C3 - Energy. Ideas. Change.

ENERGY EFFICIENCY FUNDING AND ADMINISTRATION OPTIONS FOR ALBERTA

Analysis by C3 for Discussion

September 2012

Foreword

Over the last 12 years in partnership with government, municipalities, and business, C3 has accumulated substantial practical knowledge about helping Albertans conserve energy, become more energy efficient, and switch to cleaner fuels. This practical knowledge is reinforced by C3's energy-economics modeling tools, best practice program development and evaluation frameworks, and other related research.

Specific C3 research complementing the attached paper includes:

- The Conservation Potential Review modeling tool, which calculates the magnitude and sources of potential cost-effective energy-efficiency improvements in Alberta's residential, commercial, and institutional buildings, along with associated benefits such as emissions reductions and energy cost savings;
- The Economic Impact Analysis model, which quantifies the net direct, indirect, and induced economic effects of specific energy-efficiency initiatives on Alberta's economy;
- The Energy Efficiency Best Practice Planning Framework, which describes key concepts, methods, and main steps for designing, implementing, and evaluating bundles of energy-efficiency measures, programs, and policies. It also provides direction for integrating these into an overall resource planning framework consistent with government objectives. The planning framework draws on more than a decade of C3's experience with successful energy-efficiency programming. It incorporates best practices from Canada and the United States; and
- Research into potential energy-efficiency funding and administration options for Alberta which considers alternative funding options that may better tap into the energy-efficiency potential of the province, as well as options for governance and administration of measures, programs, and policies.

C3's investigation of potential funding and administration of measures, programs, and policies to improve energy efficiency in the province consists of two phases: The focus of Phase 1 is to provide evidence of why a new funding approach is required for Alberta, and to present the range of available funding and administration options. Phase 2 will evaluate those options to identify the most beneficial approach for Alberta. The attached paper summarizes the first of these two phases.

C3 has approached the issue assuming any new funding and administration approach should be applicable to electricity, natural gas, and refined petroleum product use across the industrial, commercial, residential, and transport sectors, as well as communities (encompassing aspects from each sector) – ultimately, the scope of any new funding and administration structure will be at the discretion of government decision–makers. In addition to outlining the main funding and administration options, we suggest potential criteria for appraising these options. To provide context for appraising the various funding and administration options, we also provide a review of pertinent aspects of Alberta's energy system and current approaches to the funding and administration of energy-efficiency measures, and programs in the province.

However, in the attached paper we do not go as far as appraising the strengths or weaknesses of any particular option vis-à-vis the suggested criteria. As part of a follow-on second phase, C3 considers that further, in-depth analysis, complemented by fulsome stakeholder dialogue, is required to determine the best approach to energy-efficiency funding and administration in the province.

1.0 Executive summary

Even within an energy-rich jurisdiction such as Alberta, improving the efficiency of our energy system is an important economic, environmental, and social opportunity. The province has sizeable, cost-effective – yet untapped – energy efficiency opportunities in its residential, commercial, and institutional buildings, and in the transportation and industrial sectors. There is a strong correlation between realizing improved outcomes and funding and administration options. This paper identifies, for consideration, various funding and administration options that could be applied in Alberta's unique energy system.

Although the paper does not take a position on the benefits or drawbacks of any one approach or combination of approaches, it suggests that a modified combination of both funding and administrative mechanisms likely will be required if opportunities are to be captured and Albertans are to make meaningful improvements in how efficiently they use energy.

Governments, including the Government of Alberta, may seek to improve energy efficiency for several reasons. Improving energy efficiency would increase the productivity and competitiveness of the province's economy. It would contribute to the postponement or avoidance of costly infrastructure such as power stations, transmission and distribution lines and facilities (and related regional siting conflicts). It would reduce Albertans' exposure to spikes in energy prices; seed new businesses; support jobs; stimulate technological innovation; and boost the financial position of households, businesses and industry; and reduce environmental impacts.

Given the scale of these potential benefits, it is reasonable to ask why households and business are not implementing financially attractive energy-saving measures and practices to seize the opportunities.

There are several frequently cited barriers and market distortions that mean energy efficiency improvements opportunities are often ignored. These barriers and market distortions affect the supply of, and demand for, energy-saving and conservation technologies and practices.

The Government of Alberta has an array of policy options at its disposal (e.g., financial and non-financial incentives, regulations) to encourage businesses and individuals to become more energy efficient. In simple terms, the government can look to achieve an effective balance between helping the energy service industry increase the supply of energy-saving measures, and increasing the demand for these measures among energy consumers.

Stable, adequate, long-term funding in support of these policy options is also crucial. This helps ensure policies and associated actions maintain momentum so energy efficiency measures and practices can reach a 'tipping point' in their respective markets, after which they become the market standard and energy savings become persistent (in the absence of further government intervention). Transforming energy markets takes time. To permanently change behavior over an entire sector, such as commercial buildings, stable, adequate, long-term funding facilitates longer planning horizons and removes investment uncertainty for key actors.

Multiple funding mechanisms are used in other jurisdictions across North America and could be considered for application in Alberta to achieve the desired level of investment in energy efficiency initiatives. A typical funding mechanism – applicable to residential, commercial, institutional, and industrial energy efficiency improvements – may consist of up to five major elements: capital sources; an administrator(s); repayment vehicles (e.g., monthly credit bill, on-bill tariff, property tax assessment); credit enhancements (e.g., loan loss reserve, loan guarantee, credit insurance); and security (e.g., utility meter, tax-lien, equipment).

The capital sources and the administrator are of particular importance and are the focus of this paper.

In other jurisdictions, capital for energy efficiency is sourced mainly from:

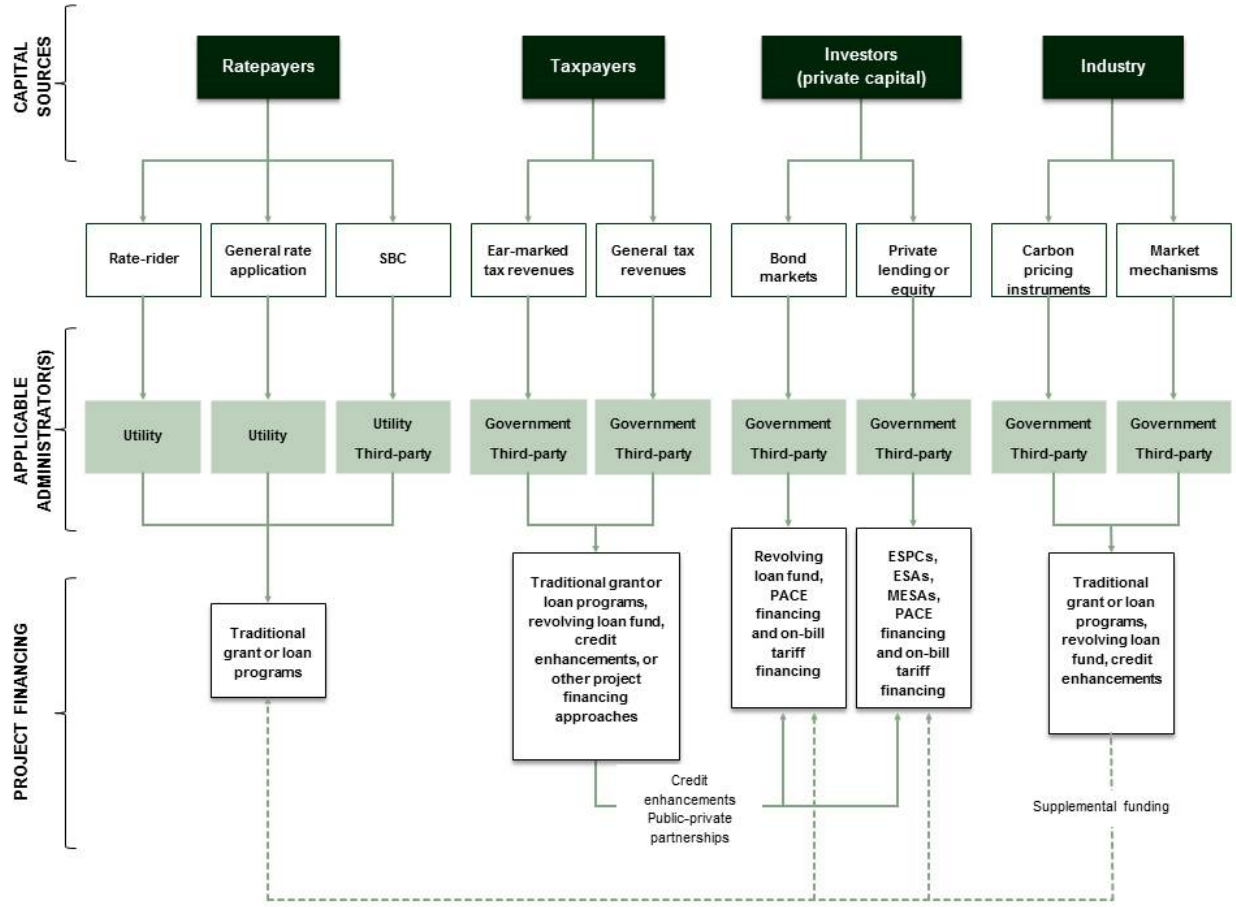
1. *Taxpayers,* through (a) general tax revenues or (b) earmarked tax receipts (e.g., sale of commodities, tobacco and alcohol products);
2. *Ratepayers*, through a separate, dedicated surcharge or system benefits charge (SBC); a general rate application; or some other rate-based mechanism (e.g., Medicine Hat's energy conservation charge);
3. *Industry*, through local, provincial, or regional market-based or regulatory mechanisms (e.g., the Climate Change and Emissions Management Corporation) ;
4. *Investors*, though bonds or private lending or equity (e.g. Alberta Capital Bonds, Alberta Savings Certificates,); or
5. Some combination of the above.

An administrator encompasses all roles required for designing, planning, implementing and the ongoing management, monitoring and evaluation of energy-efficiency initiatives. The role can be filled by a number of actors, including the traditional administrators of large-scale energy efficiency programs – utilities, independent third parties, government departments or agencies – and various hybrids of these. Administrators can also include private financial institutions, such as national or regional banks or credit unions, and for-profit third parties (like ESCOs) – particularly for lending programs in niche markets)

Possible combinations of approaches to funding and administration that plausibly could be applied in Alberta are summarized in Figure ES 1. To help Alberta successfully become the national leader in energy efficiency and sustainability, C3 believes the identification of the best overall approach from the myriad of options should be informed by all key stakeholders, including the Government of Alberta. As a starting point for wider consultation on the options presented herein, the paper also presents a set of commonly accepted criteria against which the options could be appraised by stakeholders, along with some key questions that need to be addressed by stakeholders going forward.

C3 looks forward to discussing with the Government of Alberta and other stakeholders how best to inject the research and knowledge summarized in this paper into discussions relating to the development of a provincial and national energy efficiency and resource sustainability strategy.

Plausible funding and administration options for energy efficiency initiatives in Alberta



2.0 The energy-efficiency opportunity in Alberta

Energy efficiency is an important economic opportunity for Alberta. It improves the productivity and competitiveness of our economy; postpones or avoids the need for additional costly infrastructure such as power stations, transmission, and distribution lines (and related regional siting conflicts); reduces our exposure to spikes in energy prices; seeds new businesses; supports jobs; stimulates technological innovation; boosts the financial position of households, businesses, and industry; and reduces environmental impacts.

Recognizing such potential benefits, the Government of Alberta, C3, and other stakeholders have collaborated to help Albertans become more energy efficient. Much has been achieved; yet, there remain meaningful opportunities for cost-effective energy-efficiency improvements as well as opportunities to conserve energy and switch to cleaner fuels.

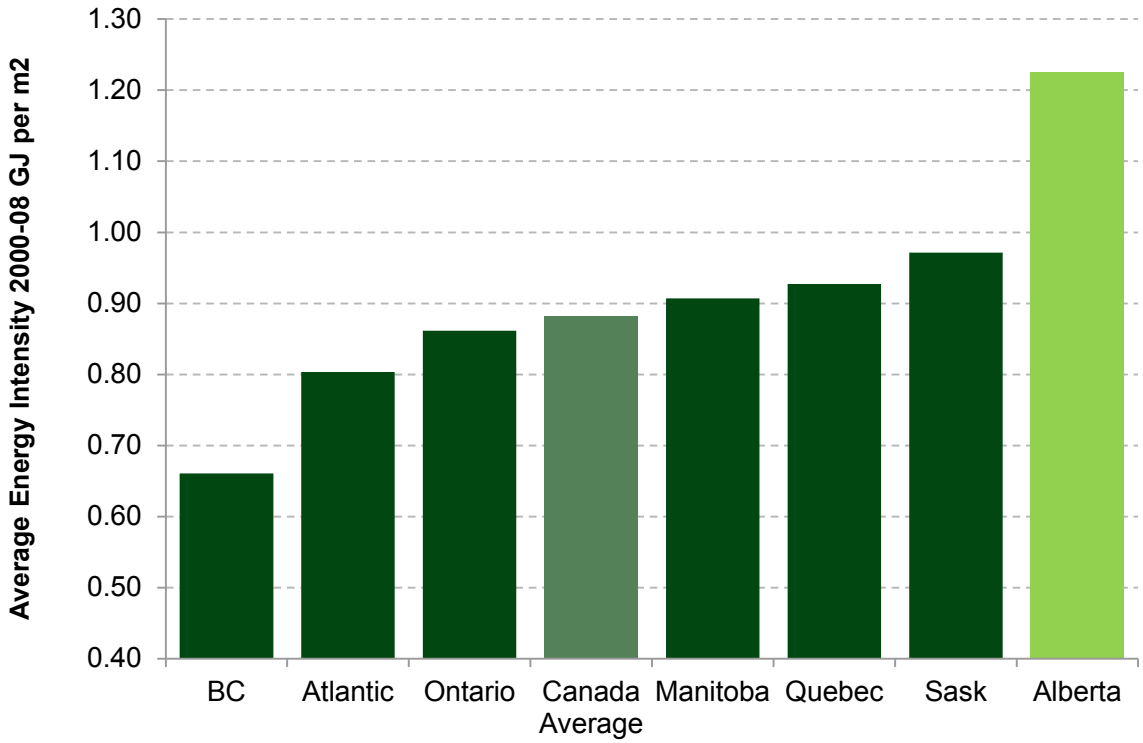
How large might the potential energy cost and GHG savings be from realizing these opportunities? What level of investment would be required to capture them? What are the most cost-effective opportunities to pursue? Government-sponsored research is underway on these questions. C3's commercial and residential buildings-related Conservation Potential Review (CPR)[1], published in early 2012, answers some of these questions and demonstrates that Alberta has abundant untapped cost-effective opportunities to improve energy efficiency (Boyd, R., Gorecki, K., 2011).

