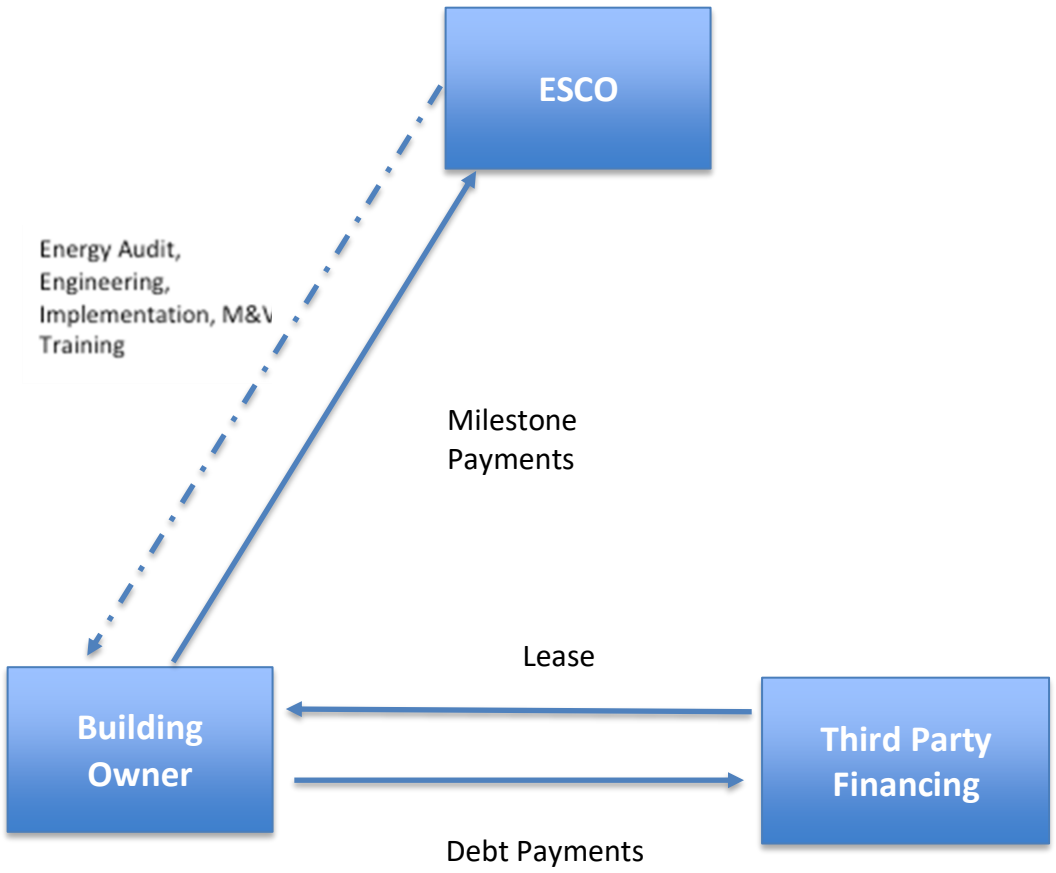

Figure 5. Equipment leasing model

[As of 2019 new rules introduced by International Financial Reporting Standards (IFRS) has made operating leases very difficult to implement. Traditional operating leases will need to undergo significant changes in order to meet the IFRS rules[2]]

1.2 Types of Financing

1.2.1 Third-party financing

Third party financing is the most common source of financing and is defined as financing sourced through a third-party such as a financial institution or any other kind of lender. The guaranteed energy savings cover the debt repayments for the duration of the contract. The guaranteed savings are essentially are a guarantee of future positive project

2 Johnson Controls. (2010). Mind the GAAP: A study on the effects of proposed changes in accounting standards for leases on investment in energy efficiency retrofits in the United States.

cash flow which reduces risk resulting in more favourable interest rates. Interest cost during, construction, design and installation are included as part of the project financing agreement. There are two types of third-party financing: credit of ESCo and credit of customer. Brokers, such as companies like FINESCo play a major role in arranging financing between ESCOs and

Credit of ESCO

If financing is based off of the ESCO's credit the ESCo bears the risk of the entire project even if a cause off failure was out of their control. The customer has no relationship with the financier. This model can be appealing to the customer but is risky for the ESCo and can be difficult for them to secure sufficient capital, particularly if they are a small company. This can result in smaller projects as the ESCo may be debt limited. Very few ESCOs use this type of financing.

Credit of Customer

In this model, the customer holds a contract directly with the source of financing. This approach allows the customer to apply for credits or subsidies that may only be available to them and allows them to potentially implement bigger projects if they are credible with the banks. The loan is repaid in agreed upon installments and requires a guarantee such as property collateral. The interest rate is set according to the creditworthiness of the customer and the quality of the project.

1.2.2 ESCo Financing

ESCo financing is financing provided from the internal funds of the ESCo including its own capital or through debt or leasing instruments. Internal funds are rarely used as this limits the ESCOs capacity to implement projects on a sustainable basis.

1.2.3 Customer Financing

Customer financing is financing from the internal funds of the customer. It can be associated with borrowing if it comes from their internal capital expenditures budget or existing lines of credit. This is often seen as the least costly source of financing for the customer however cost assessments should also include opportunity cost and sudden need for future resources in case of unexpected events.

1.3 Energy Service Contracts Key Considerations

Energy service contracts contain many elements that must be considered in order to ensure risks and responsibilities are properly distributed. This section outlines the key elements in energy service contracts, as well as the risks and risk mitigations that can be employed.

Key ESPC contract elements:

Guarantee of savings- A certain amount of yearly savings are guaranteed by the ESCO, clearly defining how the ESCO will settle a negative difference between guaranteed savings and actual savings, as well as if savings exceed the guaranteed levels.

Volume of investment- Identifies the volume of investment needed to realize the guaranteed savings and a commitment by the client to pay the investment after installation.

Clear definition of reference scenario- Baseline of future energy consumption that is set in physical units, calculated in current prices and specifying rate of inflation.

Report on yearly savings- Obligation of the ESCO to provide annual report detailing the amount of achieved savings

Design and Implementation of energy saving measures- Responsibility falls on the ESCO to do this correctly

Condition for implementation- Pre-agreed to by the client

Planned Duration of Installation

Ownership Transfer- to the client

Means of payment for service- Usually monthly fixed advanced payment agreed to by both parties. Payments are settled at the end of each year after the savings evaluation report

Length of contract

Method of recalculation of guaranteed savings- in case of variation of input parameters used in the baseline scenario

Final Report- Delivered prior to the end of the contract detailing the total amount of cost savings, guaranteed savings, etc.

Other elements to consider

- Equipment ownership
- Malfunctions
- Equipment selection and installation
- Provisions for early termination
- Conditions beyond the control of the parties
- Indemnification
- Assignment
- Applicable law
- Savings calculation formulas
- Energy prices
- Comfort standards
- Projected compensation and guarantees

Sample Contracts:

Vermont Public Purpose ESCO
https://www.ppescohowto.org/Media/Default/resources/PPESCO-model-ENERGY-SERVICES-AGREEMENT.pdf

US Department of Energy Model Contracts:
https://www.energy.gov/eere/slsc/model-documents-energy-savings-performance-contract-project

1.3.1 Risks in Energy Performance Guarantees

Types of Risk

Figure 6. Types of Risks

- **Performance Risk:** Risk that modifications will not provide the predicted savings. Types of performance risk include:

- **Installation Risk**: Removal of existing equipment and limited work hours to not disturb occupants may cause delay. Responsibility depends on who is responsible for the delay.

- **Technology Risk**: Equipment performance and lifetime variations caused by inaccurate sizing, improper system selection, unexpected deterioration. ESCO bears this risk.

- **Operational Risk**: Variation in energy savings due to changes in operation schedule, load O&M and control strategy or from changes in tenant behavior. ESCO usually not liable if tenant operates equipment outside of agreed upon strategies and procedures. Uncertainties around weather and occupancy conditions are difficult to determine and add uncertainty. Changes in interest rates and construction costs (material, equipment and labour costs). Risk of energy cost fluctuation is typically borne by both parties. In guaranteed savings model the ESCO bears the energy cost risk.

- **M&V Risk**: Inaccurate M&V procedures from for example errors in modeling, poor data quality and measuring imprecision. Both parties should equally bear due to their intrinsic nature. Managed through model validation, proper metering and implementation of recommended M&V plan.

Credit Risk: Risk that the borrower will default on loan payments. Is carried by the lender

Asset Risk: Risk that the building value will change. Carried by the building owner

1.3.2 Risk Mitigation

- Set repayment conditions that carry significant consequence for default.
- Asset risk can be mitigated through standardized and mandatory building efficiency labelling or energy performance reporting that allows the property's energy consumption to be compared to its peers
- EE equipment will need to be added to the building owners building insurance
- Can stipulate a fixed price regardless of fluctuating energy prices. Payment can also be tied to level of savings so more savings equal quicker repayment
- Up to date monitoring technology to ensure performance stays within parameters and to quickly identify unexpected issues.

Insurance

Insurance coverage for material damage and performance coverage covers potential shortfalls in energy savings as a way to backstop the guarantee provided by the ESCO or EE contractor, overcoming uncertainties about their ability to cover its own guarantee. The policy can be held by the contractor or the building owner. In exchange for a premium, the insurer agrees to pay over the duration of the contract any shortfall in energy savings below the baseline, less a deductible. Insurance also improves credit risk and removes contingent liabilities from the building owner's balance sheet. An example of a specialized energy savings insurance provider is Energi.

1.3 ESCo Facilitators – a potential role for Co-operatives

In the institutional sector, project development is often driven by the client. For example, mandatory requests for proposals (RFP) put out by public institutions due to contracting requirements for government agencies[3]. However, for a commercial building owner, dealing with ESCOs for EE retrofits represents a non-core business activity that an organization may not have capacity for and may constitute a significant expertise obstacle. EE Project implementation often also requires organizational and leadership change from established routines, procedures and personal relationships.

In many instances, the market solution is to employ a trusted facilitator to interact with/ between the ESCo and the building owner. The facilitator provides coordination and communication between stakeholders and can act as an independent third party overseeing the process. **Figure 7** shows the various ways facilitators can assist.

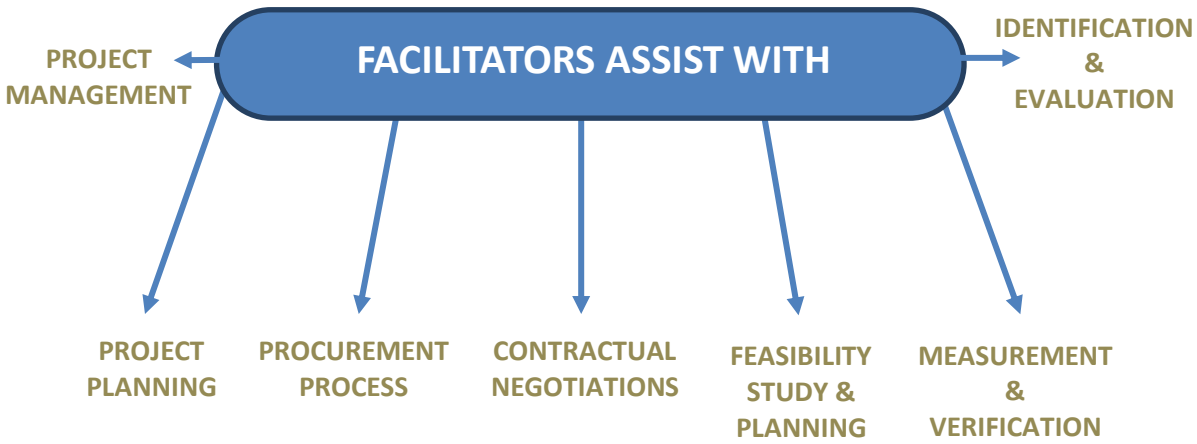

Figure 7: Ways facilitators can assist.

[3] Bieyl-Androschin, J. W. et al. (2013). ESCo Market Development: A Role for 'Facilitators' to play. ECEEE Summer Study

Most of these services are delivered during the implementation phases of the project, with the facilitator taking a more limited role during the operations phase. Being a facilitator requires in-depth knowledge of EE, financing mechanisms and M&V. The cost of service for a facilitator is usually 1 to 3% of total project costs for the duration of the project (10-15 years) and can be integrated into the project[4].

Facilitators have been used in Canada by Natural Resources Canada (NRCan) for ESCo projects in federal buildings as part of their Federal Buildings Initiative. Use of a facilitator is not as common in North America as ESCOs typically prefer provide the facilitation role themselves using a bail out clause. Typically, the ESCo provides project development such as the technical and financial analysis free of charge with the caveat that if the building owner decides against going forward with the ESPC they can pay a nominal fee for the project development work already done and exit the project.

A facilitator is a potential role that co-operatives can play in the ESCP process. Often the building owner needs advice and guidance to make an informed decision on the project goals, structuring, and business model. The independent role provides reassurance in an area that is largely outside of their expertise. In fact, there is a vital role to be played by the co-operative by identifying potential projects even prior to the ESCo being called in.

1.4 Overview of the ESPC Process

Figure 8 below outlines the phases of the ESPC process and is broken down into three segments to help guide decisions in which co-operatives could potentially participate. Within these segments co-operatives can play different value-added roles and deliver fee-for-service activities. We have highlighted in bold those services that our research showed a co-operative could be well suited to deliver, providing the proper capacities are developed. **Figure 9** provides an overview of the ESPC workflow and timelines.

[4] Econoler. (2016). Energy Performance Contracting – Key considerations to maximize benefits.

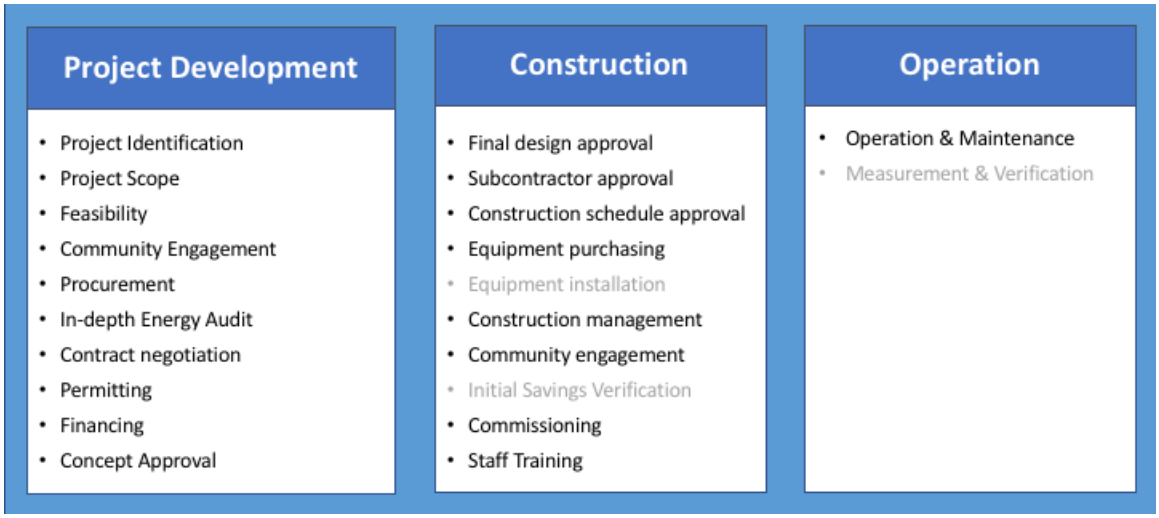

Figure 8. Phases of the energy efficiency retrofitting and energy performance contracting process

Figure 9. Overview of ESPC workflow and typical lead times[5]

[5] Bieyl-Androschin, J. W. et al. (2013). ESCo Market Development: A Role for 'Facilitators' to play. ECEEE Summer Study

2. REC Value Proposition

The core values that co-operatives can provide in the commercial sector will be through facilitation and project management services, financing arrangements, and by reaching underserved markets through project origination and aggregation. This section will provide an overview of the typical types of EE measures that may be considered, and then turn to gaps in the industry that co-operatives can potentially provide a solution.

2.1 Types of Energy Efficiency Measures

The types of EE retrofit measures that are typically undertaken can be divided into:

- those measures that deal with electricity usage
- those measures that address thermal demand (heating and cooling)
- behavioural measures and
- operational measures.

However, EE measures should not be considered in isolation. Buildings should be thought of as systems wherein changes to one element can impact another. For example, improving the efficiency of the lighting lowers heat output which increases the heating load. Improving the building envelope reduces heating cost and can improve occupant comfort, however the increased air tightness may require installation of a controlled ventilation system. Rather than seeking to achieve one-off improvements, seeing the building as an interrelated system helps maximize cost savings[6].

Opportunities should also be sought to combine building renovations with EE retrofit opportunities as well as water conservation measures. For example, reroofing a building is a good opportunity to add insulation and storm water management. If installing energy efficient lighting in apartment suites, water conservation measures such low flow faucets and shower heads can also be installed with relative ease.

Building characteristics that affect energy performance vary widely. As a result, EE measures are usually customized to the specific building. Measures are typically bundled to maximize impact yet ensure that the sum of annual cost savings is able to meet the annual finance payments. Shorter payback measures such as lighting and control upgrades will offset the higher payback periods of boiler and chiller replacements.

[6] CMHC. Energy and Water Efficiency in Multi-Unit Residential Buildings.

Figure 10. provides an overview of general categories of retrofit measures ranging from shallow to deep retrofits. Shallow retrofits are most commonly implemented, typically easier to install and have shorter paybacks at lower risk. In contrast, deep retrofits are more complex, have longer payback time, higher risk but achieve larger energy reductions.[7].

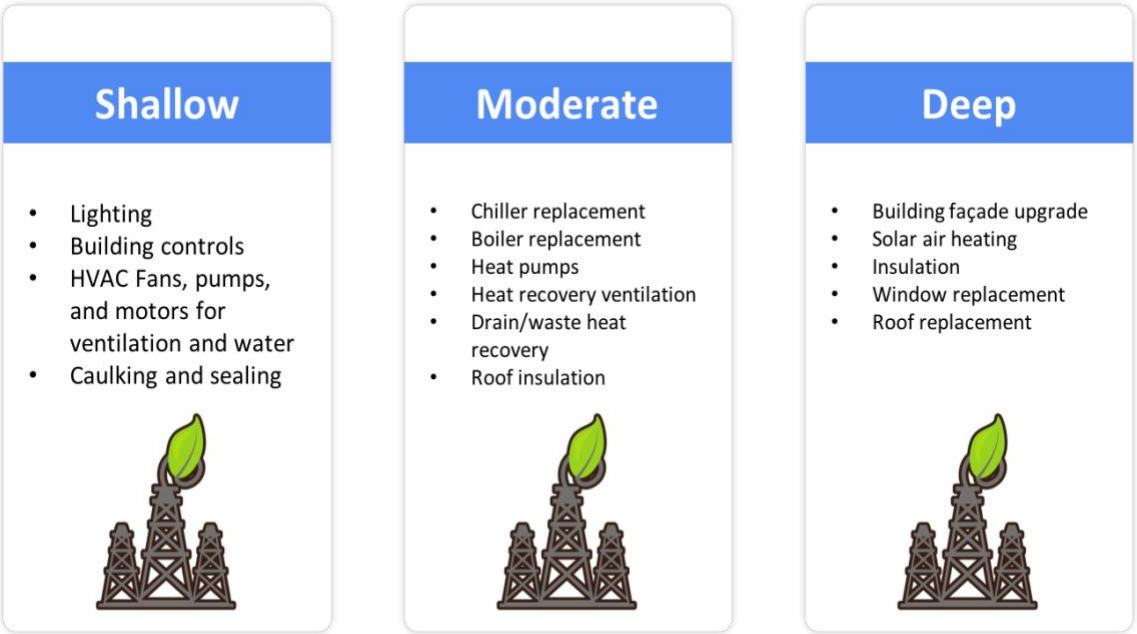

Figure 10. Typical energy efficiency measures

Table 1 provides an estimate of costs and payback times associated with the range of EE measures. This section does not intend to provide an exhaustive list of potential EE measures but to provide a short overview of the range of typical measures.

[7] Pembina Institute. (2016). Building energy retrofit potential in B.C.

Table 1. Payback times of typical energy efficiency measures in the commercial or institutional sector[8]

Controls	**Payback (yrs.)**
Controls retrofits and controls strategies	3 - 4
Demand controlled ventilation	2 - 5
Mechanical	
Variable flow primary's secondary systems with controls, VFDs	2 - 4
HVAC	
Constant Speed air handlers to variable air volume	2 - 4
VAV boxes, control setpoints, box flow minimums	5+
Boiler conversions from steam to hot water	5 - 8
High efficiency fully condensing boilers	6 - 8
High efficiency VFD chiller system	8 - 12
Lighting	
Install controls to schedule interior systems	2 - 4
Convert incandescent to CFL	1 - 3
Replace exit signs with LED lights	<2
Convert T12 to high efficiency T8s with electronic ballasts	2 - 5

Electricity based measures are anything that reduces the electrical load. In multi-unit residential buildings (MURBS) this includes in-suite loads such as lights, stoves, fridges, air conditioners and any plug loads. Ex-suite loads include motors for the make-up air units, cold water booster pumps, centralized air conditioning, common area loads, and any other loads in the mechanical room. Buildings with electric baseboard heating or domestic hot water are not as common but represent an opportunity for substantial savings if converted to an electric heat pump.

In commercial buildings, there are greater opportunities to reduce electricity usage depending on the building type and use. Grocery stores for example have large loads associated with running fridges and freezers that can be reduced by replacing them with more efficient models. Regular maintenance and cleaning, as well upgrading to more

[8] Energy Information Administration and U.S. Department of Energy Data Book

advanced control systems also provide substantial benefits. Similarly, office buildings with large electrical loads from computers can reduce consumption through installing better controls and more efficient equipment.

Typical thermal demand measures include replacement of the furnace with a high efficiency models, heat recovery ventilation, integrated fan coil units and thermal breaks. Ventilation is estimated to be 30% of an HVAC system's energy consumption, and heat recovery ventilation can reduce natural gas consumption for heating by 40%, as well as electricity consumption associated with cooling systems[9]. Solar air heating systems can also be used to preheat building ventilation air through solar radiation collected on the exterior of the building.

Behavioural measures have to do with how building occupants use energy and interact with the technology. Making simple changes to daily routines can provide immediate, zero cost options for reducing energy consumption. Behavioural measures include:

- turning off lights and other loads when they are not in use
- learning when and when not to open windows
- opening and closing blinds to maximize daylighting and natural heating and cooling opportunities
- properly setting thermostats
- as well as education and communication on how behaviour affects energy use
- provide access to their energy consumption data and ways to visualize this in comparison to other buildings or regions.
- This is increasingly being done through real-time monitors, in-home displays and information dashboards.

Operational measures are optimizations in the use of existing equipment and technology. Measures include putting in place:

- improved operation and maintenance practices
- proper commissioning and re-commissioning of existing equipment
- on-site training of operations staff
- optimizing equipment sequencing (start-up and power down times)
- conducting nighttime audits to find what's on afterhours
- visually inspecting insulation

While the biggest opportunity for operational measures are in larger buildings that have maintenance staff, there can be substantial benefits for smaller commercial buildings.

[9] TowerWise Energy Efficient Technology Scan

2.2 Reaching Underserved Markets- Aggregation and Bundled Service Packages

ESCOs tend to overlook smaller scale projects that are less than $1 million as smaller scale projects are seen as higher risk and likely unprofitable. Each ESCo surveyed believes that they have to incur fixed client acquisition and contracting costs during the procurement process. Some reported an interest in projects as small as $500,000 but none were inclusive of deep retrofit measures. Upgrades to the building envelope (insulation, exterior cladding, windows) have also been difficult to sell as building owners always want faster payback and shorter contract times. Deeper energy retrofits can also be more difficult to document in terms of measurements and verification.

The good news from a GHG reduction is that ESCOs are motivated by bigger projects with more measures and longer contract times to ensure long-term revenue security. Still, this can be a challenge where opportunities for bigger and deeper retrofits are limited by a do-it-yourself mentality which often results in targeting of low-hanging fruit measures. It is unlikely that these deeper energy retrofits will be pursued at a later date as a building owner is unlikely to go through the same ESPC process again. Furthermore, if there are no fast-payback measures left to blend the longer payback investments with, then deeper energy retrofits become harder to sell.

Co-operatives are potentially well positioned to address these barriers that have prevented smaller scale commercial uptake of ESPC. Because co-operatives are owned and operated by community members the issue of trust may be mitigated, in particular where co-operative values are shared between RE co-operatives and building owners and their tenants. Co-operatives are also better suited to addressing these underserved markets as they are not required to maximize profits for their investors. Co-operatives are very comfortable with the ‘group purchase’ model. This makes smaller projects more viable and also can allow for blending in deeper retrofits at a fair return.

Aggregation of projects in close proximity can create a risk-balanced and profitable EE portfolio centered on a neighbourhood. Running concurrent evaluations would allow the co-operative to consolidate multiple contracts under one umbrella reducing risk and lowering transaction costs. In an aggregated model the co-operative can pool resources, achieve economies of scale, and offer bulk purchasing power to reduce the payback time of EE investments.

Providing a project origination and aggregation service creates value for ESCos and other EE organizations by providing access to smaller markets that would otherwise be too small attract interest. By its inclusive nature, the co-operative can enlist all of the various

property owners, including municipalities, faith groups and social housing, in combination with smaller commercial owners.

During our interviews a number of municipalities showed interest in the idea that the co-operatives would approach aggregation by focusing on a local neighbourhood. A neighbourhood-scale approach is a concept that is growing in popularity across the US. The neighbourhood is ideal in terms of an achievable scale for local climate change initiatives and management of distributed energy resources. We found Ontario examples of local conservation authorities that partnered with local community and environmental organizations to develop neighbourhood action plans. Together they identify priorities, opportunities and actions at the neighbourhood level. These local engagements could be integrated with city-level energy plans or climate action plans.

Depending on which business segment co-operatives wish to focus, the co-operative could play different roles in the implementation of EE retrofits identified below. In each case, the neighbourhood is a reasonable scale at which the co-operatives can operate. They can easily take advantage of their networks to originate projects, create deep partnerships with local organizations and engage residents and business in an EE program. Neighbourhood goals might be set, for example to be the most energy efficient neighbourhood in their city or county or province. This can be used to then create friendly competition with other neighbourhoods and provides a realizable goal that the community can mobilize around.

The ability of the co-operative to provide an affordable source of capital for long-term financing is sorely needed to finance deeper energy savings. This combined with a trusted ESCo turn-key delivery model may be an attractive model for many building owners. The co-operative can provide a comprehensive, bundled EE retrofit service package in partnership with ESCo or other EE contractors, acting as trusted advisors and offering community financing at favourable rates.

Outside of the commercial sector, they might be able to assume a similar role with partners such as housing co-ops, social housing providers or private market rental apartment building owners. The service package would include assembling all of the technical service providers and contractors needed to undertake the work and will need to be marketed to building owners in an attractive way. The co-operative can blend EE measures together to mitigate risk, so if one measure does not perform as expected, the package as a whole may still perform well. Blending shorter payback measures with longer payback measures also makes the longer payback measure more financially viable. Separate longer-term financing for the deeper retrofit measures on the building envelope could also be offered. In addition, RE co-operatives can offer transparent pricing on products and services and bias-free recommendations.

3. Roles and Primary Activities

Co-operatives can play a range of value adding roles throughout the ESPC process.

a. **Project development phase** - co-operatives can provide soft and hard development services such as identifying potential projects, providing community engagement, energy consulting, project scoping and budgeting, feasibility and financing, as well as managing the procurement phase and developing measurement and verification (M&V) plans.

b. **Construction phase** - co-operatives have a more limited role to play but can still act as independent third-party oversight for project approvals and construction management, represent the building owners' interests throughout this phase, aid in construction scheduling, and communicate and coordinate construction disruptions with the building owner and occupants. They can also act as third-party independent oversight for the commissioning process, as well as perform initial M&V duties and provide staff training on the newly installed equipment.

c. **Operations phase** - co-operatives can provide M&V services as well as coordinate new maintenance with old maintenance schedules and provide reporting services on the performance and maintenance of the equipment. Throughout the process the co-operative can take a general contracting role, procuring the needed contractors for regular maintenance of the equipment, as well as the M&V.

Co-operatives can choose in which of the segments they wish to participate and which roles they wish to take on. While it is also possible for the co-operative to become an ESCo themselves, that approach is not recommended. To be successful, this would require significant capacity building and would put the co-operatives in direct competition with larger and well-established ESCOs.