Energy intensity in Alberta's homes, for example, is significantly higher than it is in other provinces. During the period 2000-2008m energy consumption in Alberta's homes averaged 1.23 GJ/m^2. This level of consumption was 26 per cent greater than in our prairie neighbour, Saskatchewan; 85 per cent higher than in the best-performing province, British Columbia; and nearly 40 per cent higher than was the average for Canada (see Figure 1). If action is not taken to improve the energy efficiency of Alberta's homes, and if historical trends in energy intensity across all provinces continue, the gap between Alberta and the rest of Canada will widen. By 2015, the difference between Alberta (without additional improvements of historical tends) and the projected best performing province could be as high as 45 Petajoules (PJ) – the equivalent of the energy consumption of over 303,000 more households[2] per year.

[1] The Conservation Potential Review for buildings was published in January 2012 and is available through C3's website (www.C-3.ca). http://climatechangecentral.com/files/attachments/DiscussionPapers/C3_Conservation_Potential_Review.pdf

[2] The consumption of each household was based on 2009 figures.

Figure 1 Average energy intensity of homes in Canada, by province / region (2000-2008)



The performance of buildings in Alberta's commercial–institutional sector is better than that in the residential sector, but room for improvement exists. During the period 2000-2008, average energy consumption per unit of commercial-institutional floor space in Alberta was similar to the Canadian average. By 2015, however, under a business-as-usual (i.e., with no additional improvements) scenario, the gap between Alberta and the best-performing province could be as high as 25 PJ per year.

A significant proportion of the differences between Alberta and the best performing other provinces could be closed through investment by Albertans in a range of cost-effective energy-efficiency measures.[3] An investment of $326 million[4] annually by private individuals and businesses by 2015 would realize the full cost-effective potential for energy-efficiency improvements in the residential, commercial, and institutional buildings in the province. It would reduce business-as-usual energy consumption by 13 per cent, or 52 PJ, driving down annual energy costs by $662 million and averting annual GHG emissions of 3.66 megatonnes (Mt).

[3] Energy efficiency measures are defined as an act, design, or technology that reduces energy use relative to a baseline. An energy efficient measure is cost–effective if its life–cycle costs (including the dollar value of energy savings) are less than the life–cycle costs of the baseline measure.

[4] All figures are in Canadian dollars unless otherwise noted.

While C3 has not completed comprehensive conservation potential reviews for Alberta's transportation and industrial sectors, studies point to the likelihood of significant cost-effective energy-efficiency opportunities in these sectors, too.[5]

[5] For example, Canadian Manufacturers & Exporters – Alberta Division, Marbek & Stantec Consulting, *Improving Energy Efficiency for Alberta's Industrial and Manufacturing Sectors*, May 2010; and McKinsey & Company, *Unlocking Energy Efficiency in the US Economy,* July 2009.

3.0 To seize Alberta's energy-efficiency opportunity

Given the scale of potential benefits, it is reasonable to ask why households and businesses are not implementing all cost-effective measures to seize the opportunities.[6] All these measures look to save more money than they cost; the most cost-effective energy-efficiency measures have rates of return around 10 (for every dollar spent you save $10 in energy supply costs!).

A number of barriers and market distortions are frequently cited as causes of the untapped potential for energy-efficiency improvements.[7] These barriers and market distortions affect the supply of, and demand for, energy-saving and conservation technologies and practices. For instance, one barrier, cited by homeowners, is a lack of money. In a recent C3 survey 62 per cent of Alberta households polled agreed that lack of money to purchase energy-saving measures was a significant barrier to becoming more energy efficient at home.[8]

The presence of market imperfections provides a rationale for public policy to help energy product and service markets work better, if doing so results in an improvement in the overall well-being of Albertans. Households in Alberta believe it would. A full 81 per cent of respondents to the C3 energy use survey said they would be more likely to make their homes more efficient if there were programs of rebates, discounts or other forms of financial assistance to help with the purchase or installation costs (See a summary of survey results here.)

It is important to recognize that addressing energy-efficiency-related barriers and market distortions is about much more than just rebates – the predominant policy response in Alberta to date.

3.1 Addressing barriers to energy efficiency through government policy

The government has an array of policy levers at its disposal to help businesses and individuals become more energy efficient. Government can look to increase the supply of energy-saving measures, increase the demand for these measures, or achieve a balanced combination of the two. Supply-side policies focus more on 'invention' (basic and applied research and

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[6] Although many examples used throughout this discussion is commercial and residential buildings, the funding options apply to energy efficiency in all sectors, including the industrial and transportation sectors.

[7] These include *inter alia*: ❶ informational barriers – a lack of awareness of energy efficiency measures by individuals and business; ❷ financial barriers – difficulty accessing money for the up–front costs of an energy efficiency investment; ❸ capacity barriers – a lack of technical know–how to install and maintain energy efficiency technologies; ❹ split–incentives – a disconnect between those responsible for recurring monthly costs (the tenant) and those responsible for investment costs (the landlord); ❺ average cost pricing – average cost pricing by utilities as opposed to marginal cost pricing.

[8] The C3 Energy Use Survey was conducted in 2011 with 3,009 respondents. Highlights of the survey results, published in November 2011, are available through C3's website (www.C-3.ca).
http://issuu.com/c3-energy.ideas.change./docs/c3_energy_use_survey

development, and demonstration projects) to help bring new technologies or practices to market at the required speed and scale. Supply-side policies focus on helping new energy saving measures enters the market. By contrast, demand-side policies focus more on increasing market adoption of those measures, and other existing measures that already make commercial sense.

Policies to increase the adoption of energy-efficient measures generally fall into one of three categories:

1) Direct regulation (or command-and-control mechanisms), which mandate, – by law, specific levels of energy efficiency. Examples of direct regulation include building codes and equipment or appliance standards;
2) Market-based mechanisms, which use price signals to encourage individuals and businesses to adopt energy-efficient measures. Examples of market-based mechanisms include carbon taxes, emissions trading arrangements, and other financial incentives, such as targeted subsidies); and
3) Complementary policies or support mechanisms which address additional barriers to energy efficiency (such as programs to overcome informational barriers).

The best portfolio of public policies to increase demand for energy efficiency will depend on numerous factors, including:

- The specific barriers and market distortions that are impeding the adoption of the target energy-efficiency measures;
- The business-as-usual level of adoption by households and businesses;
- The degree to which cost-effectiveness varies throughout the market; and
- Government (and public) preferences for policy options.

To date, the Government of Alberta's preferred approach has been to help markets work better, rather than to impose direct regulation. In the context of helping households and businesses become more energy-efficient, this has meant providing programs that offer targeted technical and informational services, and financial incentives to help decision-makers overcome key barriers inhibiting the take-up of suitable technologies and practices. It also has meant using emissions trading to price negative externalities such as GHG emissions which, in turn, raises the price of carbon-intensive goods and services, and increases the financial attractiveness of energy-efficient measures.[9]

[9] Discussion of Alberta's emission-trading scheme – implemented through the Climate Change and Emissions Management Act – is beyond the scope of this paper, except to say that the higher the carbon price the more energy efficiency improvements become financially attractive to households and businesses.

Nonetheless, all forms of policies have important roles to play in cost-effectively improving energy efficiency; some market barriers cannot be effectively addressed through only one type of policy approach. Indeed, intelligent and timely direct regulation, financial and non-financial incentives, and complementary policies are all needed to most effectively encourage energy efficiency in the province. Each initiative addresses specific barriers to the development and up-take of energy savings measures, targets specific market segments, and has its own benefits and drawbacks that need to be appraised on a case-by-case basis. C3 is currently appraising the costs, benefits, and environmental outcomes of a range of initiatives to realize the energy and GHG savings potential in Alberta's buildings. C3 considers that all types of policies will be required to create the best mix for Alberta's unique needs.

Can investor-owned utilities (IOUs) be expected to address these barriers and market distortions and help all Albertans seize all cost-effective energy-efficiency opportunities? Experience outside Alberta suggests that utilities in deregulated markets do not naturally pursue energy-efficiency programming. During the years when electricity restructuring was being introduced across North America, between 1993 and 1999, annual expenditures by utilities on demand-side management (DSM) fell by about 55 per cent relative to levels prior to deregulation, and incremental annual energy savings fell by about 65 per cent (Palmer, 2005). Even states with previously high levels of energy-efficiency expenditures experienced a decline in spending while moving to a deregulated market (State of Vermont Public Service Board, 1997).

The shareholder value of an investor-owned utility (IOU) in a market like Alberta's is basically a function of its rate base, its sales between rate applications, and the agreed rate of return on the rate base. Depending on how they are accounted for, approved expenditures on energy-efficiency programming does not necessarily grow a utility's rate base. Other things being equal, to the extent that energy-efficiency program expenditures do not increase the rate base they have an earnings inequality relative to other utility infrastructure investments that do. Furthermore, in between rate applications an increase in sales will translate into higher earnings for the utility, so long as the variable cost of sales is less than the revenue received. This provides IOUs with an incentive to increase throughput, not decrease sales as would be the case with successful energy-efficiency programming. In the absence of specific policy interventions to the contrary[10], there is thus a strong disincentive for an IOU to help customers implement successful energy-efficiency improvements on a large scale.

[10] For example, policies to decouple utility profits from sales, to mandate specific energy savings targets, to provide performance incentives to achieve those targets, etc.

3.2 Avoiding stop-go funding

Like all public policies, those targeting energy-efficiency improvements need to be resourced adequately to ensure their effectiveness over time. 'Stop-go' funding is a perennial concern for energy-efficiency program administrators. The importance of securing long-term funding is highlighted in one of five recommendations that came out of the U.S. Environmental Protection Agency's (EPA) National Action Plan for Energy Efficiency in 2006. Developed by 50 leading organizations representing diverse stakeholder perspectives, the recommendations pointed to the importance of providing "sufficient and stable program funding to deliver energy efficiency where cost-effective" (U.S. Environmental Protection Agency, 2006).

Stable, long-term funding facilitates longer planning horizons and removes some investment uncertainty. Clean-energy projects and some energy-efficiency projects may take several years to develop. For example, following an energy-efficiency assessment of an industrial facility, the identified improvement program often involves a number of project stages spread out over a number of years. The facility manager likely will want to know that secure financial and other support is available for the program before making a decision to proceed with the first stage. In general, most energy consumers will need assurance that funding is going to be available during all stages of multi-year clean-energy or energy-efficiency project opportunities before proceeding.

Additionally, secure, long–term funding allows the cumulative effects of energy–efficiency improvements to make a difference to the capital investment decisions of utilities. With longer planning horizons, energy efficiency can be used as an economic strategy to delay or to avoid costly and environmentally damaging spending on infrastructure. Stable, long–term funding also is important to help ensure that short–lived energy–efficiency opportunities, such as new construction and equipment replacement, do not become lost opportunities. Such funding also will help ensure market transformation initiatives maintain momentum, so efficiency measures or practices can reach their tipping point, after which they become the market standard and energy savings are persistent. Market transformation initiatives to – permanently change behavior over an entire sector – take time. Consequently, such initiatives require stable, long-term funding and planning horizons.

Given levels of tax funding for energy efficiency in the province over the last decade, and given changing political priorities and competing needs for tax dollars, it may be difficult to secure annual funding levels of the magnitude needed to facilitate long-term planning horizons and realize Alberta's full potential may be difficult to secure. It is common for energy-efficiency budgets to be reduced when economic conditions dictate government-wide funding freezes or reductions. Recognizing this, C3 considers it would be prudent necessary to examine a wider array of options to fund increased energy-efficiency efforts in the province.