Figure 11 shows the model of the co-operative acting a facilitator. The co-operative would take on the role of project manager for the entire EPC process. They act as a coordinator between the ESCo and the building owner, facilitating communication between stakeholders, securing financing and negotiating contracts

As a precursor to offering M&V as a service, the co-operative would be active in the project development phase. Their role would be to develop the initial M&V plan and to act as independent third-party verification of the energy savings. This role could extend during the acceptance to provide commissioning and initial savings verifications.

Co-operatives can also form their own community-owned ESCo to specifically support EE in their own neighbourhoods and communities, which could also be expanded to include providing other energy services such as solar, storage and demand response.

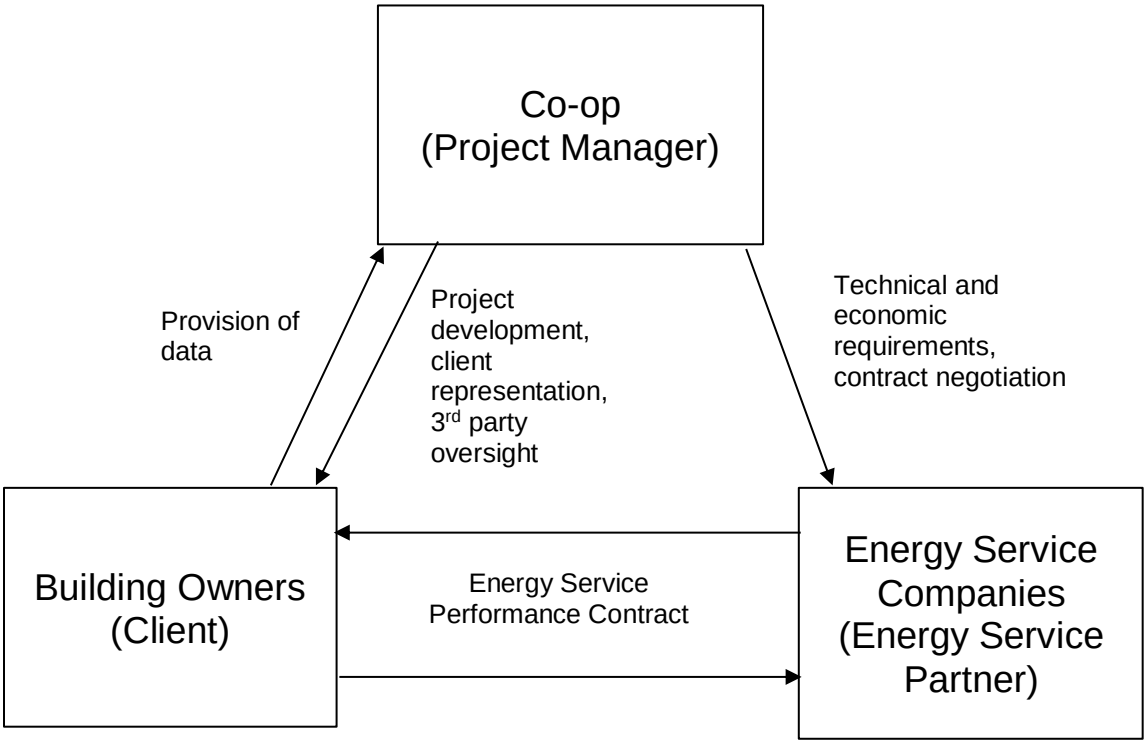

Figure 11. The co-operative as a facilitator

3.1 Project Development Phase

Table 2. Project development roles and activities

Roles	Project Development Activities	Revenue Streams
Outreach	● Project origination and aggregation ● Community Engagement ● Concept Approval	● Commission
Technical Consultant	● Project Scope ● Feasibility	● Fee-for-Service

Financial Consultant	● Project Scope ● Feasibility ● Financing	● Fee-for-Service ● Return on Financing
Project Manager	● Procurement ● Permitting ● Concept Approval ● General Contracting	● Fee-for-Service ● Mark-up on contractor fee

Outreach: There are two outreach activities where RECs can add value –

Project identification- Co-operative identifies potential candidates for EE retrofits for the municipality. Finds smaller projects that can be aggregated into portfolios, identifies opportunities for bulk purchasing. Provides initial outreach to building owners.

Community Engagement- Performs community engagement to determine level of support for work. Facilitates communication between stakeholders. Educates community on project. Ensures that the concept is understood by all stakeholders (i.e. occupants, operations and maintenance staff, building managers).

Revenue Streams: Long-term commission or commission at close of transaction for aggregation of contracts.

Technical Consultant: Project scope and feasibility- Identifies range of EE measures that can be implemented and range of likely savings. Performs benchmarking against other similar buildings to determine where it sits in terms of performance. Develops M&V plan. ESCOs often offer feasibility studies free of charge or as part of their RFP submission. However, some building owners may wish to more thoroughly scope the project and identify budget before issuing an RFP.

Revenue Streams: Fee-for-service

Financial Consultant: Defines budget and therefore scope of financially viable EE measures. Builds business model, calculates required investment to implement EE measures and payback time based on estimated savings. Helps determine if level of investment is worth the projected savings. Organizes financing, communicates with investors, finds and utilizes existing EE subsidies and utility EE programs

Revenue Streams: Fee-for-service. If the co-operative is providing capital, then the co-operative will earn a return from the interest and a modest markup on the cost of capital

Project Manager: Runs procurement process by setting up RFP defines selection criteria, negotiates contracts and ensures all necessary provisions are present, secures necessary permits. Develops project plans to monitor and track EE progress, provides project documentation, manages project budget and schedule

Revenue Streams: Fee-for-service. If the co-operative is providing general contracting services, they can charge a markup on contractor fees

3.2 Construction Phase

Table 3. Construction phase roles and activities

Roles	Construction Phase Activities	Revenue Streams
Independent Auditor	● Construction Management ● Final Design, subcontractor and construction schedule approval ● Commissioning	● Fee-for-Service
Project Manager	● Client representation in final design, subcontractor and construction approvals ● Community engagement ● General Contracting	● Fee-for-Service ● Markup on contractor fee
Technical Consultant	● Initial savings verification ● Staff Training	● Fee-for-service

Independent Auditor: Provides independent 3rd party oversight of the construction process. Provides weekly detailed construction-schedule reviews.

Revenue Streams: Fee-for-service

Project Manager: Represents interests of the building owner throughout the construction process. Signs off on payment. Communicates with community stakeholders: Ensures occupants and building owners are informed of the construction schedule and expected disruptions and receive adequate notice.

Revenue Streams: Fee-for-service

Independent Auditor: Produces commissioning report that verifies the ESCo has met the approved final design and ensures that the ESCo has delivered all required materials such as permits, inspection reports, equipment manuals and documentation.

Revenue Streams: Fee-for-service

Technical Consultant: Initial savings verification includes surveys, inspections, spot measurements, and short- and long-term metering. Can provide staff training on installed equipment although ESCo typically performs this themselves

Revenue Streams: Fee-for-service

3.3 Operations Phase

Table 4. Operation period roles and activities

Roles	Operations Period Activities	Revenue Streams
Project Manager	● O&M Reporting and scheduling ● General Contracting	● Recurring payments for service
Contractor	● Measurement and Verification	● Recurring payments for service

Project Manager: Produces periodic reports on the performance of the equipment from communicating with the O&M team and the M&V team. Schedules and coordinates new equipment maintenance with old equipment maintenance in the building. Finds contractors to conduct maintenance.

Revenue Streams: Recurring payments on an annual basis for example for service. Markup on contractor fees.

Contractor: Carries out M&V plan according to international standard IPMVP. Quantifies ongoing energy savings, monitors equipment performance, identifies opportunities for additional savings, verifies proper O&M, verifies cost savings and guarantees are met, allocates risk to appropriate parties

Revenue Streams: Recurring payments for M&V services.

4. Market Segments

This section provides a detailed profile of each of the Commercial, Institutional and Residential market sectors. If a neighbourhood approach is used, then all 3 sectors may be found in the same business model. Maps of the market segments can be found in Appendix A.

4.1. Commercial Sector

The commercial sector has good potential for energy savings; however, owners may be reluctant to undertake anything that will disrupt their business or revenue streams. Contracts with the commercial sector are typically customized on an individual basis in comparison to the residential sector where standard contracts can be used for most buildings. Commercial buildings account for 15% of total energy demand in Ontario[10].

The ideal candidates for EE retrofits are older buildings that are at least 10-15 years old that have not had any recent retrofit work conducted and that have annual energy and water costs of $50,000 or more. In order for there to be sufficient energy savings, generate positive cash flows, repay the debt financing, and cover all the costs of service, the minimum amount of achievable energy savings should be 30%. Buildings that have stable ownership for 10 to 20 years are ideal to ensure long-term ESPCs are viable.

There two very different types of companies in the commercial sector: large, sophisticated companies that have access to capital and expertise, and small to mid-sized companies that do not. Large companies may look to implement EE on their own using their in-house expertise and capital or would be of sufficient scale to contract directly with an ESCO. These types of companies are generally driven by the following attributes:

- CEO values
- Internal skills
- Shareholders
- Competition
- ROI/profitability
- Consumer preference

In general market characteristics of the commercial sector include:

- Good potential for cost-effective emissions reductions
- Fewer end-use decision makers than residential

[10] National Energy Board. (2016). Provincial and Territorial Energy Profiles – Ontario.

- Existing technologies can be deployed over wide areas using existing distribution channels
- Commercial building retrofits occur every 20 years on average to maintain asset value and attract tenants. Capital renewal periods are opportunities to increase energy efficiency
- Split-incentives under commercial leases
- 3-5-year payback periods for investments
- Large commercial has strong relationships with financial institutions and portfolios of properties
- Small and medium enterprises can have difficulty accessing financing

Split-incentives in the Commercial Sector

The split-incentive problem is prevalent particularly in the commercial leasing sector. This primarily occurs in individually metered buildings where the unit holder pays their own utility bill based on the metered consumption in their unit. The split-incentive occurs when the benefit of the EE investment made by the building owner accrues to the tenant. In a bulk metered building where one meter is used for the entire property and the utility costs are recovered through the monthly rent fees this problem is mitigated as the building owner can reduce their operating cost and improve their return on investment. A voluntary approach that is gaining increasing popularity in the US and Australia is green leases. A green lease creates a clause or a separate agreement that allows the building owner to raise the rent to finance EE improvements. The National Resource Defense Council has developed guidelines for how standard leases can be revised to include terms that address the responsibilities of landlords and tenants in terms of EE and how costs and benefits are to be shared. Helping to modifying tenant landlord leases may be a role for co-operatives in an EE facilitation or aggregation role. For more discussion on split-incentives see **Appendix B**.

Market Organization

The commercial sector can be separated into the retail, office, and industrial uses. The market can also be categorized if they are owned by the company themselves or if the business is leasing the space from a property owner. Mixed-use is another category that is characterized by office or apartment rentals above ground stores. The tables below provide a breakdown of the main categories of buildings in the commercial sector.

The appropriate market scale for co-operatives to aggregate in would be smaller sized community shopping centres, retail stores and Class B to C office buildings. A breakdown of Industrial buildings is included here although this market segment is also not recommended for co-operatives unless they have developed specific expertise in delivering industrial energy efficiency.

Retail

The retail sector is the most complex in terms of the different type's buildings and arrangements. They can be single-tenanted, which are typically free-standing buildings ranging from large box stores to small business on an urban street, such as mom and pop variety stores. The multi-tenanted segment includes different non-freestanding buildings such as malls and shopping centres, that usually have larger anchor tenants located with smaller retailers. The segment could also include power centre which are multiple large free-standing box stores on a single lot with common parking and loading areas. Retail can also include special purpose buildings like stadiums, theatres, self-storage, etc.

Table 5. Non- free standing retail building types

Type	***Description***
Super-Regional Shopping Malls	Enclosed space, 800,000 sqft+, 5+ anchor stores with large variety of other tenants
Regional Shopping Malls	Enclosed space, 400,000-800,000 sqft, 1-5 anchor stores with other tenants
Community Shopping Centre	Open space, 125,000-400,000 sqft, general merchandise and commodities (supermarkets, department stores)
Neighbourhood Shopping Centre	Open space, 3,000-125,000 sqft, commodities for nearby neighbourhoods (e.g. drug stores)
Strip or Convenience Shopping Centre	Open space, less than 30,000 sqft, located along suburban transportation arteries
Lifestyle Centre	Main Street Concept with pedestrian circulation at core, and vehicle circulation around perimeter

Table 6. Free- standing retail building types

Type	**Description**
Bix Box Stores	50,000+ sqft
Power Centre	3+ big box anchor stores, multiple large buildings with parking in front, and smaller retailers clustered in a community shopping centre configuration
Retail Outlet	Manufacturers' outlet store, 50,000 to 400,000 sqft

Office:

Offices are categorized into Class A, Class B, and Class type buildings depending on their quality as defined by BOMA:

Table 7. Classification of Office buildings as defined by BOMA

Type	**Description**
Class A	Rent in the top 30-40%, well located, above average upkeep and management. Prestigious and have state of the art systems, high quality finishes and definite market presence
Class B	Rents between Class A and C, fair to good locations, average upkeep and management, fair finishes and adequate systems
Class C	Rents in the bottom 10-2%, less desirable locations, below average upkeep and management. Competes for tenants looking for below average rents

Industrial:

Table 8. Classification of Office buildings as defined by BOMA

Type	***Description***
Heavy Manufacturing	Heavily customized buildings with machinery required to produce goods and service
Light Assembly	Less customized and can be reconfigured, used for product assembly, storage and office space
Warehouses and Distribution Centres	Large buildings serving as storage and distribution centres

4.2 Institutional Sector

The institutional sector is an excellent candidate for EE retrofits due to their long-term stable ownership and tolerance for payback periods over 10 years. However, the Province has issued the *Broader Public Sector Procurement Directive* which sets mandatory guidelines for procurement processes including a requirement to hold a competitive procurement process. This will make it difficult for co-operatives to compete in this sector with larger companies that have already been active in this sector over the last decade or more.

Sector characteristics include:

- Have stable ownership and can tolerate payback periods over 10 years.
- Have limited debt loads
- Procurement rules may hinder new entrants from getting contracts
- ESCOs already active in the MUSH sector
- Public sector borrowers have access to low interest long-term debt rates

4.3 Residential Sector

The residential sector is a broad category that includes single-family homes and multi-unit residential buildings, each with very different market characteristics. This section will provide an overview of the market potential in the residential sector, then turn to the characteristics of each residential market segment.

Out of the 5,169,175 residential dwellings in Ontario in 2016, 67% were constructed prior to 1990 (**Figure 12**). This gives an idea of the scale of the market potential, as these buildings were constructed with less stringent energy performance standards in the building code. The residential sector is also the third largest energy consumer, accounting for 18% of total energy demand behind industrial at 38% and transportation at 29%.

The residential sector in Canada is not well suited to Community financing due to a number of barriers that make large-scale application difficult including:

- Lack of scale in per unit consumption
- Lack of necessary energy intensity to justify investment
- Decentralized structure
- High transaction cost of face-to-face interaction
- Wide variety of building types, and energy fixtures increases complexity
- Split incentives
- Legal requirements: all tenants/board must agree

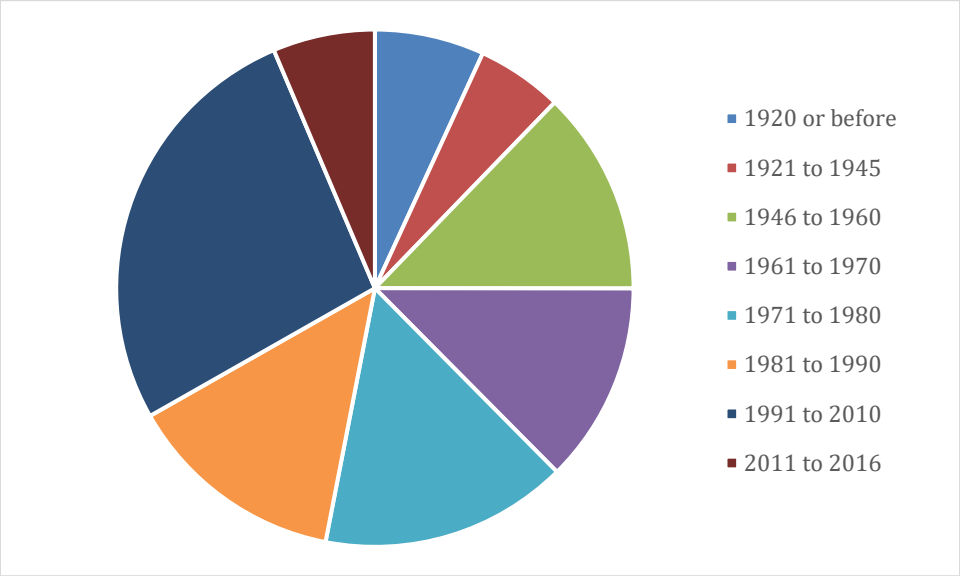

Figure 12. Ontario residential dwellings by year constructed. 2016 Census Data.

4.3.1. Existing Programs for Residential Energy Efficiency

The residential energy efficiency market has primarily been driven by government incentive and rebate programs delivered through electricity and natural gas utilities. Several non-profit organizations will conduct energy audits and connect owners with the incentives. Due to recent cuts in Ontario government funding, incentives only remain for First Nations and low-income housing.

The Toronto Atmospheric Fund's (TAF) TowerWise program launched in 2007 has sought to address the problem of EE retrofits specifically in MURBS by conducting a pilot project for construction and financing of EE retrofits in ten buildings. It has produced case studies and resources to further work in this area. Out of these pilots TAF created and licensed its own Energy Service Performance Agreement which is delivered through Efficiency Capital Corporation, who has been active in the social housing sector.

Local Improvement Charges (LICs) are low interest loan issued by the municipality for EE retrofits that is repaid through the property tax bill. The loan is tied to the property and can therefore be transferred to a new owner in the event of a sale. In Ontario LIC programs are currently in place in Toronto and Guelph and Hamilton is in the process of developing one. In Ontario LICs have been primarily targeted at single-family homes.

4.3.2. Multi-unit Residential Buildings (MURBS)

MURBs range from low-rise apartments to high-rise towers and can include attached townhouses. Over 75% of MURBS in Canada were built before 1990, representing a high need for EE retrofits[11]. The MURB sector can be broken down into three different segments:

- Social Housing Providers
- Private Market Rentals and
- Condominiums.

For property classification purposes MURBs with greater than 4 housing units fall under commercial mortgage classification which requires more stringent underwriting criteria. The MURB sector has a high market potential for EE retrofits, representing a significant portion of residential dwellings in larger municipalities. In Toronto for example, MURBs account for 55% of the building stock and 2.6 million tonnes of carbon emissions. 64% of the buildings were built before 1990 indicating a need for EE upgrades.] The highest impact retrofits in terms of energy savings are improved boiler efficiency, reduced air leakage, and improved building envelope through insulation and window replacement[12]. Space and water heating account for 80% of overall energy use in MURBS and energy savings of 21% can be achieved through installation of high-efficiency boilers alone[13].

MURBS should also be further distinguished by whether or not they are serviced through a single bulk utility meter or if they are sub-metered to the level of a tenant unit. Bulk metering uses a single meter for the entire property and usually means the landlord or property manager (PM) is paying the utility bill and recovering that cost through the rent. In individually metered buildings, each individual unit is responsible for paying their own utility bill based on their unit's metered consumption.

The split-incentives problem can arise in individually metered buildings and is quite common and a real barrier to investment - where the building owner pays for the capital investments, but the tenants receive all the benefits in the form of reduced utility bills. This can potentially be overcome through the use of green leases, pioneered in Australia, which are based on the principle that whoever makes the investment should receive the benefits of the energy savings.

However, as many MURBs are bulk-metered in Ontario, building owners receive the benefit of the EE investments through reduced operating costs. Split-incentives may be less prevalent in the social housing sector as social housing providers seek to reduce

[11] CMHC. Energy and Water Efficiency in Multi-Unit Residential Buildings.

[12] TAF. Energy Retrofit Opportunities for Multi-unit Residential Buildings in the City of Toronto.

[13] CMHC. Achieving High-Performance Multi-Unit Residential Buildings: The Opportunities

operating costs and operate according to a social mandate. For a further discussion of split-incentives see **Appendix B**.

4.3.2.1. Social Housing Providers

Social housing providers have stable long-term ownership, and some have large portfolios of buildings under a single owner. Many have capital constraints, limited operating budgets and housing stock in need of repair. This makes them good candidates for third party financing of EE retrofits.

Background

With the devolution of the responsibility of social housing provision from the Province to municipalities, Local Service Managers (LSMs) are responsible for the funding and administrative responsibilities of the *Social Housing Reform Act.* LSMs are the sole shareholders of the local housing corporations which are arm's length municipally-owned corporations that own and operate housing units throughout Ontario.

Alongside local housing corporations, housing co-operatives, non-profit housing providers and municipally owned housing provide social housing in Ontario. Private non-profit housing is typically developed and owned by community associations or charitable organization such as ethnic or religious groups. Special purpose groups are organized that accommodate seniors, people with disabilities and low-income households.

Housing Stock

There are 270,000 social housing units covering the entire range of building types in Ontario although low to high-rise apartment buildings as well as town or row houses are the most common. Social housing represents 5% of the total building stock in Ontario and 20% of the rental stock. Most of the social housing stock was developed after WWII and between 1964 and 1995. The majority of the stock is between 20 and 50 years old and is in need of essential maintenance and capital replacements.

Capital Reserves, Funding and Operating Agreements

It is currently estimated that 70% of the social housing units in Ontario have a shortfall of capital reserves required for investments for capital repairs that is estimated at $1.21 Billion. Under provincial and federal operating agreements social housing providers (SHPs) are required to maintain portfolios of rent-geared-to-income (RGI) units which prevents them from sharing higher costs of energy and mortgage debt service with their tenants[14]. The provincial and federal government have made some funding available to

[14] Institute on Municipal Finance and Governance. (2013). Affordable Housing in Ontario: Mobilizing Private Capital in an Era of Public Constraint.

address the situation however problems still remain. One example was with 6,300 vacant units in 2016 due to having not met minimum health and safety standards. Typically, many have deferred capital repairs or investments in EE that could reduce their operating costs. Specific funding for EE for social housing was recently lost with the cancellation of the GreenON program.

Furthermore, federal operating agreements that provide subsidies to social housing to cover the difference between rent paid by low-income residents and operating expenses are being phased out over the next two decades and are not being renewed based on the assumption that once the mortgages have matured, operating expenses should fall and affordable rents would be able to be offered without subsidy. As subsidies are tied to the mortgage terms, providers who are paying more to service their mortgage than they receive in subsidy should remain viable at the end of the mortgage, while those with high ratios of RGI and major capital repair needs will experience a funding gap. Research in BC has indicated that projects with more than 65% RGI units are unlikely to be financially viable post-expiry[15].

Unlike other Canadian jurisdictions, responsibility for social housing was devolved to the municipalities in Ontario which made them responsible for administration of the federal funds. Under these agreements there is no sunset clause so the operating obligation of the provider and the subsidy obligation of the municipality will continue even after the federal subsidy has ceased at the end of the mortgage term. As government funding for repairs and upgrades and operating agreements comes to an end, and with the withdrawal of provincial money for GHG reductions in social housing the cost of capital repairs and renewal therefore are placed entirely on the municipality.

Expiry of operating agreements may be a barrier to an aggregated retrofit program as many seek to complete capital repairs while the subsidy is still provided, however this can miss opportunities to combine capital repairs with retrofits. On the other hand, providers will be looking for new ways to finance capital repairs which can catalyze conversations on asset management[16]. Some operating agreements define energy as an uncontrollable expense and would reduce the amount of subsidy provided as a result of energy savings, therefore removing the incentive. Other agreements define energy as a fixed cost and the operating subsidy remains unchanged if energy savings are realized.

More recently, the 2018-2019 federal budget has allocated $547 million over 5 years for repairs and retrofits. The federal National Housing Strategy is creating a national co-

[15] BC Housing and BCNPHA, preparing for the expiry of operating agreements.

[16] Pembina Institute. (2017). Aggregation of energy retrofits in affordable housing

investment fund providing $15.9 billion ($4.7 billion in contributions and $11.2 billion in low-interest loans) for repair and development of new social housing.

Social housing providers have indicated that they desire to increase environmental sustainability and energy efficiency but are often unsure of the options and necessary steps to evaluate those options[17]. Operational costs are often higher in social housing than in other housing. EE represents a controllable operational cost. The cost of utility bills in Ontario for social housing is $500 million per year[18]

RE co-operatives may be able to play a role in capital renewal by providing facilitation of the EE process as well as low cost financing for EE retrofits in conjunction with other needed building upgrades. Social housing is also a stable off-taker for EE with ownership estimated at 30-50 years compared to single-family home ownership of 13 years[19]. Mid- and high-rise social housing developments have been recognized by ESCOs as having sufficient scale to justify investment, so some competition already exists in this sector.

Housing Co-ops

Housing co-operatives are an important potential off-taker for EE services provided by RE co-operatives as there already exists shared co-operative values between them. For these reasons housing co-operative can be a good starting place for RE co-operatives to enter the market and begin to build a track record of successful projects. There are 550 non-profit housing co-operatives across Ontario half of which were developed under federal operating agreements. They follow operating rules in an operating agreement with CMHC. The other half were developed under the provincial housing program when responsibilities were devolved, and follow operating rules outlined in the *Housing Services Act,* administered by municipal service managers[20].

Decision-making power lies with the board in co-operatives and most housing co-operative buildings are still bulk metered. This means the EE investments will mainly be in the common area elements such as the mechanical room, the HVAC system, and lighting in the corridors and common rooms. However, in-suite EE measures such as toilets, showers, air radiators, and LED lights could also be done which will decrease operating costs in a bulk metered building.

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[17] Review of effectiveness of investments in renewable energy for social and affordable housing.

[18] Tsenkova, S. & Youssef, K. Energy efficiency retrofits: Policy solutions for sustainable social housing.

[19] Emrath, P. (2013, Jan 3). Latest Study Shows Average Buyer Expected to Stay in a Home 13 Years. Retrieved from http://eyeonhousing.org/2013/01/latest-study-shows-average-buyer-expected-to- stay-in-a-home-13-years/.

[20] Co-operative Housing in Ontario. https://chfcanada.coop/your-region/ontario-region/about-ontario-region/co-operative-housing-in-ontario/

4.3.2.2. Private Market Rentals

Private market rentals can be broken into six different ownership structures[21]. Individual investors and private corporations are the most dominant types. Generally, management of rentals are done by a superintendent or property manager that lives in the building. EE retrofits represents a good business case for private rental apartment owners as they stand to benefit from the reduced operating costs in a number of ways.

The market value of buildings is determined by their net operating income divided by the local capitalization rate. Many buildings in Ontario are still bulk metered, meaning the owner pays the utility bills and recovers the costs from the rent. After an EE retrofit is completed net operating income will increase for the owner because their operating costs will have decreased whereas the rent has stayed the same resulting in an increase in net operating income. With a retrofit project that produces a $100,000 increase in net operating income, the building owner could see an increase in value of their property of 1.5 to 3 million dollars depending on the capitalization rate. Alternatively, they could reduce rent commensurate with the operating cost reduction to improve the marketability of their building or promote their building as being green.

4.3.2.3. Condominiums

Condos consist of owner-occupied units, except where individual units may be offered on the secondary rental market. Improvements within a condo unit are therefore the responsibility of the unit owner. Condo boards are the point of contact in regard to EE retrofits in the common elements as they are responsible for the maintenance of the building and grounds, condo finances and must uphold and enforce the Condo Act, the declaration, by-laws and rules.

Condo boards are elected by the unit holders to represent and run the condo corporation on behalf of the owners. Individual unit holders would only have to be engaged if a debt instrument is being used by the condo, as according to the *Condominium Act* states that a corporation may only borrow for expenditures outside of its current fiscal year budget if it passes a bylaw authorizing it to do so, which requires approval by a majority of the unit owners.