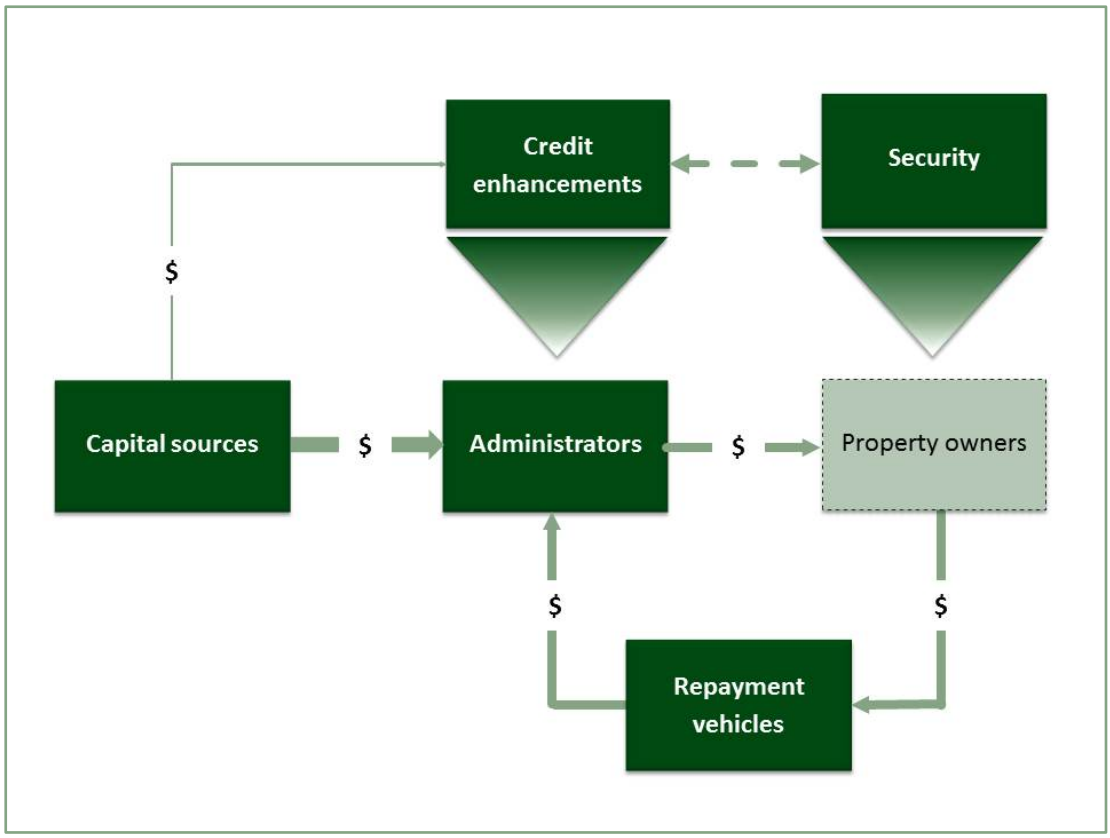
4.0 Funding options

Multiple funding mechanisms are used in jurisdictions across North America that could be considered for application in Alberta to achieve the desired level for energy-efficiency initiatives and associated funding outlined above.

4.1 Main elements of a funding mechanism

A generic funding mechanism – applicable to residential, commercial, institutional, and industrial energy-efficiency improvements – may consist of up to five major elements (see Figure 2). A lending program, for example, will comprise all five elements; a grant program, only the capital sources and the administrators. The five major elements: are ❶ administrators; ❷ capital sources; ❸ repayment vehicles; ❹ credit enhancements; and ❺ security (US DOE, 2010). The capital sources are of particular importance and are therefore the focus of this section.

Figure 2 Main elements of a funding mechanism for energy-efficiency initiatives



Source: Adapted from US DOE (2010)
Note: '$' indicates dollar flows, with the width of the arrow suggesting the relative size of the flow. Credit enhancements and securitization function in tandem (discussed further below); hence the dashed arrow in the figure.

4.2 Administrator

The administrator can be one of a number of actors, including the traditional administrators of large-scale energy-efficiency programs discussed in Section 5 below; these include utilities, independent third parties, government departments or agencies, and various hybrids thereof. Administrators also can include private financial institutions (e.g. national or regional banks or credit unions) and for-profit third parties (e.g., ESCOs[11]) – particularly in lending programs.

Administrators receive funds that cover the costs of energy-efficiency initiatives that they provide directly or indirectly (via contractors), including monies loaned or granted, from a number of sources.

4.3 Capital sources

In other jurisdictions capital to fund conventional energy-efficiency initiatives is sourced primarily from:

1. *Taxpayers,* through (a) earmarked tax receipts general or (b)tax revenues ;
2. *Ratepayers*, through (a) a separate, dedicated surcharge or system benefits charge (SBC), (b) a general rate application, or (c) some other rate-based mechanism;
3. *Industry*, through local, provincial, or regional market-based or regulatory mechanisms;
4. *Investors*, though (a) bonds or (b) private lending or equity; or
5. Some combination of the above.

Of note, most of these options are, or have been, employed on some scale in Alberta. However, given the recent Alberta Utilities Commission's (AUC) ruling on the general rate application by ATCO Gas, a new situation exists that might limit 2(b) as an option going forward.[12]

4.3.1 Tax-based capital sources

In the case of taxpayer-funded initiatives, tax revenues collected by municipal or provincial governments may be set aside or allocated (by law) directly to energy-efficiency initiatives,

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[11] An ESCO is a private energy service company that typically offers the following services for client facilities, equipment, and infrastructure: ❶ identify, develop, and engineer turn–key energy efficiency projects; ❷ provide (from internal capital sources) or arrange (with a private financial institution) project financing; ❸ install and maintain identified energy efficiency projects; ❹ measure, monitor, and verify the performance of projects (e.g., energy savings); and ❺ various types of energy savings performance contracts (ESPCs) (e.g., 'shared savings' contracts, 'guaranteed savings' contracts). ESPCs are usually financed through the energy cost savings generated by the project. In contrast to ESCOs, energy service providers (or ESPs) are smaller companies that provide similar services to ESCOs, except they tend to be independent companies not associated with a specific technology and typically do not provide long–term performance contracts. In many cases ESPs function as sub–contractors on ESCO–led projects.

[12] The Alberta Utilities Commission Decision 2011-450: ATCO Gas (a Division of ATCO Gas and Pipelines Ltd.), 2011-2012 General Rate Application Phase I, Application No. 1606822.

sometimes through an extra-budgetary (tax) fund.[13] Taxes allocated to a specific expenditure program are referred to as 'earmarked' (or hypothecated) taxes. Earmarked tax revenues can be raised from the wider pool of general tax revenues (e.g., defined as a percentage of total revenues), but are more commonly raised from a single tax base (e.g., from the sale of a particular commodity like electricity, natural gas, gasoline, cigarettes, alcohol). When levied on harmful products or activities, earmarked taxes directly encourage environmental and/or health improvements by reducing consumption.

By raising revenues from a single tax base, a direct link can be formed between those paying the tax (e.g., car drivers, smokers) and the specific purpose to which the revenues are reserved (e.g., road maintenance, health services). This is useful to generate political support when introducing a new tax or charge – especially when the revenues raised are dedicated to a service that the public highly value, like energy efficiency. The establishment of an energy-efficiency fund, and the introduction of a dedicated tax or charge to finance its expenditures, is likely to be more acceptable politically than the increase in general tax revenues required to finance equivalent levels of expenditures. For instance, when the UK's Climate Change Levy – a tax on the business use of energy – was introduced in April 2001, a portion of the revenues was earmarked to fund the Carbon Trust to increase the acceptability of the levy among business. [14] By setting aside revenue from a specific tax base for a specific purpose, a trustworthy government can generally facilitate agreement about increasing both revenue and expenditures in cases where there would likely be no consensus about raising either separately.

In any budget process that involves competing claims on resources, the process may be vulnerable to interference from strong special interests, resulting in too few (or too many) resources being allocated to specific services in any one budget. In general, if government spending on, for example, energy efficiency is too low (or unstable), an earmarked tax could increase and stabilize resources by insulating energy-efficiency spending from both competition with other publicly funded activities and from interference from special interests.

The practice of earmarking may be contrasted with general fund financing, whereby government expenditures on programs are funded from consolidated tax receipts. The latter has been the main approach to funding traditional energy-efficiency programs in Alberta.

By funding programs and services from consolidated tax receipts, it is possible to avoid potential budgetary inefficiencies, which is a criticism often leveled by economists at earmarked taxes. Critics of earmarking argue that it reduces flexibility in public decision-making to address changing circumstances and, more generally, undermines fiscal discipline and transparency. Economists, specifically, argue that earmarking may add to price and tax distortions created by existing tax policy. The same critics also claim that financial management, governance, and

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[13] A fund established for a specified purpose(s), where all revenues, expenditures, and financing are excluded from the annual budget process, and are therefore not jeopardized by budget rules that require budget allocations to necessarily expire at the end of the budget period.

[14] The Carbon Trust is a not–for–profit UK–based company that provides specialist support to help businesses and the public sector boost returns by cutting carbon emissions, saving energy, and commercializing low carbon technologies. In effect, the Carbon Trust provides businesses with a means to reduce their tax liability through Trust–supported energy efficiency improvements.

public accountability are diluted when earmarked taxes and associated extra-budgetary funds (as opposed to on-budget consolidated receipts – are used to finance government services or programs. Extra–budgetary funds can be particularly problematic when allowed to borrow or implement on–lending programs, as is the case with some revolving funds (see below). Poorly designed and managed funds that result in bad debt can result in contingent claims against the general government budget. Such problems, however, can readily be addressed through:

- Sound financial management and reporting procedures;
- Rigorous governance structures (e.g., roles, responsibilities and independence of the board, transparency of the decision making process, etc.);
- A strong interface between these bodies and the budget process; and
- Integration with overall government fiscal objectives and existing tax administration.

It is therefore feasible for government to use earmarked taxes to pay for energy–efficiency initiatives through an extra–budgetary fund while retaining much of the fiscal control, flexibility, transparency, and soundness of analysis typical of general fund financing. Moreover, despite the concerns of economists about potential price and market distortions, and of treasury officials about a loss of fiscal flexibility, the earmarking of revenues from specific taxes is common practice in many countries, due to the strong political economy advantages.

4.3.2 Ratepayer–based capital sources

The three options by which the cost of energy–efficiency initiatives can be funded by ratepayers – or strictly speaking, by which the costs of such initiatives can be recovered from ratepayers – are described below. These options can be used simultaneously. For example, within one jurisdiction, Public or System Benefits Charge (SBC) may be used to fund electricity initiatives, whereas natural gas initiatives may be funded through general rate applications. All three approaches are in use across North America. As shown in Table 1, for example, 42 U.S. states use rate–base funds for some of their demand–side management (DSM) initiatives.

Table 1 Existing or proposed use of ratepayer funding for demand–side management (DSM) programs by investor–owned utilities in various U.S. states

General Rate Case	Other Mechanism Outside General Rate Case	Separate, Dedicated Surcharge
AL, AZ, CA, CO, DE, DC, GA, IA, IL, IN, IO, MN, MO, MT, NV, NM, PA, TX, UT, WA, WI	CO, FL, IO, KY, OH, UTY, WA, WI	AZ, CA, CT, MA, ME, MT, NH, NJ, NY, OR, RI, VT, WI

Source: (U.S. Environmental Protection Agency, 2007)

4.3.2.1 System Benefits Charge

With this option, a separate surcharge is levied on natural gas and/or electricity customers, typically assessed in increments of mills per unit of energy consumed (e.g., per kWh for electricity or per therm for natural gas) or, less commonly, through a flat monthly fee. (One mill is equal to one–tenth of one cent.) For example, with annual electricity consumption in the province of around 70,000 GWh, a surcharge set at one mill (or $0.001 per kWh) would raise $70 million per year. Surcharges in the US range from less than one mill to about 5 mills per kWh.

In the United States, money collected via such surcharges is allocated to funding programs with public and energy system–wide benefits, including energy efficiency, clean energy and low–income energy assistance programs. For this reason, the surcharge is often referred to as a public or system benefits charge (the latter is adopted for the remainder of this document). Typically, SBCs are implemented at the state or provincial level and were originally conceived as part of electricity industry restructuring in the United States. The level of the surcharge is thus usually set by government, or by the state or provincial regulator, or in combination; rules governing its introduction and use can be embedded in legislation. It is common for the SBC to have sunset provisions, requiring renewal – usually after five to ten years. Longer time frames allow for more effective energy efficiency and clean–energy initiatives, particularly for industrial and business energy consumers. Given the potential for an SBC to secure a large–scale source of funding over long time frames, it is particularly suited to funding the pursuit of future low–carbon or energy–intensity targets.

While normally a state- or provincial-level policy, some municipalities have implemented their own SBC. The City of Medicine Hat, for example, pays for programs to encourage energy efficiency and clean energy through a separate energy conservation charge on natural gas and electricity bills.

Typically, an SBC appears as a separate item on the customer's bill, but can be embedded in the electricity or gas rate. Listing the surcharge as a separate item can engender both support for, and opposition to, the introduction of an SBC.