4.3.2.4. Pitching EE Retrofits to Decision-Makers

Presenting EE retrofit proposals to decision-makers requires understanding the different goals and constraints of the different market segments and ownership models within each as outlined in this section. Value cases should be closely linked to ownership objectives and it should be made clear that proposals are preliminary, and final decisions

[21] CMHC. (July, 2017). Rental Ownership Structures in Canada, Housing Market Insight

come with more detailed analysis and cost estimates. The CMHC provides a useful summary on which benefits should be emphasized and common concerns associated with different ownership models in the MURB sector[22]:

Benefit Emphasis

- Reduced O&M costs which improve the bottom line
- Enhanced asset and resale value of property
- Improved tenant comfort and satisfaction which leads to higher occupancy
- Extended life expectancy of building components which reduces maintenance cost
- Bundling major repairs with rapid and longer payback EE retrofits produces higher returns on investment

Table 9. Common concerns of building owners and counter arguments

Ownership	Common Concerns	Benefit
Social Housing Agencies	Tenant comfort and affordability	Focus on reduced operating costs that defer the need to raise rent as energy and water costs rise
	Costs	Piggyback energy and water saving measures where possible Stress how reducing building operating costs may free up money for other improvements Recommend measures that can be implemented by on-site maintenance staff where possible
Condominium Boards	Condominium dues	Emphasize measures that reduce operating costs/maintenance fees without adding costs
	Safety and security issues	Focus on safety measures- for example, exterior and parking garage lighting improvement measures
	Non-essential renovation costs	Emphasize benefits such as enhanced comfort, improved air quality, environmental issues, etc.
	Reserve funds	Prepare a reserve fund study that incorporates energy and water efficient measures into planned repair and maintenance activities
Co-operative Housing Boards	Raising rents	Focus on reduced operating costs that defer the need to raise rent as energy and water costs rise
	Safety and security issues	Focus on safety measures- for example, exterior and parking garage lighting improvement measures
	Environmental concerns	Stress measures that reduce environmental impact

[22] CMHC. Energy and Water Efficiency in Multi-Unit Residential Buildings

Rental Units	Operating costs	Emphasize reduced operating cost and return on investment
	Occupancy/Turnover	Emphasize that benefits of energy and water efficiency activities can reduce turnover by improving building and occupant comfort and security
	Payback	Blend measures to improve average payback. Integrate measures into ongoing repair and maintenance activities
	Occupant complaints	Focus on measures to reduce drafts, improve comfort and security and improve indoor air quality
	Maintaining property value	Piggyback energy and water efficiency measures onto renovation activities where possible
	Maintenance costs	Include measures to reduce maintenance cost (for example relamping programs that reduce bulb replacement

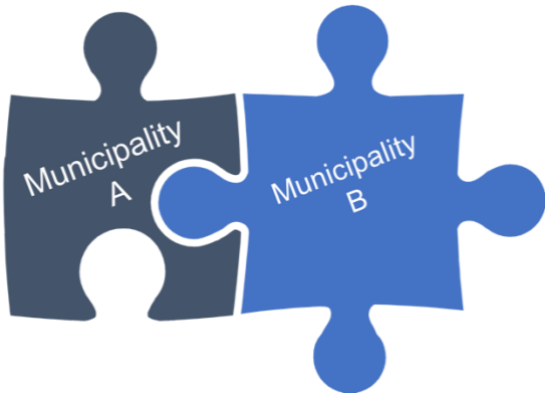
4.5. Single-family Homes

Single-family homes have been shown to use 1.8 times more energy than apartment dwellings on a per capita basis. However, EE in single-family homes has primarily been driven by utility-led incentive and rebate programs for furnace replacements. Even these programs have achieved limited success in bundling other EE retrofits with the furnace replacement as homeowners are not interested.

While there is likely no role for ESCOs in delivering EE in single-family homes, this may be a secondary market for RE co-ops. Co-operatives can potentially access this market through their existing member base as a starting point, by organizing bulk equipment purchasing or running an equipment leasing program for its members. Once some projects have been completed, those success stories can be used as a baseline to recruit other households. Co-operatives may be able to assist Municipalities experiencing barriers to LIC implementation by providing education, consulting and/or program delivery.

5. Partnership Models

Municipal Partnerships



Municipalities have experienced a lack of capacity, insufficient budget and public support as barriers in implementing local climate and energy plans. Partnership with co-ops can help to overcome these barriers.

Municipal and co-op goals are also well aligned in terms of shared concerns regarding community well-being and both serving the same stakeholder: the citizens, making them natural allies. Most municipalities believe that public procurement rules hinder or even prevent partnership with co-operatives. They are locked into a competitive tendering process which favours larger, more well-established companies that have track records of successful projects in the industry.

This entrenched position prevents staff from accessing friendly community capital, ignores a low-cost delivery agent, and sidelines a potentially powerful advocacy ally. Worse still, they lose out on the opportunities to keep economic benefits circulating in the local economy that co-operatives provide. Depending on which municipality or public sector organization a co-operative is seeking to partner with there may be exemptions from the normal procurement rules for co-operatives with a non-profit status.

Co-operatives could also provide advisory services to their members in applying for existing municipal programs where EE audits and project management plans may be required by building owners, such as the Toronto Energy Retrofit Loan program and the Home Energy Loan Program (HELP).

Toronto Region Conservation Authority- Neighbourhood Action Plans

SNAP
Sustainable Neighbourhood Retrofit Action Plan

The TRCA's Sustainable Neighbourhood Action Plan (SNAP) is an established program aimed at revitalizing communities. They have successfully implemented programs for strategic infrastructure and environmental renewal at the neighbourhood level throughout the TRCA's watershed. SNAPs look to identify solutions that produce measurable environmental improvement and sustainable community transformations. SNAPs meet the diverse of

objectives of municipal strategic plans and local community interest and overcome implementation challenges.

Building on the TRCA's already established relationships with municipalities, SNAPs utilizes local networks, science-based research, market research, demonstration projects, and coordination of public and private actions to reach the multi-objective goals in the plans. Each neighbourhood SNAP establishes its own framework of sustainability goals, indicators and targets that guides the development of the action plan. Examples of SNAP projects include stormwater management, community gardens, rain barrels, and home retrofit programs.

Key challenges of the program are marketing and upfront costs. To overcome these challenges SNAPs uses market research and behavioural insights to design targeted marketing programs that identify messaging that captures local attention, as well as builds awareness through various community engagement and outreach methods such as community events, focus groups and door-to-door engagement. Industry partnerships have been leveraged to provide desired products and to showcase preferred options that are available to program participants and local organizations have been utilized for program delivery.

Participation in the programs is still relatively low and further and wider outreach is needed to improve uptake. On the financing side, they have taken advantage of short-term incentives, rebates and subsidies for products as well municipal financing.

The TRCA has expressed strong interest in partnering with co-operatives to create new programs or help deliver existing ones. The SNAP framework could provide a platform for the co-operatives to expand the scope and increase uptake of the EE programs. They are interested in the idea of portfolio aggregation. They endorse the idea that a local community co-operative would act as a delivery agent, providing a one-stop shop for EE retrofits to streamline the process.

The addition of RE co-operatives into the SNAP program would provide an opportunity for community financing. It would also expand their local capacity for community outreach and engagement, building on the TRCA's existing marketing approach and established relationships. In order to implement these plans BIAs and community associations will be important partners to provide access to markets.

Efficiency Capital Corporation

Efficiency Capital (EC) is a for-profit EE company incubated by the Toronto Atmospheric Fund (TAF). EC's key asset is the trademarked Energy Savings Performance Agreement (ESPA) which acts as an engineering audit, work order and investment product. The ESPA is typically an 8-10 year agreement with a minimum $250,000 retrofit value (required for insurance) that provides a no money down option for building owners.

EC secures financing for the client and is paid back through guaranteed energy savings backed by a specialized insurance policy. The ESPA differs from the traditional ESCo ESPCs in the financing arrangement, the shared savings approach and in the third-party performance guarantee. Instead of the building owner taking on a loan such as in the ESCo guaranteed savings model the ESPA puts no debt on the building' balance sheet.

Unlike ESCOs the EE equipment installed in the building is owned by EC until contract expiry at which point ownership is transferred to the building owner. The engineer guarantees the energy savings as would a traditional ESCo . However, the ESPA requires that the engineer covers their work with retrofit insurance removing risk from the building owners, as well as investors, while ensuring engineers do not over-estimate savings as they are required to pay the deductible if a claim is made.

The ESPA positions EC between the building owner and the engineer. EC owns the EE equipment and is selling the savings to the client, so if the savings are not being realized, the building owner does not have to pay EC, in contrast to the ESCo model.

EC has expressed interest in potentially partnering with co-operatives on EE retrofits in MURBS. A number of different partnership arrangements exist which are outlined in **Figure 13.** A potentially attractive arrangement would be for EC to pay the co-operative a commission for the project origination and aggregation.

The co-operative could offer a financing package to the client as part of their trusted advisor and facilitator role. EC would hold the ESPA and receive a portion of the energy savings, while the co-operative would receive the debt service and could also take a general contracting role to provide ongoing services such as O&M and monitoring.

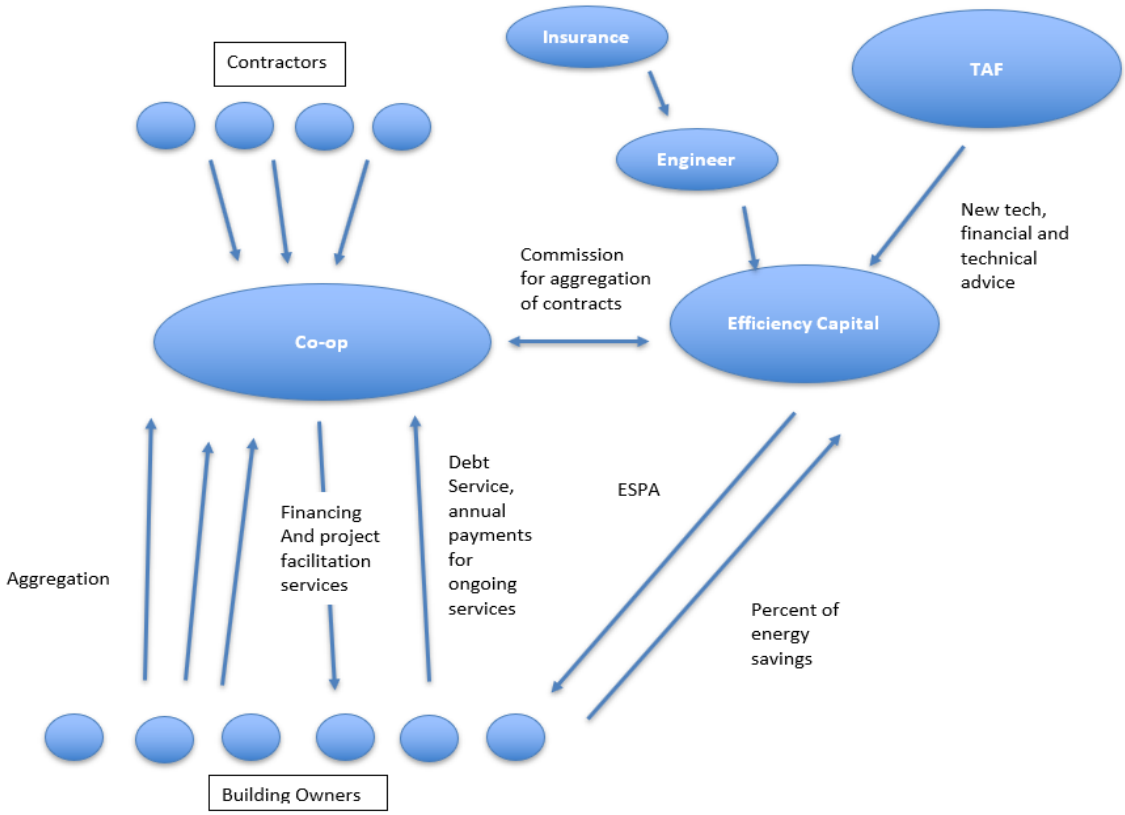


Figure 13. Efficiency Capital partnership model- co-operative financing

ESCOs

Partnering with traditional ESCOs is another partnership opportunity where the co-operative could sell aggregated contracts to ESCOs to guarantee energy savings and perform the work while the co-operative provides the financing and project management and facilitation services. In this model, the co-operative would take on a more traditional ESCo facilitation role as outlined in the Roles of Facilitators section.

Tri-Party Partnership- Municipal, ESCO, Co-op

Another opportunity for partnership is around municipal LIC financing. A barrier to LIC programs has been low uptake from homeowners. One reason for this may be the lack of a guarantee on the energy saving measures. Another barrier specific to Toronto has been the requirement that banks had to agree in writing that the loans had priority. A partnership between the co-operative, municipality and ESCo wherein the co-operative is the facilitator and/or financer, and an ESCo provides the guarantee could be a way forward.

In the current LIC model, the relationship is only between the municipality and the homeowners. The municipality provides access to recommended contractors to perform the work which is paid for from a loan taken by the municipality. The homeowner then pays back the loan through their property tax bill. With the introduction of the co-operative and ESCOs to the equation the municipality can shift some of the risk away from itself while potentially increasing uptake of the program.

Green Communities

Green Communities (GC) is a national non-profit association of community organizations that work with homeowners, businesses, governments, and communities to deliver community-wide sustainability programs and services including: Energy and water conservation, active transport, stormwater managements and community gardens. GC is a member organization similar to a co-operative in that members own the organization, elect the board, serve as directors, and share information and resources.

Member organizations deliver the programs and develop their own local programs. In terms of energy solutions Green Communities primarily focuses on delivering home energy evaluations and an advisory report as well as some post retrofit verification, while allowing homeowners to take advantage of utility incentives. In the past Green Communities has done community-wide retrofit programs which were essentially concentrated marketing campaign in one area to create better economies of scale. It was generally concluded that the marketing costs outweighed any economies of scale that were gained; therefore, this model is generally not done anymore.

If a co-operative wishes to establish a home energy retrofit program in their community Green Communities will be a good partner that can provide access to experience, resources, networks and advice needed to startup. In order to become a member organization, the co-operative must be a non–profit.

6. Core Competencies

This section outlines the core competencies (**Figure 14**) that co-operatives will need to start an EE performance contracting/facilitation business. Not all competencies are expected to be held by one organization and highlights the importance of developing partnerships. The most important competency will be to establish credibility and a successful track record. This primer addresses many of these competencies, however, co-operatives will need to conduct their own research to understand the specific local market contexts.

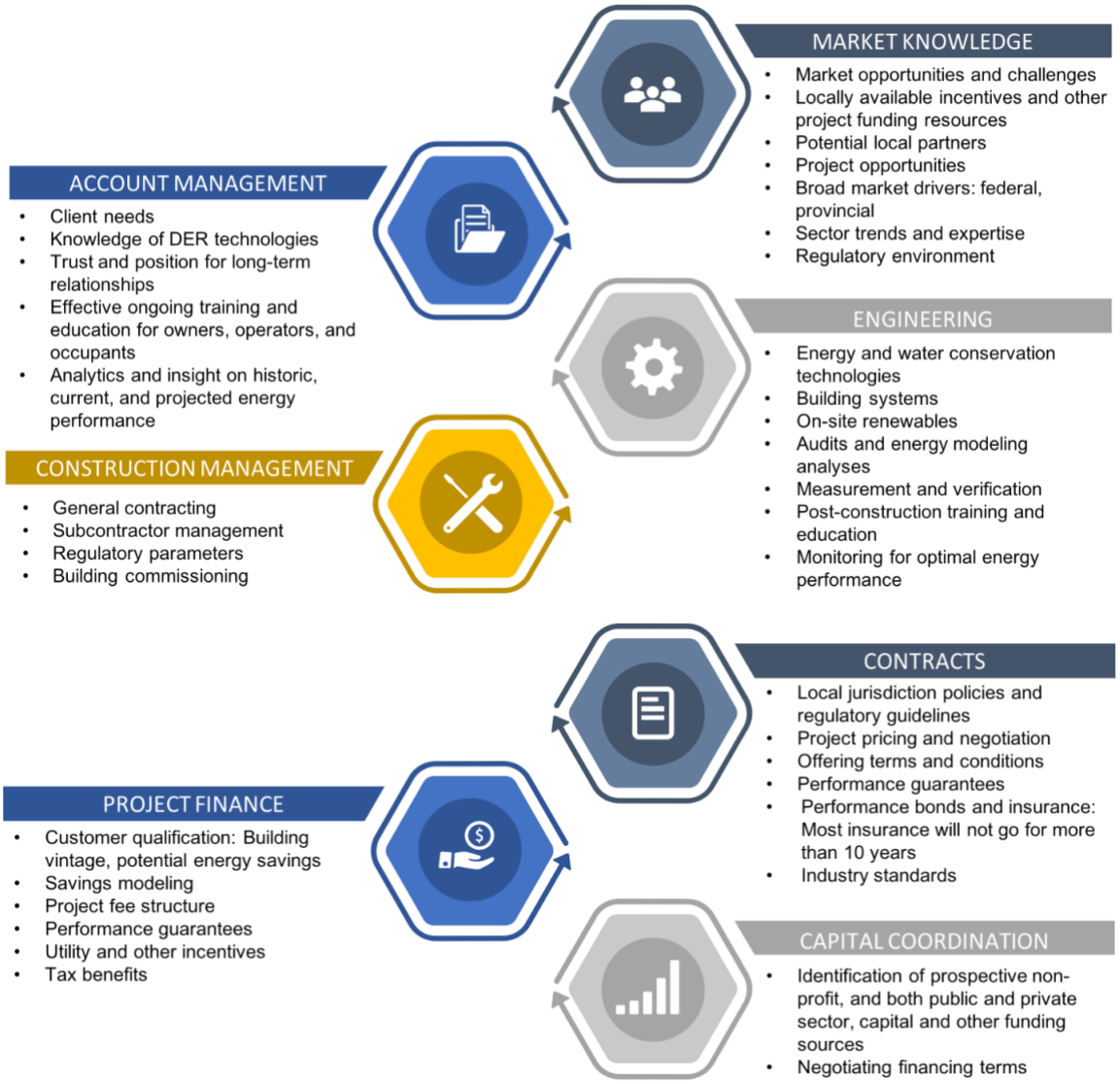


Figure 14. Core competencies to operate an energy efficiency businesses

7. Sources of Capital

The 2019 Federal budget announcements have allocated $1.01 billion to increase EE in residential, commercial and multi-unit buildings. Funding will be delivered through the Federation of Canadian Municipalities (FCM) via the Green Municipal Fund that will provide financing to municipalities. Municipalities will likely be designing their own retrofit programs and may be issuing RFPs to find delivery agents. Federal funds will be allocated as follows

- Collaboration on Community Climate Action ($350 million): to provide municipalities and non-profit community organizations with financing and grants to retrofit and improve the energy efficiency of large community buildings as well as community pilot and demonstration projects in Canadian municipalities, both large and small. FCM and the Low Carbon Cities Canada Initiatives will create a network across Canada that will support local community actions to reduce GHG emissions.

- Community EcoEfficiency Acceleration ($300 million) to provide financing for municipal initiatives to support home energy efficiency retrofits. Homeowners could qualify for assistance in replacing furnaces and installing renewable energy technologies. The FCM will use innovative approaches like the LIC model that allows homeowners to repay retrofit costs through their property tax bills.
- Sustainable Affordable Housing Innovation ($300 million) to provide financing and support to affordable housing developments to improve energy efficiency in new and existing housing and support on-site energy generation.

In order to take advantage of this funding co-operatives will need to go through the competitive RFP process or be exempted if they operate on a non-profit basis. Please see Appendix A for an overview of EE subsidies that are still available through organizations such as the natural gas utilities and the IESO.

8. Business Model Frameworks

This section outlines how taking on the different value adding roles and responsibilities are integrated into a business model

8.1. Neighbourhood Action Plans

Neighbourhood action plans are a vehicle for a co-op to engage with the residents and business within in their communities to deliver EE to underserved markets through aggregation of smaller contracts to achieve economies of scale. The Co-op identifies neighbourhoods and organizes community support for neighbourhood wide rollout of energy efficiency retrofits and can act as project manager, offer equipment leasing, organize bulk purchasing agreements, arrange or offer financing, and offer support and advice throughout the project. The options presented below will describe the business models behind the different roles co-ops can play in a neighbourhood action plan.

Key Partners:

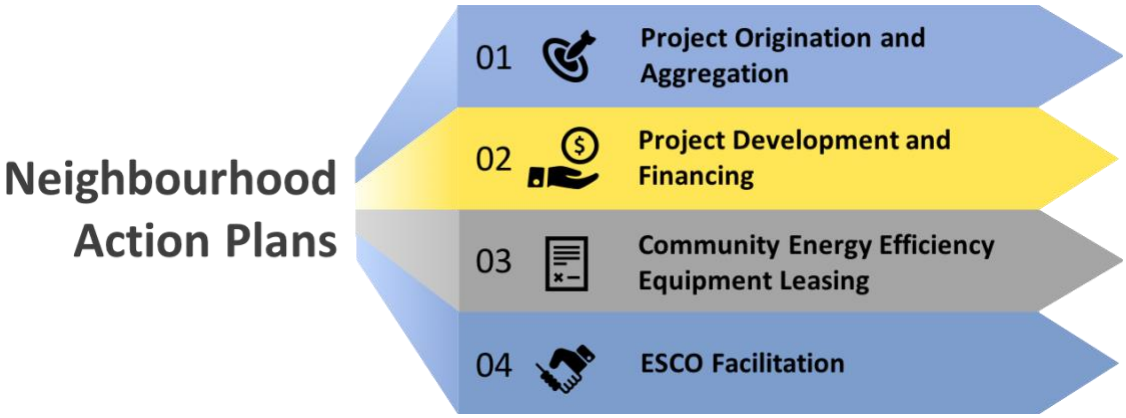
- Business Improvement Areas
- Local Community Associations
- Municipalities- can provide data for feasibility studies, project facilitation, financing through LICs
- Other local organizations or companies for technical support

Customer Segments:

- All buildings within a neighbourhood
- Buildings over 5 years old at least (10 years preferable) that have not had any major renos recently represent the greatest potential for energy savings
- Buildings with stable ownership
- Those in need of community capital
- No procurement rules or have exceptions for non-profits
- Buildings with large energy demands and/or simultaneous heating and cooling demands represent a good opportunity for heat recovery
- Bulk metered buildings or buildings with common areas
- Low-rise MURBs are a sector overlooked in the industry

Value Proposition:

- Aggregation of smaller buildings that alone are outside the scale of investment sought by ESCOs
- Bulk equipment purchasing
- Community engagement and outreach
- Community financing
- EE advice and support
- Contract negotiation



Option #1: Project Origination and Aggregation

Option	Project Origination and Aggregation
Description	The co-op identifies suitable buildings for EE retrofits through pre-feasibility assessments and secures building owner/PM/occupants/boards agreement on implementing EE. Aggregates residential units and/or common areas of buildings under one contract to be outsourced to an ESCO that is selected through a procurement process, or an engineering company that can provide a performance guarantee. Co-op can also provide financing if necessary.
Key Partners	● Organizations that control large building portfolios ● Housing co-ops ● Municipal Service Managers ● Municipalities with LIC for EE programs

Customer Segments	Buildings over 5 years old at least (10 years preferable) represent the greatest potential for energy savings ● Stable ownership ● In need of community capital ● No procurement rules or have exceptions for non-profits ● Buildings with large energy demands and/or simultaneous heating and cooling demands represent a good opportunity for heat recovery ● Bulk metered buildings or buildings with common areas are good starting points for new market entry ● Low-rise MURBs are a sector overlooked in the industry ● Single family homes ● Commercial buildings Potential Off-takers ● ESCOs ● Efficiency Capital ● Municipal LIC programs
Value Proposition	Aggregation allows underserved markets particularly in the commercial and residential sector. The residential sector (MURBs and single-family homes) is often overlooked by ESCOs due to the small scale and numerous barriers to entry. Investor and energy efficiency investment firms typically seek investment thresholds of at least $500,000. Aggregation allows this investment threshold to be met and the co-op to provide one point of contact and one contract for the ESCO to implement an ESPC in multiple buildings. Originating projects is also of high value to EE companies. Low uptake is a risk of municipal LIC programs. Co-ops may be able to mitigate this if they can aggregate a large enough base of homeowners. The co-op can provide financing where municipalities are debt limited.
Financial Model & Governance	
Revenue Streams	Sale of aggregated units to an ESCO or a portion of the energy savings
Cost Structure	• Labour and operating costs • Marketing and outreach costs • Pre-feasibility assessments
Capacities, skills and resources	● Contract negotiation ● Pre-feasibility assessment ● Community stakeholder engagement and education ● Financing expertise ● EE industry networks and contacts

Case Studies	
Energiesprong	Energiesprong is an initiative in the Netherlands to aggregate individual EE projects under one portfolio to create a larger demand for equipment suppliers and constructors, that encourages large-scale investment and economies of scale. Energiesprong uses a whole house refurbishment approach to achieve net-zero that includes re-cladding, a switch out of the mechanical system and the addition of solar. To facilitate rapid deployment the process has been industrialized using pre-fabricated materials and off-site assembly. The initiative has primarily focused on the social housing sector in each market before expanding as the social housing sector offers access to large portfolios under a single-owner greatly simplifying the aggregation process. The initiative is now beginning to be implemented in North America, including British Columbia and Ontario.

Option#2: Project Development and Financing

Option	**Project Development and Financing**
Description	The co-op provides project development and delivery services for energy efficiency projects, providing an energy advisor to its members or customers to conduct EE audits or contracts a third-party to do so. The co-op helps to select EE measures, identify level of investment and savings to provide the payback period and identifies available EE subsidies. The co-op can provide financing through community bonds or preference shares. In addition, the co-op can provide resources, support, workshops, training and access to networks of suppliers and installers for its members throughout the EE retrofitting process and organize bulk purchasing.
Key Partners	• ESCos • Efficiency Capital • Municipalities and LDCs - Co-ops could partner with municipalities to offer project development and delivery services for its members looking to participate in municipal retrofit programs. For example, the City of Toronto's Energy Retrofit loan program requires a feasibility study, M&V plan and project management plan. The Co-op could provide these services or help members acquire these services in order to be eligible for the loan. Toronto's Home Energy Loan Program (HELP) program also requires a home energy assessment and an analysis of which measures to pursue which the

	co-op could provide as well. If other municipalities adopt similar programs such as LIC for EE, co-ops could provide EE consulting and support services. In the absence of LIC or programs co-ops could provide the financing for EE retrofits. • Sub-contractors, equipment suppliers, energy consultants: Co-ops may wish to partner with specific companies for equipment supply, installation and energy auditing services. For example, all Solshare projects in BC are developed and installed by their parent company Vancouver Renewable Energy Cooperative. Although this may detract from the value of providing transparent and unbiased advice to clients.
Customer Segments	Selection criteria: ● Buildings over 5 years old at least (10 years preferable) that have not had any major renos recently represent the greatest potential for energy savings ● Stable ownership ● In need of community capital ● No procurement rules or have exceptions for non-profits ● Buildings with large energy demands and/or simultaneous heating and cooling demands represent a good opportunity for heat recovery ● Bulk metered buildings or buildings with common areas Bulk metered buildings or buildings with common areas are good starting points for new market entry ● Low-rise MURBs are a sector overlooked in the industry Potential Off-takers: ● Social Housing Providers ● MURBs ● Individual homeowners ● Farmer Co-ops ● Long-term care facilities ● Arena and rec centres Some support for home energy assessments is provided by the IESO and LDCs however, co-ops can target residents that fall outside of these programs such as those that do not qualify as low-income or still use electric heating or can leverage these existing programs to improve the payback.