SBCs are generally collected by a distribution utility as part of the normal billing process, with receipts being retained by the utility or transferred to an independent third party or government agency (depending on the choice of administrator). This provides increased flexibility to policy–makers, as an SBC works as a stable funding source regardless of who is administering the energy–efficiency initiatives. To maximize the effectiveness of an SBC, it must be both non–bypassable (cover all sales to all end–users) and competitively neutral (treat all sellers equally). The idea is to raise the desired level of funding for public programs without distorting the purchasing decisions of end-users, including the selection of one supplier over another. These two criteria can only be met if the SBC is assessed for use of the distribution system – virtually all consumers (industrial, commercial, and residential) are connected to the distribution system, and would pay the same surcharge no matter who generates the electricity or provides the

natural gas they receive. Since most distribution networks are still regulated, government and state or provincial regulators have the authority to impose the introduction of distribution–level SBCs.

A non–bypassable, competitively neutral surcharge may be a requirement to maximize the effectiveness of an SBC, but some states allow customers to opt–out (e.g., if their electricity is self-generated) or receive a discount. For example, in recognition of concerns from energy-intensive industrial customers re the impact of the SBC on their energy costs, authorities in both Montana and Oregon grant large industrial consumers special discounts.

A common misconception is that an SBC is a tax. This is not the case. According to internationally accepted definitions a tax is a "compulsory, unrequited payment to general government" (OECD, 2009). In contrast, an SBC is a *requited* payment in the sense that the charge is levied in connection with the provision of a specific service (the provision of energy-efficiency initiatives) and the total funds collected generally equal the total funds spent. Moreover, the same ratepayers that pay the charge are also the recipients of the energy-efficiency expenditures. Also, an SBC is typically paid to bodies outside general government; the revenues thus do not pass through the tax collection or public finance system. As a result, SBC revenues are commonly under the purview of the regulator, and not the state or provincial government. Examples of this include the New York State Energy Research and Development Authority, Energy Trust of Oregon and Efficiency Vermont. According to the same set of official definitions, an SBC is in fact a "user fee" or "charge" (OECD, 2009).

4.3.2.2 Rate cases or riders

Funding for energy-efficiency initiatives might be raised from ratepayers through traditional utility cost recovery mechanisms established and monitored by the relevant oversight agency or regulator (e.g., the AUC, municipalities, the boards of rural gas co-operatives). The regulator sets base rates that a utility can charge different customer classes (e.g., residential, small commercial, firm and interruptible industrial) to recover the (just and reasonable) total costs of providing adequate service levels, including an allowed rate of return on investment. Base rates set by the regulator in response to a rate application by a utility normally remain in effect for 2 to 3 years, until the next application.

Mechanisms to recover the cost of energy-efficiency initiatives generally take two forms:

- Utilities recover the costs of initiatives – like most other distribution non–energy costs of service (or 'delivery charges') – directly from their ratepayers through base rates set at the time of a general rate application, typically every 2 to3 years.[15] Such applications normally consider the utility's:[16]

[15] Regulated electricity and natural gas costs (or 'energy charges') are considered at much more regular intervals by the regulator – in so–called 'pass–through' or 'pass–on' cases. Typically the cost of purchased electricity or natural gas is passed–through to customers on a dollar–for–dollar basis (as part of retailer charges in Alberta). For example, in Alberta, the AUC considers monthly

❶ Rate base – net capital investments plus any working capital necessary for operations;

❷ Operating expenses and their treatment – expenses incurred to operate and maintain the distribution network, to purchase materials and supplies, to pay salaries and benefits, to pay interest on borrowed funds, and to pay taxes. Many regulators allow utilities to treat energy-efficiency costs as an operating expense;

❸ Revenues – revenues generated from sales across all customer classes in a 'test year' (a recent historic or projected 12-month period);

❹ Return on investment – return on investment allowed (not guaranteed) by the regulator to adequately compensate shareholders for investing their capital in the utility (frequently expressed as a percentage of the rate base); and

❺ Rate design – the share of total distribution non–energy costs recovered from each customer class, based on the cost of providing services to each class.

The Energy Sense Program of ATCO Gas, for example, was funded through the base gas rates paid by its customers, as granted by predecessors of the AUC.

- Alternatively, utilities can also recover the costs of energy-efficiency initiatives directly from their ratepayers through a rate rider or adder (similar to an energy cost adjustment surcharge) that can be adjusted periodically outside a general rate application. Rate riders are often used by regulators and utilities to account – in a timely manner between applications – for differences between forecast expenses (reflected in base rates) and actual expenses. Planned expenditures and revenues to cover those expenditures rarely match actual outlays in real-time. Since utilities attach a high value to full and timely cost recovery, regulators employ a range of so-called 'balancing mechanisms' , to ensure in effect that customers do not pay for costs not incurred by the utility, or to ensure that utilities do not incur extra costs in providing services to customers that are not reflected in set base rates. Balancing accounts are sometimes used to carry surplus or deficit expenditures forward to the next general rate application, where they are built into the new set of base rates. To increase the frequency of cost recovery, rate riders can be used to facilitate more regular (at least annual) 'truing-up' of expenditures. The same mechanism can be used by regulators and utilities to recover the costs of energy-efficiency initiatives in a timely manner (e.g., a rate rider to be applied during 2013 can be set based on energy-efficiency expenditures planned for 2013, plus a true-up for actual under- or over-cost recovery relating to energy-efficiency expenditures during 2012). An example is the Demand Side Management Cost Recovery Rider employed by Nova Scotia Power.

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applications to ensure that only the actual costs of natural gas purchases incurred by a regulated retailer are passed on to customers.

[16] Elements ❶, ❷ and ❹ define a utility's total costs or 'revenue requirement', since when setting base rates a utility is *required* to earn *revenues* that are at least equal to its total costs.

There are variations within these two broad categories, including whether to treat energy-efficiency expenditures more like traditional infrastructure capital costs and amortize them over their expected life, as opposed to expensing them.

4.3.3 Capital from regulatory or market mechanisms

Energy-efficiency initiatives can be funded from environmentally-oriented charges levied by government on industry. Typical sources of such funds include emissions trading schemes or carbon or energy taxes. There are several sources of funds from emission trading schemes; these include: monies raised from auctioning allowances, paid as penalty for non-compliance, or collected through a safety-value mechanism similar to that employed in Alberta. The Regional Greenhouse Gas Initiative (RGGI) in the United States generated just over US$1 billion from the auction of allowances through June 2012. The revenues are used for 'consumer benefit' programs, with the majority channeled to energy-efficiency and clean-energy initiatives at the state and local levels[17]. For example, of the US$60 million and US$165 million raised by Connecticut and Massachusetts through June 2012, about US$42 million and US$132 million respectively was used to support energy-efficiency initiatives. In Alberta, the Climate Change Emissions Management Corporation (CCEMC) – funded through the purchase of compliance units (currently priced at $15 per t CO_2-e) by large final emitters – has allocated nearly $33 million to energy efficiency and conservation projects as of June 2011.

It is worth noting that there are strong environmental and economic arguments for using money paid to the CCEMC to fund energy-efficiency improvements in the residential, commercial, public, and transport sectors. To safeguard the integrity of Alberta's cumulative emissions goals, revenues raised should ideally be used to fund emissions savings in uncovered sectors – not in sectors covered by the Specified Gas Emitters Regulations. Furthermore, if growth in energy demand is not addressed (through, for example, energy-efficiency initiatives) large final emitters are continually chasing a target that is moving further away, requiring the implementation of more, increasingly costly GHG abatement measures.

Energy-efficiency initiatives can also be funded through other regulatory mechanisms, such as those employed in wholesale energy markets. Relevant examples in the United States where energy-efficiency efforts are funded via market or regulatory mechanisms include the Forward Capacity Markets run by:

- The New England Independent System Operator (ISO-NE) serving the states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont; and
- The PJM Interconnection (Regional Transmission Operator) serving the states of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia.

[17] However, some states – New Jersey and New York – have used auction revenues to meet budget shortfalls.

A forward capacity market is a mechanism whereby an operator, like PJM: ❶ collects bids from existing and new resources to meet planning targets for regional peak capacity needs (usually several years in advance of the power being required); ❷ runs a competitive auction to establish a market clearing price for all capacity committed by these resources; and ❸ procures sufficient capacity at the market clearing price to meet the planning targets of the region. The market clearing price is the uniform price paid to all capacity committed by existing resources and all new resources that have bid into the auction at or below that clearing price. Both PJM and ISO-NE permit energy efficiency and other demand-side-management resources to compete with supply-side resource (generation) to meet future reliability requirements. By way of illustration: assume an energy supplier cleared 100 MW of energy-efficiency resources at a capacity auction, where the market clearing price was $10 per MW-day. If the energy supplier delivered the 100 MW as contracted, its annual revenue stream would be 100 MW times $10 per MW-day times 365 days, or $365,000 per year.

Energy-efficiency resources cleared nearly 569 MW in the PJM auction for delivery in 2012-13, at a market clearing price of about US$16 per MW-day, thus generating a stream of US$3.4 million per year for investment in energy efficiency.[18] The ISO-NE auction for delivery in 2012-13 cleared 975 MW for energy-efficiency resources at a market clearing price of about US$98 per MW-day, generating investment funds of US$34.9 million per year.[19]

Of note, money from market or regulatory mechanisms is typically used only to provide a supplementary income stream to support energy-efficiency initiatives in a jurisdiction. For instance, Delaware, Maryland, Maine, New Hampshire, Vermont, New York, and New Jersey use RGGI auction revenues to pay for energy-efficiency initiatives separate from existing utility ratepayer funded efficiency programs regulated by the state.

4.3.4 Investor-based capital

4.3.4.1 Bonds

In addition to the traditional taxpayer and ratepayer funding of energy-efficiency initiatives, there are several ways in which the provincial government could use its bonding authority to fund energy efficiency. Bonds are debt securities issued by government and corporations. When government issues a bond it in effect borrows money from an investor (the bondholder). In return, the government promises to repay, on a specified date in the future (after more than one year), all monies loaned to it by the bondholder. In addition, to attract investors, the government will often promise to periodically pay interest to the bondholder over the loan term. The money raised by the bond issue can be invested in energy-efficiency initiatives. There are many different types of bond - too many to cover them all here.

[18] PJM Forward Capacity Market results available at: http://www.pjm.com/~/media/markets–ops/rpm/rpm–auction–info/2012–13–base–residual–auction–report–document–pdf.ashx.

[19] ISO–NE Forward Capacity Market results available at http://www.iso–ne.com/markets/othrmkts_data/fcm/cal_results/index.html.

Issuing bonds to pay for certain capital projects is not new to the Government of Alberta; it first issued Alberta Capital Bonds in the spring of 1987. In 1996, the name was changed from Alberta Capital Bonds to Alberta Savings Certificates. The government stopped issuing Certificates in 1997 at which time it had raised $5.7 billion through the bonds and the certificates. The last issue matured on June 1, 2004. However, in March 2010 the government returned to Alberta Capital Bonds to raise money to pay for the construction of seniors' accommodations in the province, including long-term care, supportive living facilities, and group homes. The non-redeemable five-year bonds offered a fixed interest rate of 3.3 per cent – equivalent to the best five-year GICs – and raised $74.5 million. Sale of the bonds was restricted to residents of Alberta.

Legislation (the Municipal Debentures Act in Alberta) permits municipalities also to issue bonds to raise money for local infrastructure projects. However, only cities (with good credit ratings) are likely to be able to issue their own bonds. To reach smaller municipalities, the province may need a centralized agency that can issue bonds and re-direct the funds to smaller municipalities. For example, the Municipal Finance Authority of B.C. oversees their Community Bond Program, which is open to all B.C. residents.

Traditionally, provincial and municipal bond revenues finance public infrastructure projects, such as bridges, water, and waste water treatment works. However, there are a growing number of examples and proposals to use public-backed bond revenues to capitalize funds to support clean-energy and energy-efficiency initiatives, such as via Property Assessed Clean Energy (PACE) programs (discussed below). As noted below, funds to support PACE programs can also be capitalized using tax revenues or loan capital from private financial institutions.

The attractiveness of bonds to investors, and thus the total amount of money raised, is affected by their tax status. In the U.S. the federal government permits state and local governments to sell bonds that are free of federal income tax on the interest paid – thereby increasing their attractiveness to potential buyers. State and local governments can also waive state and local income taxes on the bonds. This allows the bonds to pay lower (gross) rates of interest, as the after-tax yield can still be very competitive with other forms of fixed-income investments, especially for buyers in higher tax brackets. While interest earned from bonds is not currently exempt from federal income tax in Canada, in 2009 Senator Jerry Grafstein introduced a private members bill in the Senate that would grant municipal bonds tax-free status to encourage Canadians to invest in the municipal infrastructure. Bonds may also be exempt from provincial income tax. For example, the Ontario Municipal Economic Infrastructure Financing Authority issues tax-exempt Ontario Opportunity Bonds to support the development of local infrastructure.

Even in the absence of tax incentives, it is also possible that citizens may be willing to accept a (low) government-guaranteed rate of return in exchange for participating in the provision of a public good. Indeed, the results of our survey suggest a willingness on the part of Albertans to contribute more towards the provision of additional energy-efficiency programs to help all Albertans.

4.3.4.2 Private lending

Financial institutions (FIs), such as banks and credit unions, can function as capital sources for energy-efficiency initiatives. Both entities can invest their (depository) capital in lending projects, if the returns justify the credit risks as understood by the bank or credit union. Large ESCOs with sufficient financial resources of their own (e.g., Johnson Controls, Honeywell, Siemens, etc.) and other private investors (e.g., Metrus Energy, Transcend Equity) can likewise function as sources and providers of loan and equity capital for energy-efficiency initiatives.