Value Proposition	***Building/Home Owners, Property Managers, Business Owners***	Co-op acts as a resource throughout the process conducting EE feasibility studies and audits, interprets results for program eligibility, calculates required investment and savings to produce payback time, assesses quotes from contractors, finds rebates, offers financing, provides EE training, advice, workshops. EE upgrades also increase the amount of solar production that can be fed into the grid to obtain net-metering credits. Bulk purchasing lowers cost and reduces payback time.
	Municipality	Co-op can offer financing if municipality doesn't want to take on debt or doesn't want to finance from internal funds as well as energy consulting and marketing for municipal LIC programs. Municipality can avoid committing resources.
	Community Investors	Opportunity to invest in sustainability and local economic development and earn a return
Financial Model & Governance		
Key Resources and Skills	● Staff and EE experts to conduct audits and provide consulting ● Energy modelling software ● Financial and legal expertise ● Marketing and communication (guidelines, brochures, online tools) ● Staff to provide support and resources to members General contracting	
Financing Options	● Grant Funding: rural development, neighbourhood regeneration, climate change, energy efficiency, federal budget funding ● Low Interest loans from credit union or municipality ● Community Bonds: Investors receive a return from resulting EE savings. Requires 3rd party energy saving guarantees and M&V services. ● LIC program: co-op and municipality could issue a shared loan 60/40 municipality/co-op	
Revenue Streams	● Fee-for-Service: Members or customers of the co-op pay individually for EE assessment. Free consultation could be included with the purchase of a share. If a LIC is in place municipalities are allowed to recover pro-rated administrative, marketing and other costs directly from participants, which is a potential revenue stream for co-ops. ● Equipment lease fees	
Cost Structure	● Labour and operating costs: salary of energy auditor and staff, management, marketing, sales ● Fees for energy modelling software	

Case Studies	
Carbon Co-op (Manchester, UK)	● Non-profit energy services and advocacy co-op ● Initially started as members pooling resources and bulk purchasing to achieve high levels of energy efficiency in their housing, now provides services such as whole house retrofits, energy assessments and audits, cost-benefit analysis of renovations, and advice, resources, training, a network of installers and suppliers. Its objectives are to develop a comprehensive approach towards whole house retrofits that is community-orientated. ● Partnered with URBED (a limited company with cooperative rules, and managed by its employee members) to provide home energy assessment tools and methodologies to its members, developed an app for easily understanding home energy assessments, carries out research, organizes workshops. ● As a mutual model, it benefits from being controlled by those it provides services and advice to. This helps it to overcome the trust issues that often pose an obstacle with respect to consultations provided on home improvements. This structure also establishes a platform to facilitate a peer-learning among its members. For example, in whole house retrofits, experts are able to share knowledge about which measures work best, and what the process actually involves with those who follow-on from them.
Meadows Ozone Energy Service (MOZES)	● Community owned ESCO (incorporated company) formed to address fuel poverty and climate change in the Meadows neighbourhood in partnership with the local regeneration organization Meadows Partnership Trust (MPT) and Nottingham Energy Partnership (NEP), an independent fuel poverty charity ● MPT provided huge early stage support running projects and managing finances. NEP was chosen as the lead energy consultant and acted created the carbon and energy baseline for the neighbourhood and proposed a range of programs ● Received government funding from rural affairs ● National Energy Action (NEA) a fuel poverty charity commissioned and paid for a law firm to conduct a feasibility study ● Activities: ○ Hired an energy advisor for home energy assessments. Funded from a 20,000 pound award from a charitable organization NESTA and Scottish Power Energy People's Trust. Service is currently discontinued due to lack of finance

	○ In partnership with British Gas installed solar panels on 65 homes at no cost to the residents with 500,000 pounds received from Department of Energy and Climate Change. Excess solar is fed back into the grid for a fixed rate which is collected by MOZES to finance their activities ○ In partnership with the local credit union, developed a low-interest green loan scheme to finance energy saving improvements including EE measures and solar panels ○ Won a grant to install EE measures ○ Held energy saving information and education workshops ○ Participating in research project for community energy storage in conjunction with home solar to store solar production to offset later consumption, and energy sharing/selling between homes. ○ Developing a network of green champions to raise awareness throughout the community through energy efficiency and behavioural change training provided by National Energy Action
Pajopower	• Pajopower is a renewable energy sources cooperative (REScoop) based in Flanders, Belgium. The cooperative was founded in 2014 as a Belgian cooperative that aims to support sustainable development in Belgium. The cooperative provides consultancy services by means of independent energy experts who conduct energy audits upon request. These audits serve to better inform retrofit projects by prioritizing the energy efficiency measures required for specific buildings/homes. The cooperative issues shares and invests in renewable energy and energy efficiency projects in "hetPajottenland" and "de Zennevallei", two regions South of Brussels. All citizens are eligible to join the cooperative. After purchasing a share, citizens become co-owners of the projects and share in the profits. Pajopower reaches out for both local citizens and local municipalities and helps them to improve the energy efficiency of their buildings, thereby helping them to reduce GHG emissions and reach their climate change targets.

Option #3 Community Energy Efficiency Equipment Leasing

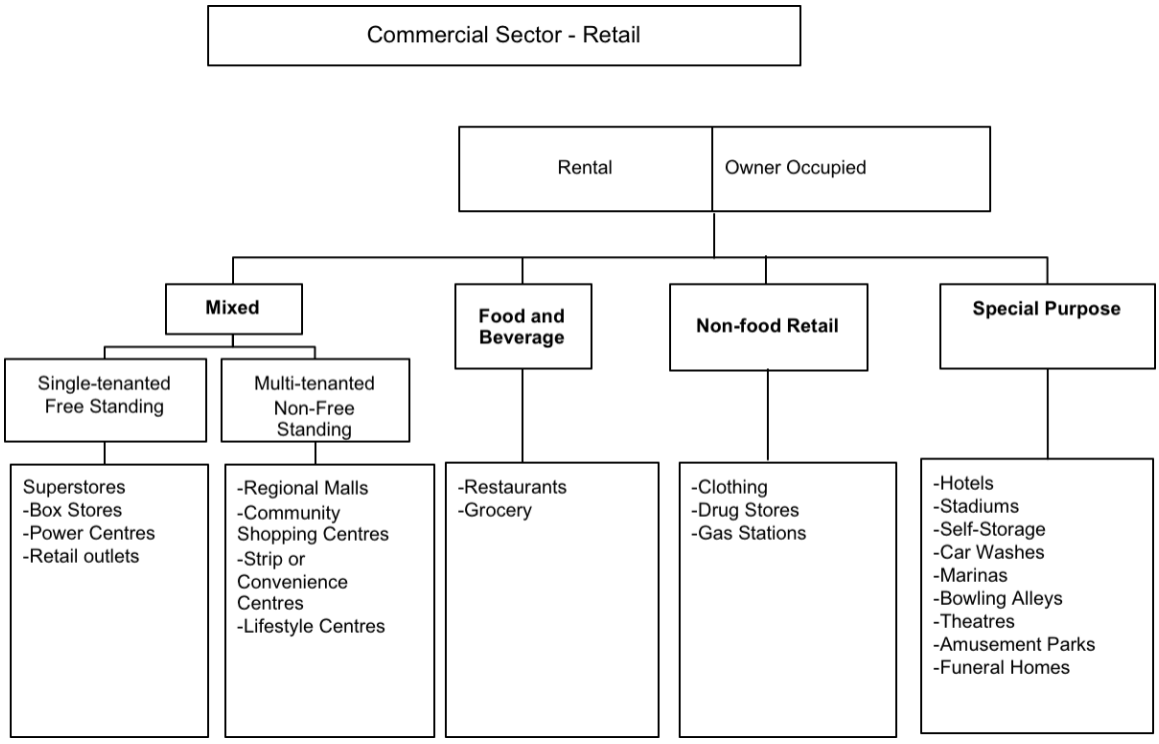
Option	**Community Energy Efficiency Equipment Leasing**
Description	The co-op can run an EE equipment leasing and bulk purchasing program with third party energy saving guarantees for its members and/or customers in the wider market, as well as provide financing and advice.
Key Partners	• Energy consulting companies • EE equipment providers • ESCOs • Engineering firms
Customer Segments	• Co-op members • Low-rise MURBs • Commercial buildings • Community Centres
Value Proposition	• Provides no money down option for building/home owners • Co-op takes project development, performance and finance risk
Financial Model & Governance	
Co-op pays for EE installations in members' homes. Co-op owns the asset and receives rental revenue from homeowner. Investors are repaid from revenue over the course of the lease agreement.	
Revenue Streams	• Lease payments
Cost Structure	• Labour and operating costs: management, marketing, sales
Case Studies	
Coenergy (Ottawa, Ontario)	• Multi-class service group with community members as investors and consumer members are those that benefit from EE services and equipment leasing • Originates projects and finances EE retrofits through preference shares. Coenergy purchases the EE equipment and leases it to the consumer member. Energy savings are guaranteed by a third-party. Revenue is generated from the lease payments. Looking to conduct EE upgrades in common areas of non-profits, MURBs, long-term care facilities and community centres (arenas, rec centres).

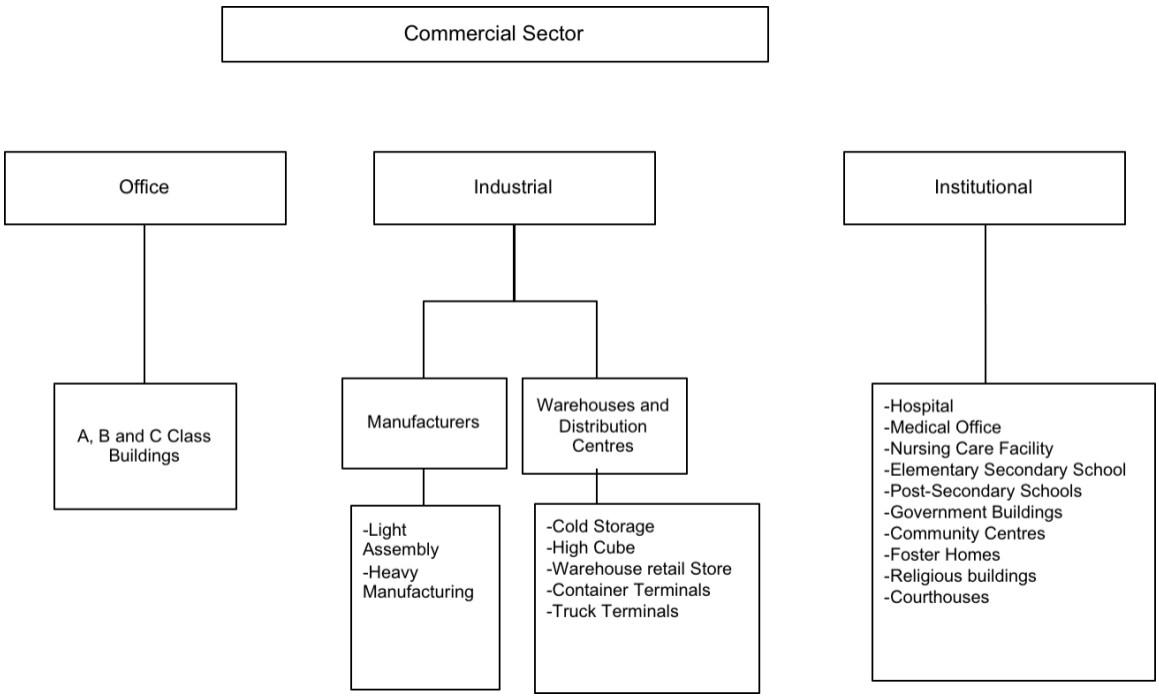
Option#4: ESCo Facilitation

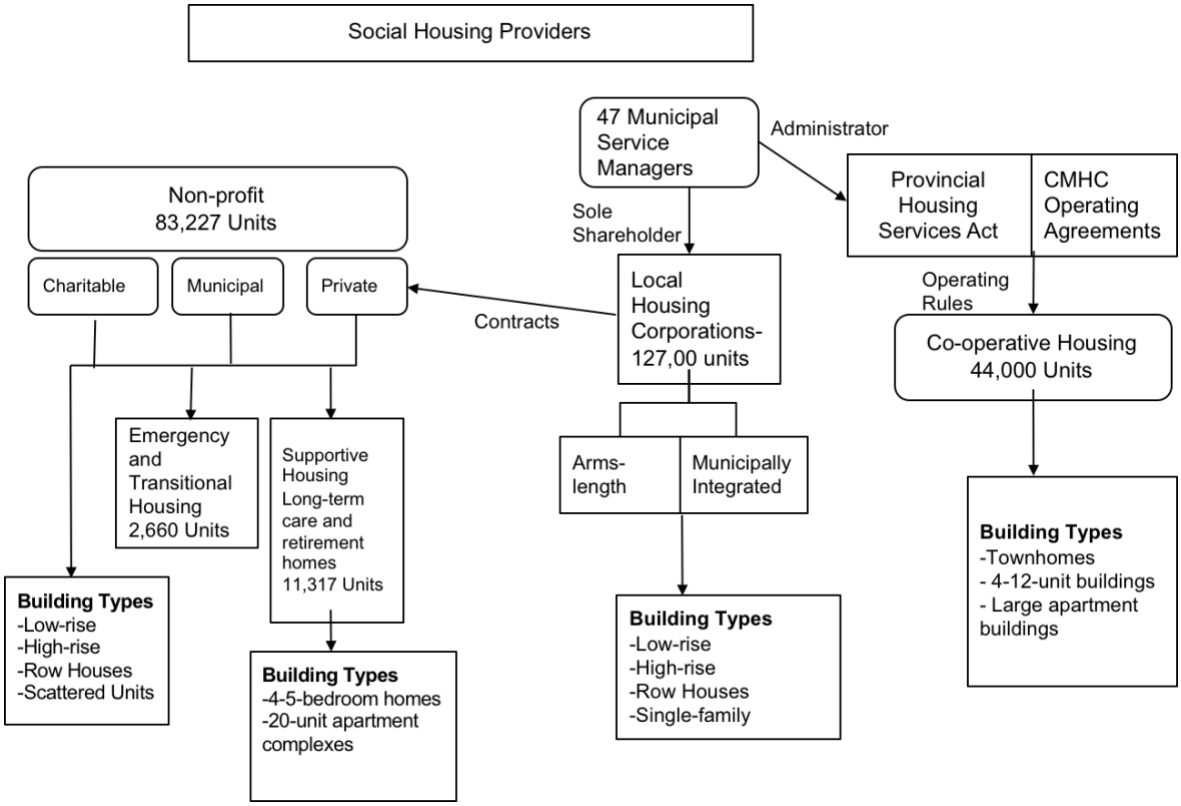
Option	ESCo Facilitation
Description	As an ESCO facilitator the co-op acts as a consultant, project manager and trusted advisor for procurement of comprehensive energy service packages. The ESCO facilitator represents their client all the way through to the service delivery and operation period, representing the client during the construction phase if any problems or disputes should arise and acting as an independent third-party assessor throughout the process. The ESCO facilitator conducts pre-feasibility study and life-cycle cost evaluation to define project scope and to determine if and how the project should move forward. The co-op's role is to facilitate communication and coordinate between stakeholders. The co-op can still play the role of project origination and aggregation as well as offering a financing option for the client. Facilitators can also play an important role in building consensus by holding workshops with clients, presenting the energy data and visualizing the cost/energy savings potential.
Key Partners	• EScos
Customer Segments	• Social Housing Providers • Commercial building owners • Condominiums
Value Proposition	• Demand for ESCOs is often hampered by lack of awareness, knowledge and trust in ESCOs. Project facilitators remove uncertainty associated with ESPC process from building owner, provides access to financing, resources, negotiation, and experience. • A partnership between two co-ops or non-profits could increase trust as they both share similar values and objectives as manifested in the co-op/non-profit structure. This may help in building consensus between unit holders to allow for more comprehensive EE upgrades in individual units rather than just targeting common areas.
Financial Model & Governance	
Capacities, Skills and Resources	• Project management skills • Financing and budgeting expertise • Procurement program design RFQs, and RFPs • Contract negotiation • Life-cycle cost evaluation