On the supply-side, the ability of energy-efficiency initiatives to attract private capital depends crucially on the administrator being able to aggregate – using standardized contractual structures – individual efficiency improvement projects at one facility and across multiple sites. Aggregation of projects pools money to finance numerous smaller projects that would otherwise be overlooked by private investors, and the use of standardized contracts creates a pipeline for replicating projects across an entire portfolio, making it cheaper and easier for investors to go after these projects (CalCEF, 2010 and Kapur *et al*, 2011). For these reasons, private capital is most attracted to large-scale, whole building retrofits (involving multiple projects, across multiple sites), with large certain savings potential, and where owners are likely to operate property over long timeframes.

On the demand-side, the ability of the administrator to attract property owners to invest in energy-efficiency initiatives using private capital will depend crucially on their capacity to offer 'commercially-attractive' terms, which may be defined as financing (Buonicore, 2012):

- Without any capital expense;
- That does not add debt (represents an 'off balance sheet' solution) or place liens on equipment and systems or the property;
- That covers 100 per cent of the total project costs;
- Is structured such that (re)payments (along with energy cost savings) can be readily passed through to tenants (where relevant);
- Available at relatively low cost (interest cost); and
- That is payable over relatively long timeframes, such that monthly payments are more than offset by energy cost savings, enabling projects to be cash-flow positive from the outset.

There are various project finance models employed by private capital providers, including:

- Energy Savings Performance Contracts (ESPCs), where a property owner is engaged by, or engages, a for-profit administrator (typically an ESCO) to design, install, and maintain an energy-efficiency improvement project. Typically, remuneration is linked in one way or another to the performance of the project, as stipulated in a performance contract between the administrator and the property owner. The two main forms of

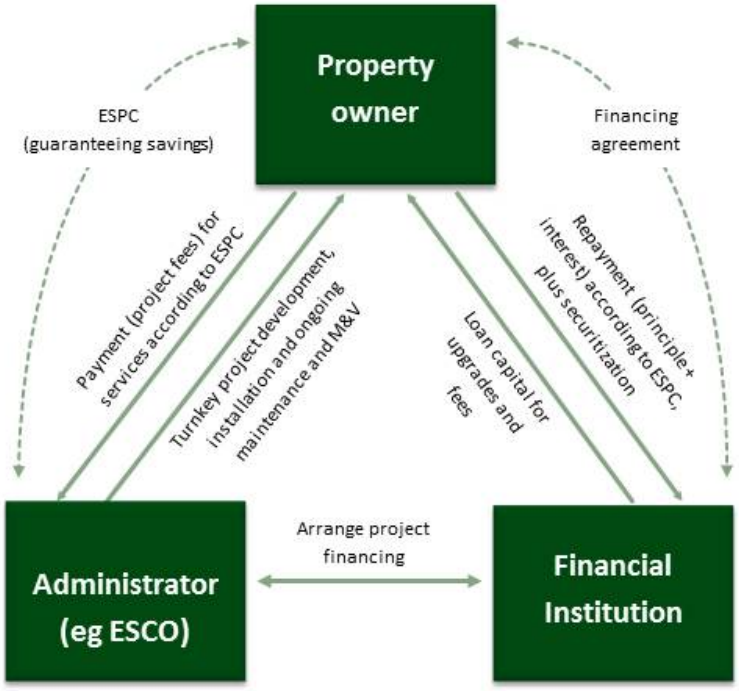
ESPC are ❶ 'guaranteed savings' contracts (see Box 1) and ❷ 'shared savings' contracts (see Box 2); and

- Energy Service Agreements (ESAs) and Managed Energy Service Agreements (MESAs), where energy efficiency is essentially sold as a service, with the for-profit administrator functioning as both the financier and owner of the energy-efficiency improvement project. Under the MESA model (developed by Transcend Equity) the administrator assumes payment of future utility bills for a property and charges the owner a fee equal to historic utility bills (see Box 4). Income is earned from future utility bill savings generated by the efficiency project. Under the ESA model (developed by Metrus Energy) the property owner remains responsible for payment of their utility bills, which are reduced by installation of the efficiency project (Box 3). A fee covering the costs of the project is paid to the administrator out of utility cost savings realized by the property owner.

The administrators of ESPCs, ESAs, and MESAs are private sector, for-profit entities. However, there is no reason why similar project financing models could not be administered by a government agency or an independent third party, using public funds as:[20] ❶ the sole source of capital for projects (like a revolving loan fund); or ❷ to provide credit enhancements for loans from private lenders. In the latter context, public funds are used to form a public-private partnership – cover the credit risk faced by private lenders – encouraging them to offer more commercial attractive terms to property owners. This is discussed more in Section 5.4.

[20] Utilities are reluctant to function as 'banks' (providing loan facilities for energy efficiency improvement projects) as this introduces default risks for their own capital and ratepayer funds.

Box 1 Energy Savings Performance Contract – Guaranteed Savings Model



ESCO offers a range of development and implementation services (an upgrade 'project') that generate energy and cost savings.

ESCO guarantees that energy cost savings will exceed some mutually agreed minimum dollar value – typically equal to project fees paid to ESCO plus debt service paid to FI over the ESPC term. ESCO fee includes equipment and installation costs plus costs of ongoing measurement, verification (M&V) and maintenance services. Basically, ESPC is designed to be cash-flow neutral over its term, with all project costs paid from energy cost savings.

ESCO arranges finance with partner FI, and markets project financing to customer at the point of sale.

Property owner is borrower, so loan (debt) remains on customer's balance sheet; borrowing capacity for other purposes is thus reduced.

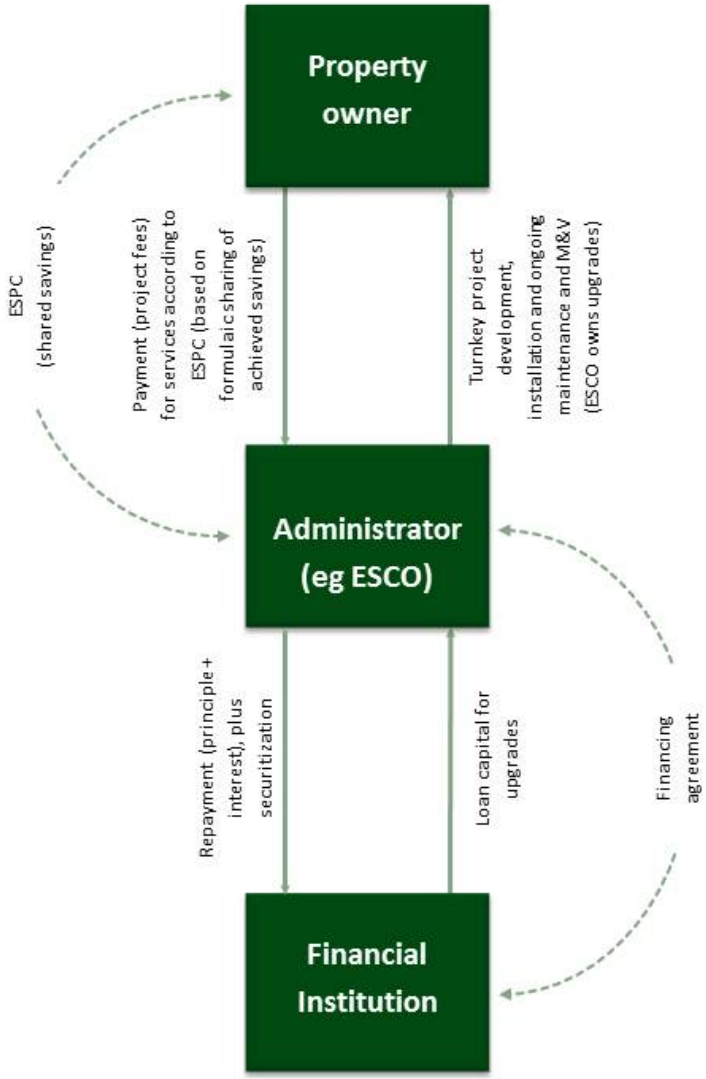
ESCO assumes performance risk via ESPC; FI assumes credit risk. ESCO guarantee is not a guarantee of payment to FI; it is a guarantee of project performance to the property owner.

Most suited to large-scale, whole building retrofits, where individual projects can be aggregated by ESCO for presentation to FI (pools money for small, individual projects that would otherwise be overlooked by FI), with large certain savings potential, and where owners are likely to operate property over long timeframes.

Provides for lower interest costs because financing provided directly by FI is based on creditworthiness of property owner; interest costs not increased by FI as it does not assume performance risks.

Sources: Hinkle and Kenny (2010), US DOE (2010), IEA (2011), Kapur *et al* (2011), WEF (2011) and Buonicore (2012)

Box 2 Energy Savings Performance Contract – Shared Savings Model



ESCO offers a range of development and implementation services (an upgrade 'project') that generate energy and cost savings.

Property owner commits -- under an ESPC – to pay a percentage (80-90%) of the project's realized cost savings to the ESCO over the term of the contract. The dollar value of the percentage share should be sufficient for the ESCO to cover the debt service payments to the FI (for equipment and installation) plus any costs it incurs for ongoing M&V and maintenance services (plus required ROI).

ESPC is designed to be cash-flow neutral for property owner over its term, with all project costs paid from energy cost savings. If no cost savings are realized, the property owner continues to pay utility bill but does not pay fee to ESCO for that period.

ESCO finances the upgrade project and bears obligation to repay the FI. As ESCO is the borrower (and must service the debt) the fee paid can be treated as an 'off balance sheet' operating expense by the property owner; their borrowing capacity is thus unaffected.

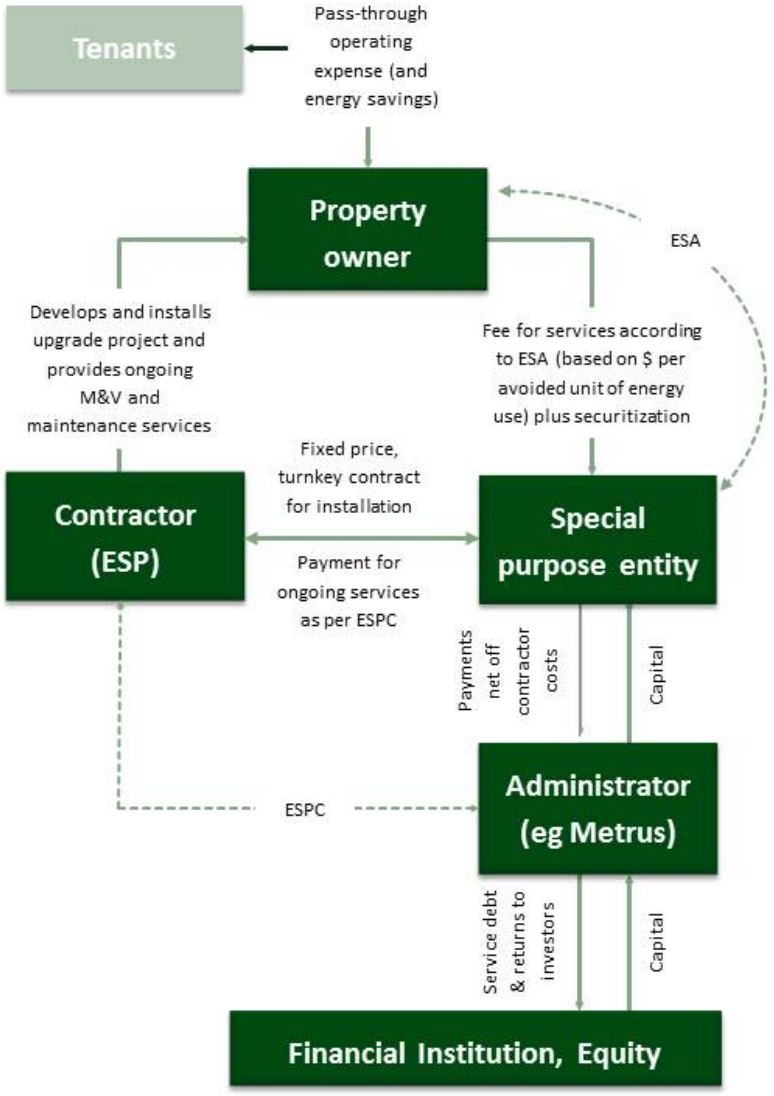
ESCO owns 'upgrades' until end of contract, after which ownership transfers (or is sold at fair market value) to property owner.

ESCO assumes the project performance risk (via the ESPC) and the credit risk of the property owner. Because of the increased risk assumed by the ESCO, the property owner is typically charged a higher cost for financing the project.

Most suited to large-scale, whole building retrofits, with large certain savings potential, and where owners are likely to operate property over long timeframes.

Sources: Hinkle and Kenny (2010), US DOE (2010), IEA (2011), Kapur *et al* (2011), WEF (2011) and Buonicore (2012)

Box 3 Energy Savings Agreement



Administrator and partner energy service provider (ESP) offer a range of development and implementation services (an upgrade 'project') that generate energy and cost savings.

Once the project is designed, a special purpose entity (SPE) is established specific to that project.

Administrator functions as both financier and owner of the upgrades, setting up an ESA with the property owner and a separate ESPC with the ESP (to help minimize performance risks). At the end of the ESA term the property owner has the option to buy the upgrades at a fair market price.