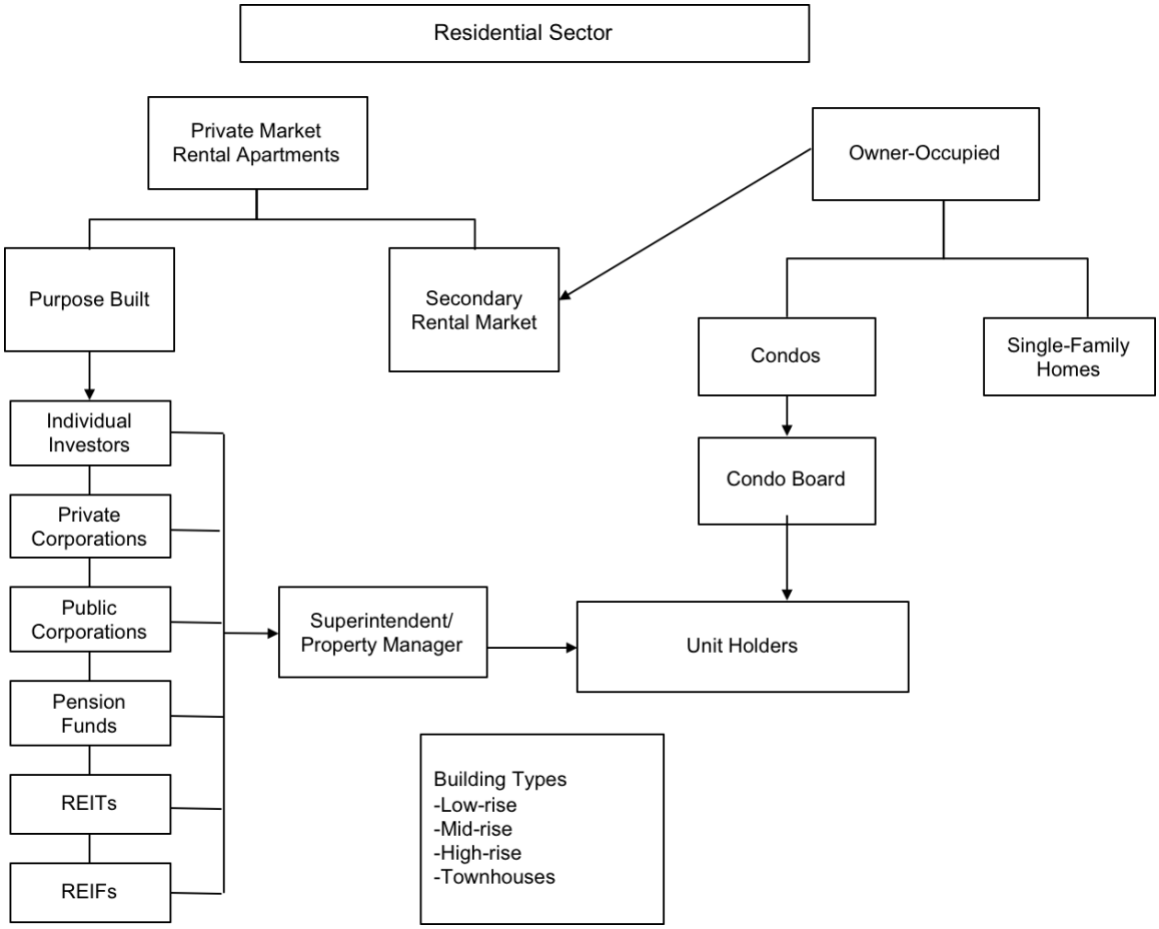
Revenue Streams	● Fee for service from client ● A portion of remuneration could come out of energy saving or be integrated into total project costs
Cost Structure	● Labour and operating costs: management, marketing, and sales ● Salary of facilitator
Case Studies	
EU Project Facilitators - Berlin Energy Saving Partnership for Energy Efficiency in Buildings	● Partnership between Berlin Energy Agency, and City of Berlin to facilitate energy retrofits in large public and commercial buildings ● Berlin Energy Agency is an energy services company operating in Germany and abroad consisting of a public-private partnership of the federal state of Berlin, the government development bank KfW Bankengruppe, and private stakeholders (Vattenfall and GASAG Berliner Gaswerke). Facilitates retrofits by arranging ESPC between pools of buildings and ESCOs ● Senate Administration of Berlin, Division for Climate Protection coordinates the partnership and provides technical and financial assistance to building owners seeking help in issuing tenders for retrofits ● Must guarantee ownership of the building for 10 years. Cannot sell building during time frame of contract. ● Minimum energy bill of $307,000 USD needed. Can pool multiple buildings to reach this level if they have the same owner and are managed by the same administrator ● Main clients have been pubic authorities (75%), hospitals and trade (20%), commerce and housing associations (5%)

Appendix A: Market Segment Maps




Commercial Sector
Office
Industrial
Institutional
A, B and C Class Buildings
Manufacturers
Warehouses and Distribution Centres
-Light Assembly
-Heavy Manufacturing
-Cold Storage
-High Cube
-Warehouse retail Store
-Container Terminals
-Truck Terminals
-Hospital
-Medical Office
-Nursing Care Facility
-Elementary Secondary School
-Post-Secondary Schools
-Government Buildings
-Community Centres
-Foster Homes
-Religious buildings
-Courthouses


Social Housing Providers
47 Municipal Service Managers
Administrator
Provincial Housing Services Act
CMHC Operating Agreements
Sole Shareholder
Operating Rules
Non-profit 83,227 Units
Charitable
Municipal
Private
Contracts
Local Housing Corporations- 127,00 units
Co-operative Housing 44,000 Units
Emergency and Transitional Housing 2,660 Units
Supportive Housing Long-term care and retirement homes 11,317 Units
Arms-length
Municipally Integrated
Building Types
-Low-rise
-High-rise
-Row Houses
-Scattered Units
Building Types
-4-5-bedroom homes
-20-unit apartment complexes
Building Types
-Low-rise
-High-rise
-Row Houses
-Single-family
Building Types
-Townhomes
- 4-12-unit buildings
- Large apartment buildings


Residential Sector
Private Market Rental Apartments
Owner-Occupied
Purpose Built
Secondary Rental Market
Condos
Single-Family Homes
Individual Investors
Private Corporations
Public Corporations
Pension Funds
REITs
REIFs
Condo Board
Superintendent/ Property Manager
Unit Holders
Building Types
-Low-rise
-Mid-rise
-High-rise
-Townhouses

Appendix B: The Split Incentive Problem

A split incentive is any situation where benefits of a transaction does not accrue to the actor who pays for the transaction[23]. In the context of EE, the split incentive has to do with a mismatch between who makes the capital investment and who accrues the benefits, which can ultimately result in inaction. Investment costs of EE are part of capital expenses whereas the financial benefit occurs in the form of reduced energy bills on the operational expenses. Therefore, if the actor in charge of capital expenses (the building owner) is not the same as the actor who receives the financial benefits (the tenant) a split incentive arises. The different types of split incentives are as follows:

Efficiency-related split incentives (ESI): An ESI occurs when the end user pays the energy bill, but has limited power in their ability to choose the technology needed to improve EE. The landlord-tenant dilemma in rental housing and commercial leasing is an example of this. In these cases, the building owner lacks the incentive to invest because they will not reap the benefits of the energy savings and often cannot capitalize the upgrades into higher rents due to uncertainty over the impact of the upgrade on the property value and lack of experience on rent premiums[24]. ESIs can also occur in new builds where the property developer's main concern is to reduce construction costs and does not have an incentive to invest in measures that will reduce the operating cost of the building when it is sold to a new owner. Although, there is marketing value to this.

Usage-related split incentives (USI): USIs occur when occupants are not responsible for paying their utility bills and therefore have no incentive to conserve energy.

Multi-tenant, multi-owner split incentives (MSI): MSIs occurs in building with multiple owners or tenants such as condominiums where EE projects can only be realized if consensus between all decision-making parties can be reached. The occurrence of this problem depends on if EE improvements are proposed for the entire building or just for common elements.

Temporal Split Incentive (TSI): TSIs occur when the EE investment does not pay off before the property is transferred to the next owner or occupant.

[23] European Commission. (2017). Overcoming the split incentive barrier in the building sector. JRC Technical Reports.

[24] European Commission. (2017). Overcoming the split incentive barrier in the building sector. JRC Technical Reports.

To bypass the split-incentive problem EE retrofits can be targeted at common areas, which requires dealing only with the co-operative or condo boards rather than individual unit holders. This also reduces transaction costs and does not require consensus of all the unit holders. This provides a good starting point for RE co-operatives new to the EE business due to the easier implementation.

Overcoming the split-incentive problem requires a more complex approach and for agreement to be reached between the landlord and tenants. In Ontario, the USI and TSI problems are the most common as most MURBs are bulk metered, meaning that there is one meter for the entire property putting the responsibility on the building owner to pay the utility bills. The building owner can recover these costs through the rent or can sub-meter individual units to better allocate costs per individual usage. Bulk metering may make it slightly easier to implement EE retrofits in these buildings as the building owner can reduce operational costs and improve their ROI, and value of their property. However, in the long-term a change to individual metering is needed in order to develop innovative rental structures to encourage EE upgrades. Individual metering usually results in reduced energy consumption as occupants receive direct feedback on their consumption which can alter habits, whereas in a bulk-metered building, the tenant does not have any financial incentive to implement behavioural changes that may be required by the newly installed equipment to maximize the savings potential.

Individual meters can also make the ESPC process easier by allowing easier and more detailed monitoring of performance to establish baselines based on actual performance rather than predicted performance. With direct feedback from the meters, the landlord and tenant can agree upon a set of comfort conditions such as indoor temperature in the winter. All costs of energy could be included in the rent but the direct feedback would allow the tenant to be compensated if they consume less or pay more if they exceed the pre-set consumption levels. Other solutions to the split-incentive problem need to occur at the regulatory level such as minimum performance levels in rented units, revisions in rent and condominium acts, and energy labeling.

Energy Efficiency Funding Sources

Program Name	Fund Administrator	Description	Eligibility	Program Budget	Link
Green Municipal Fund Study: Retrofit of Community Projects	FCM	Funding for EE retrofit feasibility studies with 10% energy use reduction potential, including on-site RE/storage	Municipalities and their project partners	50% of eligible costs up to $175,000	https://fcm.ca/en/funding/gmf/study-retrofit-community-projects
Green Municipal Fund Pilot Projects: Retrofit of community projects	FCM	Funding for EE retrofit pilot projects with 10% energy use reduction potential, including on-site RE/storage	Municipalities and their project partners	50% of eligible costs up to $350,000;	https://fcm.ca/en/funding/gmf/pilot-project-retrofit-community-projects
Green Municipal Fund Capital projects: Retrofit of community projects	FCM	Funding for EE retrofit feasibility studies with 10% energy use reduction potential, including on-site RE/storage	Municipalities and their project partners	Low-interest loan up to $5 million and a grant up to 15% of the loan; covers up to 80% of eligible costs. -High-ranking projects: low-interest loan up to $10 million and grant up to 15%; 80% of eligible costs	https://fcm.ca/en/funding/gmf/capital-project-retrofit-community-projects

IESO Conservation Fund	IESO	Funding for new program, tool, training program, community of practice, strategic research, emerging technology demonstration, or strategic opportunity in EE, demand response, conservation behavior, load reduction, load displacement, efficient electrification or system integration	Non-profit and for-profit entities	$100,000 to $500,000 depending on project type or 75% of project costs	http://www.ieso.ca/Get-Involved/Funding-Programs/Conservation-Fund/Projects-Funded

Ministry of Energy AffordAbility Fund	AffordAbility Fund Trust		Customers who do not qualify for low-income conservation programs.	Provides free lighting, appliance and insulation/weather stripping upgrades, as well as in home visits from a Home Energy Advisor. Electrically heated homes can receive a heat pump.	https://www.affordabilityfund.org/
Save on Energy	IESO	Rebates and free EE upgrades and home energy assessment for low-income	Rebates: Must use participating contractor Home Assistance for low-income provides free upgrades and assessment	Up to $850 for furnace and AC upgrades, $4000 for air source heat pump;	https://saveonenergy.ca/en/For-Your-Home/Home-Energy-Rebates
Save on Energy: Energy Manger	IESO	Funding to hire full-time Energy Manager			

Save on Energy: Existing building commissioning	IESO	Funding to hire an expert to analyze chilled water system, buy and install metering equipment and implement upgrades			
Energy Efficient Housing Program	Genworth		Must be user of Genworth mortgage insurance purchasing an EE home or EE improvements	Refund up to 25% on insurance premiums	https://www.genworth.ca/en/products/energy-efficient-housing.aspx
Affordable Housing Program	Enbridge	Up to $100,000 in incentives to affordable housing providers for retrofits			
Toronto Energy Retrofit Loans		Loan at cities rate of borrowing for up to 100% of costs of retrofit. Max. 20 year payback	Eligible buildings: academic, social, healthcare, industrial, commercial sector,		

			privately owned buildings and condos and non-profits. Not individual units. Must have completed feasibility study, project summary, project management plan, and M&V plan.		
Home Energy Loan Program		Low-interest loan up to 75,000. Repaid through property tax	Owner of detached, semi-detached or row house. Needs mortgage lender consent		https://www.toronto.ca/services-payments/water-environment/environmental-grants-incentives/home-energy-loan-program-help/
Union Gas Home Reno Rebate		Rebates for upgrades and assessment		Up to $5,000	

Union Gas Home Weatherization		Upgrade and energy assessment to homes with low insulation		Free	

Sources:
http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/policy_e/results.cfm?searchType=default&sectoranditems=all%7C0&max=10&categoryID=all&regionalDeliveryId=7&programTypes=4&keywords=&pageId=1