Property owner agrees to pay a regular fee to SPE – fee is structured as cost per unit of energy avoided, which is normally set just below the property owners' historic energy costs. This ensures the project is cash-flow neutral over the ESA term. Property owner has no performance risk and only pays for realized, verified savings.

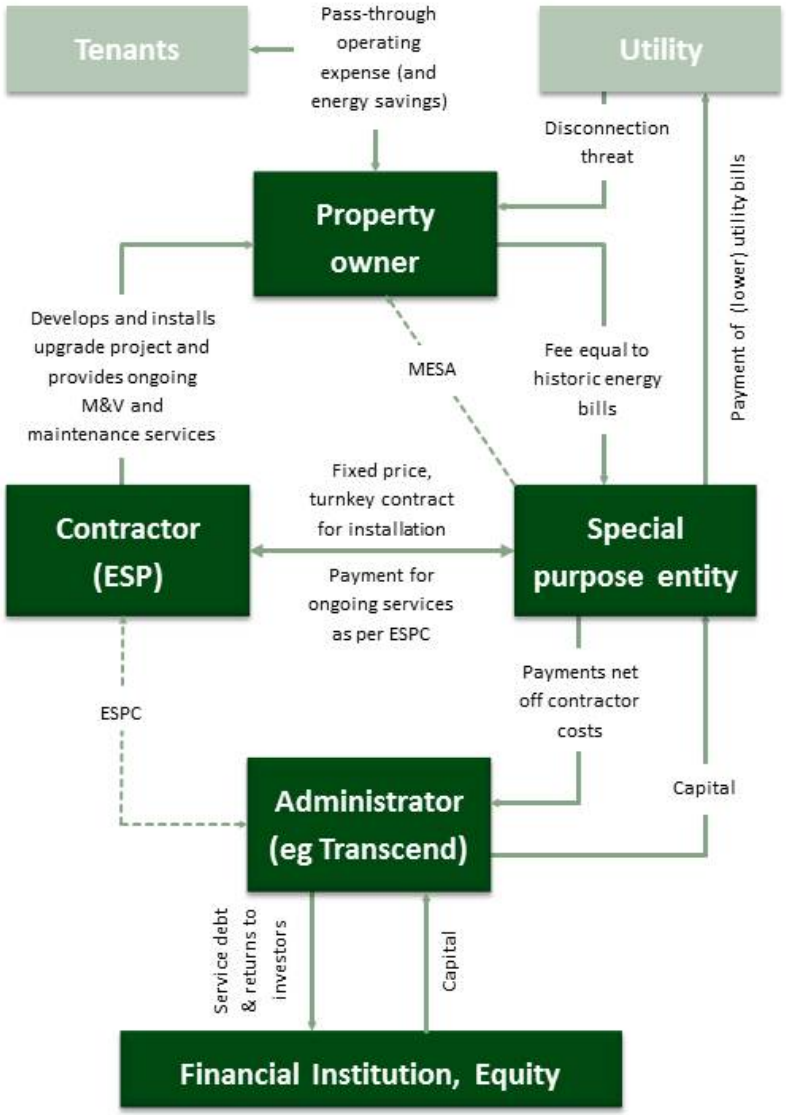
SPE pays contractor for project installation from capital provided by the administrator. From property owner payments, the SPE pays the ESP for ongoing maintenance and M&V services, as per ESPC, remitting all remaining funds to the administrator to service debt and compensate investors (for original investment in the project).

Represents 'off balance sheet' solution – property owner does not take on any additional debt. Fee paid to SPE is also viewed as a 'pass-through' expense to tenants (addressing the problem of split incentives).

Most suited to large-scale, whole building retrofits, with large certain savings potential, where upgrade projects can be aggregated across a portfolio of facilities, making it easier and cheaper to attract outside capital.

Sources: Hinkle and Kenny (2010), US DOE (2010), IEA (2011), Kapur *et al* (2011), WEF (2011) and Buonicore (2012)

Box 4 Managed Energy Savings Agreement



Administrator and partner ESP offers a range of development and implementation services (an upgrade 'project') that generate energy and cost savings.

Once the project is designed a SPE is established specific to that project.

Administrator (or SPE) sets up a MESA with the property owner and a separate ESPC with the ESP (to help minimize performance risks). Administrator finances and owns all upgrades over the MESA term, after which title to the upgrades passes to the property owner.

SPE assumes payment of property owner's utility bills over term of MESA, and in turn is paid a regular fee – the fee is based on historical utility costs, adjusted for key occupancy and weather variables. This ensures the project is cash-flow neutral over the MESA term.

Upfront costs are paid from capital provided by the administrator. SPE generates income by capturing the difference between historical utility costs and lower costs as a result of the upgrade project (net of payments to the ESP for ongoing maintenance and M&V services, as per ESPC). Property owner has no performance risks.

Represents 'off balance sheet' solution – property owner does not take on any additional debt. Fee paid to SPE is viewed as a 'pass-through' expense to tenants (addressing the problem of split incentives).

Payment to SPE is secured through the utility bill – property owner is unlikely to risk disconnection.

Most suited to large-scale, whole building retrofits, with large certain savings potential, where upgrade projects can be aggregated across a portfolio of facilities, making it easier and cheaper to attract outside capital.

Sources: Hinkle and Kenny (2010), US DOE (2010), IEA (2011), Kapur *et al* (2011), WEF (2011) and Buonicore (2012)

4.4 Repayment vehicles

A repayment vehicle is not needed for grant-based funding mechanisms, such as the My Rebates program administered by C3. However, if the funding mechanism is to function similar to a revolving loan fund (RLF) – perhaps capitalized by an injection of tax dollars or private capital from bond markets – a repayment vehicle which aims to keep the capital base intact over time is required.

Box 5 A Revolving Loan Fund

An RLF is a source of capital from which loans are made. Loans are made to borrowers (property owners) that are consistent with standard loan origination, serving, and underwriting practices. As loans are repaid by borrowers, the money is returned to the RLF and becomes available to finance more projects.[21] In this way the RLF becomes an ongoing or 'revolving' project financing tool – extending the impact of the original capital injection. The interest (or fees) paid by the borrower are inclusive of the administrators costs to manage the fund, so the capital base remains intact.[22] RLFs are typically administered by government agencies or independent (non-profit) third-parties.

Source: US EPA (2011)

A repayment vehicle is also required if the capital source is private – as evident from the discussion in Section 4.4.3.2.

For a traditional third-party loan – between a property owner and a lender (whether a private FI or administrator of a publicly financed RFL) – the simplest repayment vehicle involves the lender sending out a regular bill to the borrower (recovering loan principle, interest, and fees), collecting payments, and tracking payments and defaults. This repayment vehicle is typical of the 'guaranteed savings' ESPC model illustrated in Box 1. In addition to the other repayment vehicles employed in the private lending models discussed in Section 4.4.3.2, new mechanisms are emerging for RLFs (capitalized using either public or private funds), including:

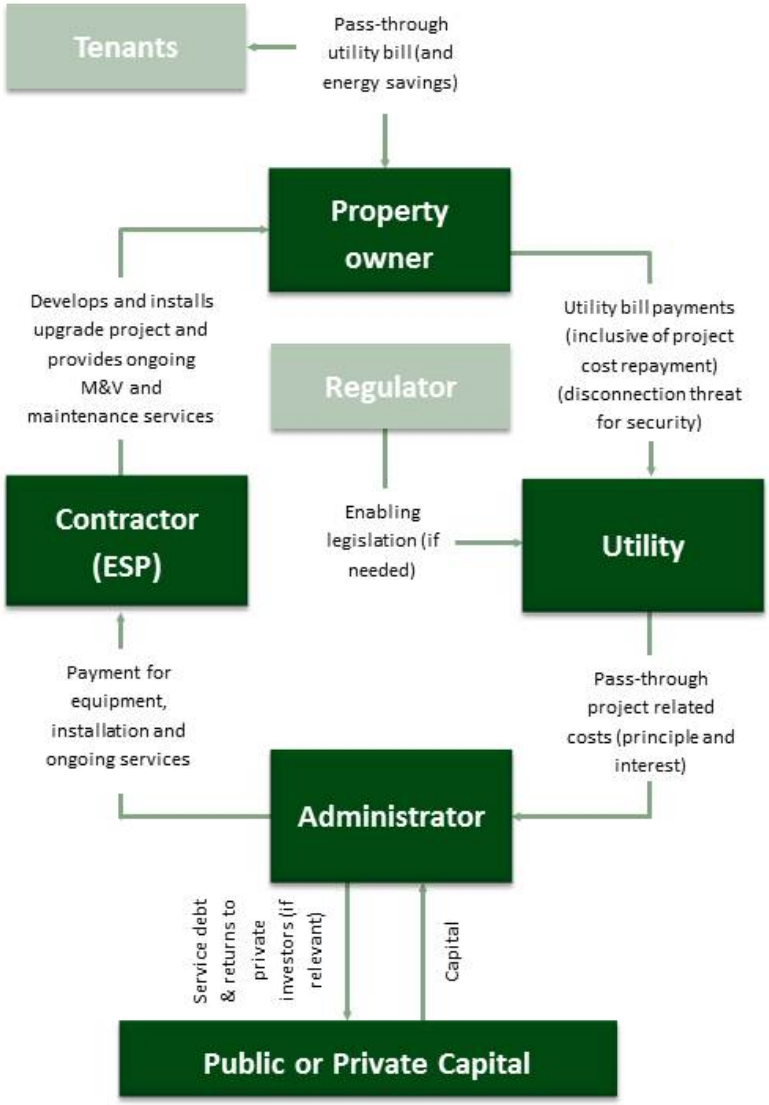
- On-bill tariff financing (see Box 5); and
- Property Assessed Clean Energy (PACE) financing (see Box 6).

As a general rule, lenders will favor a repayment vehicle that is most likely to collect regular, full payments of principle, interest, and fees. New and unfamiliar mechanisms are likely to require some form of credit enhancements and/or strong securitization (see Section 4.5).

[21] It is worth noting that once a certain volume of lending is met, lending for new projects is constrained to the stream of repayments from earlier rounds of lending. For example, if a $100 million RLF makes interest–free loans with 10–year terms and commits all the funds in year one, only $10 million is collected in year two and is available for new loans.

[22] RLFs must, however, absorb all losses from loan defaults, which reduce the capital base with time.

Box 6 Repayment vehicles – on-bill tariff financing



Administrator and partner ESP an upgrade 'project' that generates energy and cost savings.

Projects are debt financed by the administrator, using either private funds (e.g., bonds or lending) or public funds (e.g., tax dollars), or a mix of both

Property owner pays back money borrowed for upgrade over time via a surcharge on their utility bill. Utilities function simply as a repayment vehicle – loan origination and capital are provided by the administrator.

Payment is secured through the utility bill (tied to the utility meter) – the threat of disconnection provides a strong form of security and incentive against non-payment.

Because repayment is secured to the utility meter (and not the property owner) the repayment obligation remains with the property even if ownership transfers. As loan is secured to meter, owners that would not qualify for a bank loan can still access attractive financing (decision depends on payment history and not credit rating or score).

Longer loan terms (with repayment obligation remaining with meter) allows for lower monthly surcharges on bills - making more projects immediately cash-flow positive. Longer-terms also enables deeper upgrades with relatively long payback periods.

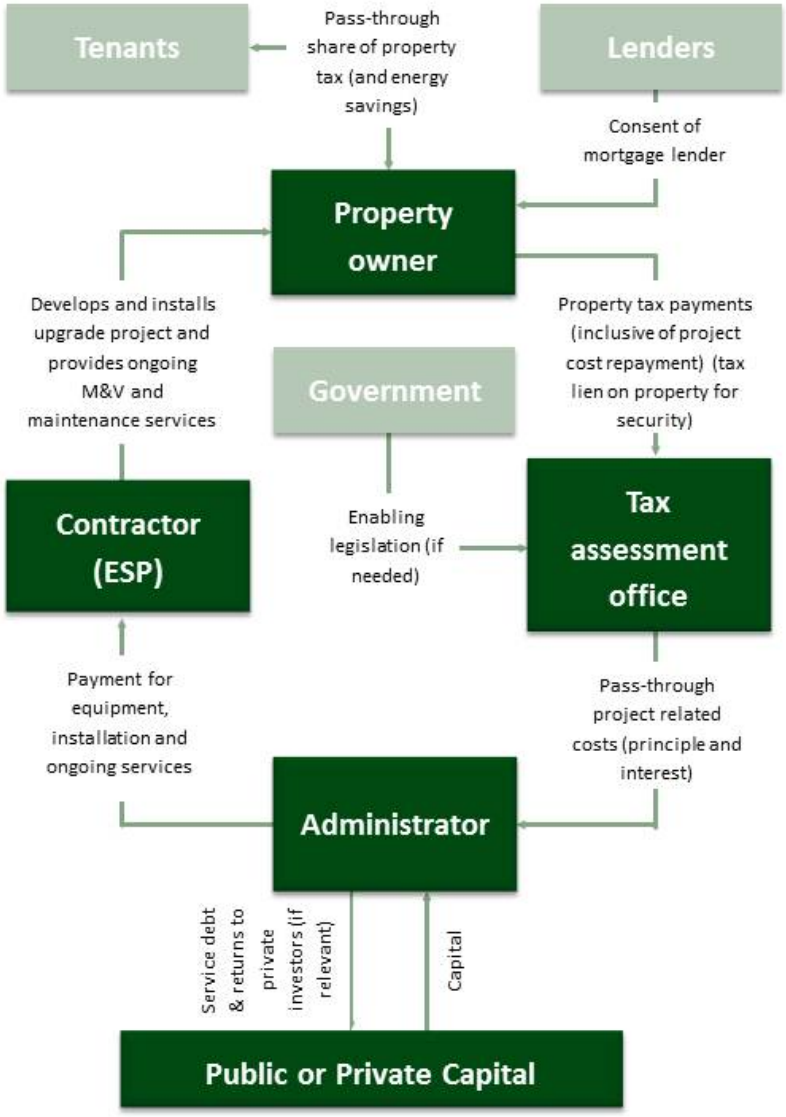
Represents 'off balance sheet' solution – property owner does not take on any additional debt.

Surcharge collected on bill is viewed as a 'pass-through' expense to tenants (addressing the problem of split incentives).

Can be used for selective (fixed, non-portable) upgrades in residential, commercial, public and industrial sectors.

Sources: Hinkle and Kenny (2010), US DOE (2010), IEA (2011), Kapur *et al* (2011), WEF (2011) and Buonicore (2012)

Box 7 Repayment vehicles – Property Assessed Clean Energy (PACE) financing



Administrator and partner ESP offer an upgrade 'project' that generate energy and cost savings.

Projects are debt financed by the administrator, using either private funds (e.g., bonds or lending) or public funds (e.g., tax dollars), or a mix of both.

Property owners pays back the loan through an assessment (surcharge) on their property taxes. This requires the local government to place a lien on the property, which may require enabling legislation. The security provided by the first position lien makes it possible to use private capital from bond markets and makes private FIs more willing to underwrite projects, and lend at commercially attractive rates.

As the assessment is tied to the property (and not the owner) the repayment obligation remains with the property even if ownership transfers. This enables the loan term to be extended over many years. It also enables owners that would not qualify for a bank loan to access attractive financing.

The longer-terms and lower cost of capital results in low monthly surcharges making more projects immediately cash-flow positive. Longer-terms also enables deeper upgrades with relatively long payback periods.

Because the tax-lien is senior to mortgage debt, property owners usually must get the approval of existing (mortgage) lenders before signing up to a PACE-financed project.

Represents 'off balance sheet' solution – property owner does not take on any additional debt.

Can be used for selective (non-portable) upgrades in all sectors, but due to transaction costs minimum project size is $2-3,000.

Surcharge on property tax is viewed as a 'pass-through' expense to tenants (addressing the problem of split incentives).

Sources: Hinkle and Kenny (2010), US DOE (2010), IEA (2011), Kapur *et al* (2011), WEF (2011) and Buonicore (2012)

4.5 Credit enhancements and security

Credit enhancements encompass a variety of provisions that reduce the risk of extending credit to a borrower (so-called 'credit risk'); basically they are anything that improves the likelihood that loans are repaid in full and on time. In the context of funding energy-efficiency initiatives, credit enhancements can be instrumental in terms of (U.S. DOE, 2010):

- Encouraging lenders and investors to finance unfamiliar products (e.g., ESA whole building retrofits where the revenue stream is essentially energy cost savings and not a tangible product);
- Encouraging lenders to provide more commercially-attractive terms, by absorbing or sharing some of the credit risk; and
- Convincing lenders to relax their underwriting criteria and lend to households and businesses that they otherwise would not, again by absorbing or sharing some of the credit risk.

It is important to note that credit enhancements can support the range of financing structures discussed above: private lending facilities, bond issues, PACE financing, on-bill financing, ESAs, etc. An example is credit-enhanced private loans, whereby a third party, backed by public funds, absorbs some of the credit risk that would normally be borne by a private FI. Credit-enhanced loans are financed, originated, and serviced by a private FI, but, due to the reduced credit risk provided by the government-backed third party, are offered with lower interest rates and longer terms. The public funds held by the third party are not used to make loans, but rather to absorb losses from loan defaults or to buy-down the interest rate offered to the borrower. Credit-enhanced private loans are one way of convincing private FIs to make small unsecured loans to homeowners or small businesses looking to invest in energy-efficiency improvements – by reducing their required credit score. They constitute a form of public-private partnership between government and private FIs.

Supporting credit enhancements with public funds through a third party allows government to make the most of limited resources by leveraging their money with private capital. A $1-million loan loss reserve capped at 5 per cent, for example, can support up to $20 million in private FI lending for energy-efficiency initiatives (U.S. EPA, 2011). Credit enhancements can also encourage – and jump start – private sector interest in unfamiliar areas (e.g., energy-efficiency upgrade projects) and underserved markets (e.g., extensive retrofits for residential and SMEs).

The main forms of credit enhancements include (US DOE, 2010 and IEA, 2011):

- Loan loss reserves (LLRs) – funds are set aside (reserved) to help pay for potential losses when borrowers default on their loan. The pool of money set aside typically covers a share of the first losses on individual loans (say, 80 to 90 per cent of first losses) with the total reserve capped as a fixed percentage of the total loan portfolio

principle of the private FI (say, 2 to 10 percent of first losses). As noted above, LLFs can achieve significant leverage of public funds;

- Loan guarantee – is similar to a LLR, except it does not require money to be set aside nor is it capped as a percentage of the total loan portfolio principle. All potential losses of the private FI portfolio are covered. An agreement is signed between the third party and a private FI stating that a guarantee covering all losses will be triggered in the event of a loan default;
- Letter or dedicated line of credit – a third party provides a dedicated credit line to one or more private FIs, providing a set amount of funds for investment in energy–efficiency initiatives at low-interest rates and allowing the FI to lend-on the funds at a higher interest rate. This increases the total size of the available loan pool. The credit line can also include technical assistance. The line of credit in effect buys-down the interest rate offered borrowers;
- Credit insurance – a third party may purchase insurance that covers losses in the event of a loan default. Credit insurance functions similarly to an LLR in that the insurance payouts only cover a percentage of first losses up to some capped amount. But instead of setting money aside in an account, the third party must pay an upfront premium to a private insurer; and
- Subordinate debt – a third party provides capital to be placed into an RLF. Through an agreement with a partner private FI, the capital provided by the third party is classified as 'subordinate' to any ('senior') capital provided by the FI. The subordinate capital absorbs all first losses on loan defaults up to some agreed cap (say, 10 per cent of the total loan portfolio principle). The senior capital does not absorb any losses until the subordinate capital is exhausted. In this way, the subordinate capital absorbs the majority of the credit risk, and in doing so, seeks to leverage (senior) private capital.

Loans can either be secured or unsecured. A secured loan is a loan offered to borrowers with collateral. The collateral provides the lender security that the principle and interest will be repaid and also what they receive in the event that a loan defaults. A property owner can effectively borrow as much as the assessed value of the collateral. This is suitable for property owners, who can clearly offer their property as collateral, and who require larger loans – it is less suitable for tenants. In general, secured loans offer lower interest rates and longer loan terms, because the loan is backed by collateral that can be repossessed in the event of non-payment.

In the context of funding energy-efficiency initiatives, security comes in several forms, as evident from the above discussion (U.S. DOE, 2010):

- A lien on the property (e.g., PACE financing gives the administrator a first-priority lien position in the event of a loan default, allowing them to make a first claim on the proceeds from the sale of a foreclosed property);

- A lien at the meter (e.g., on-bill tariff financing provides strong security through the threat to disconnect utility service); and
- Fixture filings, whereby the administrator can repossess equipment in the event of non-payment. However, this provides a weaker form of security as many energy-efficiency improvements do not necessarily involve the installation of portable assets that can be readily repossessed and resold (e.g., installation, air sealing, etc.).

Unsecured loans, as the term suggests, come with none of the types of security listed above. Instead, credit risks and associated losses are minimized through careful loan origination and underwriting practices. Clearly, with unsecured loans, a borrower can get qualified even when not owning a property. In the absence of collateral, loan amounts also tend to be smaller than with secured loans. Unsecured loans are therefore most applicable to tenants making selective improvements. Interest rates tend to be higher and loan terms shorter, unless backed up by third-party credit enhancements. Compared to secured loans, less documentation is required for unsecured loans, decreasing processing times and costs.

It should be fairly evident from the above discussion that several elements of a funding mechanism for energy efficiency interact. The presence of a strong form of security (e.g., a tax-lien on property), for example, can reduce the level of credit enhancements desired by administrators. Likewise, robust repayment vehicles can also mean that lower levels of credit enhancements are required.

5.0 Administration options

If Alberta is to shift to a new model for funding energy-efficiency initiatives, an examination of whether a change in the institutional arrangements for managing how energy-efficiency funds are spent is also warranted – addressing the question of what would then be the most suitable administration and governance model.

A properly chosen and designed administration and governance model can assure accountability to all stakeholders, especially ratepayers or taxpayers (depending on the funding option chosen). It can ensure that energy-efficiency programs have accountable oversight, effective management, and achieve the greatest savings for a given level of funding (Costello, 2009).

An administrator encompasses all roles required for the planning, management, monitoring, and evaluation of energy-efficiency initiatives. Decisions about which oversight and governance structure to employ depends largely on which administration model is chosen, and is also a key consideration guiding what administration model is best for a particular region like Alberta.

The delivery of energy-efficiency initiatives is a separate function from the administration of initiatives. Delivery constitutes providing whatever services are required for implementation of initiatives. Some examples of delivery tasks include: marketing, providing technical assistance, answering questions, issuing incentive cheques, implementing auditing services, applying verification procedures, etc.

5.1 Oversight and governance

A government agency, department, or utility commission generally provides oversight and governance with respect to energy-efficiency initiatives funded by tax or ratepayer dollars. The oversight body typically specifies an overall budget, performance goals, targeted market segments, and time frames for achievement of stated goals. This body may also be involved in evaluation, measurement and verification, but day-to-day operations of energy-efficiency initiatives are left in the hands of the administrator and contracted delivery agents (US EPA, 2008). In situations involving the use of ratepayer funds, the oversight body conducts hearings and other review processes that pertain to energy-efficiency plans put forth by regulated utilities (as part of general rate applications). Governance of a utility or an independent third party can occur through a board of directors.

5.2 Main organizational models

Three basic organizational models are used to administer large-scale energy-efficiency initiatives. These are:

- Utility administrators;
- Government departments or agency administrators; and
- Independent third-party administrators.

Hybrid models form a fourth category, covering a different situation – specific blends of the three basic organizational models. As such, hybrid models can be very different from one another.

Generally, the private lending options discussed in Section 4.4.3.2, are administered by traditional ESCOs or private companies set up through a mixture of debt and equity specifically to manage ESAs or MESAs. However, there is no reason – in principle – why a government agency or third party could not also administer some forms of private lending options – independently or in partnership with the private sector.

Two key factors delineate organizational types (summarized in Table 2):

- Mandate and driver – The three basic types of organizations have different mandates and/or purposes. For example, a utility's mandate is to generate/procure, transmit, distribute, and/or market energy to customers – and in the case of investor-owned utilities (IOUs) – to increase shareholder value. Different organizational mandates require different internal processes, technical and human capacity, incentives, and communication structures.
- Ownership – Ownership for the different organizational models spans a continuum from strictly public to strictly private. IOUs are wholly privately owned whereas government agencies and departments are at the other end of the spectrum, being entirely publicly owned. Somewhere in the middle of the spectrum lie independent organizations that often have a private board, but exist for the public good and can be subject to various levels of government influence.

Table 2 Key factors distinguishing administrator options

Factors	Government	Third Party	Utility
Ownership	Public	Board members	Shareholders, members, or municipality
Driver	Not for profit	Generally not for profit	For profit and not for profit distributors
Mandate	Multiple, but can be single purpose	Single purpose – pursue energy efficiency	Provide safe, reliable and economic delivery of energy to customers, while growing shareholder value in the case of IOUs
Oversight/Governance	Relevant minister	Relevant minister or AUC	AUC, board of directors, or City Council

5.2.1 Utility administration

Utility is a broad term that encompasses any, often for-profit company that generates or produces/procures, transmits, and/or distributes natural gas and/or electricity. Administration of energy-efficiency initiatives by utilities is generally conducted by two types of utilities (United States Environmental Protection Agency, 2008). These are:

- Distribution only utilities in regions with deregulated energy markets; and
- Vertically-integrated utilities in regions that have not undergone deregulation.

Alberta's energy market is deregulated. Traditionally, distribution-only utilities are used to administer energy-efficiency initiatives in deregulated markets. First, they are generally the only utilities that are regulated and, collectively, provide service to all customers. The latter point is particularly pertinent if the capital source is an SBC; recall the discussion in Section 4.3.2.1.[23] Furthermore, a utility must have regulatory oversight from a utility commission (or in the case of some municipally owned distribution companies, bodies such as a municipal council or board of directors) to ensure accountability relating to the use of ratepayer funds for energy-efficiency initiatives that are not, in the absence of policies to the contrary, aligned with distribution utility financial objectives. If distribution utilities (or a third party or a government agency for that matter) were to act as administrator(s), this would not preclude involving energy retailers or other independent entities in the delivery (and other aspects) of program implementation.

[23] To maximize the effectiveness of an SBC it must be both non–bypassable (cover all sales to all end–users) and competitively neutral (treat all sellers equally). These two criteria can only be met if the SBC is assessed for use on the distribution system.

While it is true that there are regulated rates available through some of Alberta's retail utilities, not all customers choose these regulated rates; therefore, the customer reach of regulated retail utilities is limited. Also, in Alberta, natural gas co-ops, rural electrification associations, and municipally-owned distribution utilities are not regulated by the AUC (except for EPCOR).

Case studies of the utility administration model include: Connecticut, Colorado, and New Hampshire.

5.2.2 Independent third-party administration

Under this model, an existing or newly created independent organization is designated by government or chosen through tender to be the energy-efficiency program administrator. Such organizations tend to be non-profit[24] entities whose central mandate is to pursue energy-efficiency goals for the benefit of the general public, irrespective of the capital source. It is often a single purpose entity, but in some instances, may also deliver other energy related programs (Lipp, 2008). They are incorporated organizations directed by an independent board of directors. They are not owned, per se – not privately, nor by government.

There is often a fine line between a third party and a government administrator. The third-party administrator signifies greater independence from government, but there can be varying levels of government influence (for example, the government may choose to have board members and/or ministers or bureaucrats sit on the board). [25]

Hawaii, Maine, Nova Scotia, Oregon, and Vermont (see Box 7) are all examples of independent administration models in practice.

[24] It is possible for these organizations to make a profit, but it is not their principal purpose and they cannot distribute any portion for private gain (The International Centre for Not-for-Profit Law, 2011).

[25] Because of these blurred lines of distinction, some analysts integrate the independent third-party and government models and title it independent administration of energy efficiency programs (Nichols, 2007).

Box 8 Energy-efficiency utility – example of Vermont

Vermont has recently implemented a unique model – an energy–efficiency utility (EEU) – which is analogous to a supply utility under performance-based regulation. The new structure will be implemented by a regulatory "Order of Appointment" that designates one entity to serve as an EEU for the state of Vermont for a twelve year period. The Order contains all the necessary terms and conditions that were previously provided by contract (to a traditional third-party organization), but also permit improvements, such as:

- Establishing a regulatory, rather than contractual, relationship with the oversight body to permit greater participation in regulatory proceedings and in the Legislature;
- Permitting the EEU to enter into long-term financial obligations, such as partnering with financial institutions to provide financing products;
- Participating in the ISO-New England Forward Capacity Market;
- Enabling the EEU to meet needs for state-wide electricity planning; Creating greater familiarity for the regulator, as the model is analogous to regulated supply utility; and
- Engaging long-term energy supply commitments and partnerships.

For ten years, the Vermont Energy Investment Corporation (VEIC) had three-year contracts to operate Efficiency Vermont under appointment by the Vermont Public Service Board. It is now acting as the state energy-efficiency utility.

Sources: Hamilton (2008) and Lipp (2008)

5.2.3 Government administration

Efficiency programs can also be administered by an existing or newly created government entity. This government entity could be an energy office, a division in a utilities commission, or a government agency, among others. When ratepayer-based funding – specifically an SBC – is used, the utility collects the charge and transfers them to the government entity. (The same would occur if an independent third party were administrator.) An advisory board and/or another public agency may be present to provide oversight (Lipp, 2008).

Examples of government administration models in practice include Alaska, Tennessee, New Brunswick, and Prince Edward Island.

5.2.4 Hybrid administration

In practice, administration models do not adhere strictly to the above organizational structures. Elements of any of the above three models could be combined to create a hybrid approach. The virtues of different models could be adopted selectively and combined to recognize the policies and energy market characteristics that are specific to a region, so as to design the best administration model for that area.
There are two ways energy–efficiency administration can be constituted as hybrid:

1. Different types of organizations take on different roles in energy-efficiency administration, delivery, or type of programs. In Illinois, for example, legislation passed in 2007 requires electric utilities to implement 75 per cent of the demand response programs approved by the Utilities Commission, and the remaining 25 per cent must be implemented by the Department of Commerce and Economic Opportunity.

2. One organization has organizational structure and/or ownership characteristics of two (or three) different models. For example, the Ontario Power Authority (OPA) is an incorporated company with a board of directors, but it reports to the Minister of Energy and a board of directors is chosen by the Minister.

For the purposes of this paper, crown corporation utilities will be considered utility/government hybrids. On one hand, their mandate is to generate/procure/distribute energy, and they possess technical capacity and expertise typical of IOUs. But, political influence on the organization is stronger than is the case of a regulated, pure IOU, given that it is owned by government (although it can have a board of directors upon which sit private individuals).

British Columbia, Ontario electricity, New York State Energy Research and Development Authority (NYSERDA), California, New Jersey, and Delaware are all examples of hybrid model.

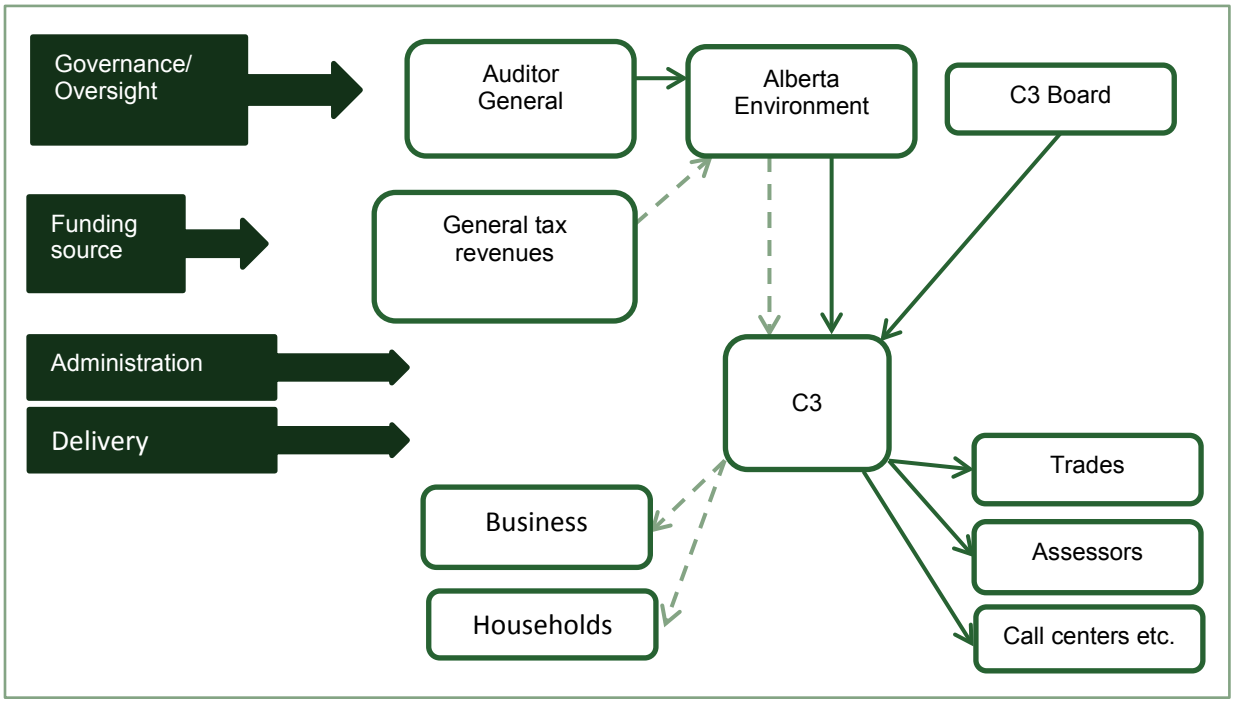
6.0 Funding and administration options

6.1 Alberta's current approach to funding and administration

Alberta's energy markets and its current approach to the funding and administration of energy-efficiency programming provide context for considering alternative approaches. Key considerations going forward will include: Alberta's deregulated energy markets and the number of players in these markets, differences between natural gas and electricity markets, existing governance and oversight bodies, sources of energy-efficiency expertise, and – of course – the capital sources sought.

In Alberta, consumer-based energy-efficiency initiatives are funded almost entirely from general tax revenues. C3, an independent third party, has administered and delivered most of these initiatives during the past 10 years, although some tax-funded initiatives were operated directly by government departments. In these exceptions, oversight was provided by the department controlling the funds. C3 is governed by an independent board of directors upon which also sits the Minister of the Environment and a government elected representative. The Minister or the Minister's delegate acts as the government co-chair. The board elects the Board co-chair. C3 also develops, administers, and/or delivers energy-efficiency incentive programs for municipalities such as Edmonton, Calgary, Spruce Grove, Leduc, Strathcona, Okotoks, and the City of Medicine Hat – whose programs are funded by their Energy Conservation Charge.

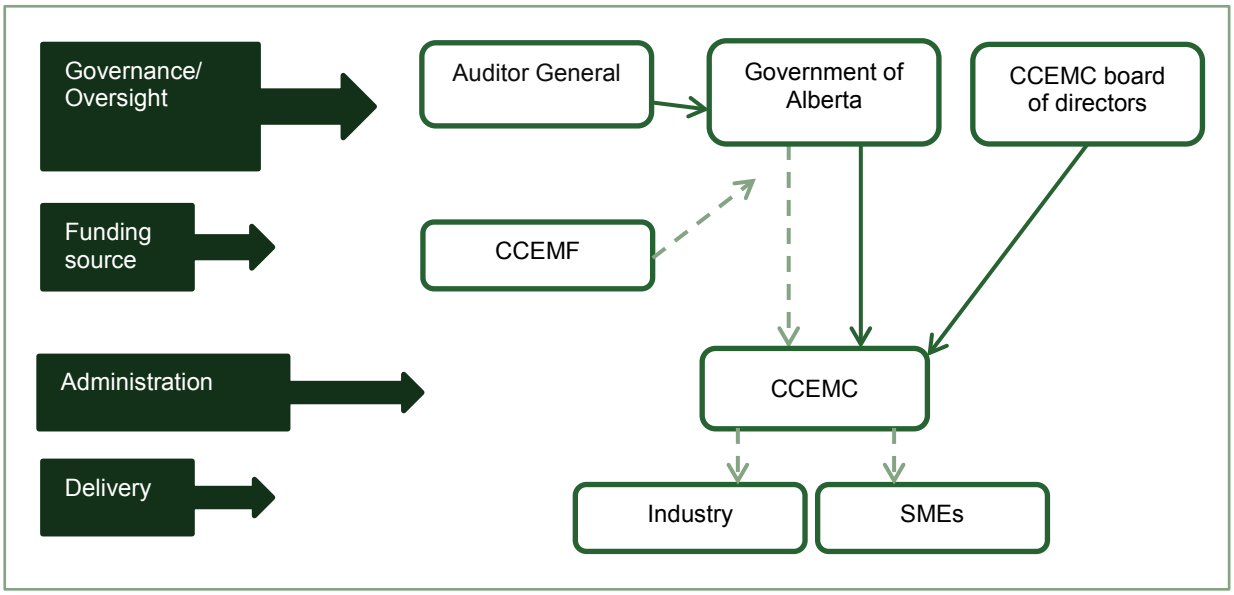
Figure 3 Alberta's current approach to governance, funding, administration and delivery of consumer-based energy-efficiency programs



Capital for energy-efficiency and clean-energy initiatives is also available from Alberta's GHG regulatory system for large final emitters (big industry). Since June 2010, the Climate Change Emissions Management Fund (CCEMF)[26] has been the source of $33.7 million for industrial-based energy-efficiency projects. Many of these projects are in the oil and gas industry and not focused on downstream end-use of natural gas and electricity. Another $17.5 million has been allocated to smaller-scale renewable energy projects (Climate Change Emissions Management Corporation, 2011). Oversight of these funds is provided by the Climate Change Emissions Management Corporation (CCEMC) – an independent non-profit organization governed by a board of directors. Alberta's Minister of the Environment is responsible for advancing monies from the CCEMF to the CCEMC.

[26] The CCEMF is one compliance option under Alberta's emission reduction regulations. Companies that are required to meet the provincial reduction target for greenhouse gas emissions can choose to pay $15 a tonne into the CCEMF for emissions over the target.

Figure 4 Alberta's current approach to governance, funding, administration and delivery of industrial energy–efficiency programs



Finally, a small number of energy-efficiency programs have been funded by ratepayers through the general rate applications of regulated utilities, like ATCO Gas or Electricity.

This approach was called into question recently in a ruling by the AUC on elements of the 2011-2012 general rate application by ATCO Gas (AG) (ATCO Gas General Rate Application, Filing 2011-2012, 2010). AG requested approval from the AUC to include a comprehensive DSM program in its rate base. The request was for funding to continue an existing education and awareness initiative and a small commercial audit program and for a new a research program and a pilot incentive-rebate program in 2012. The AUC denied all of AG's DSM-related requests. The basis of the AUC's decision was that DSM was not intended by the legislature to be among the functions of a natural gas distributor in Alberta.

6.1.1 Alberta's energy market structure

Alberta's electricity and natural gas utilities operate in a competitive marketplace. The AUC fully regulates the delivery of energy to consumers, whereby the commodity price is determined through competitive markets. Retail energy consumers (residential, farm, small businesses, and commercial) may elect to purchase energy from a retail energy provider that is regulated by the AUC, but otherwise there is no regulation of commodity pricing with competitive retail energy providers.

The AUC approves the distribution rates for investor-owned and certain municipally-owned transmission and distribution utilities. Some distribution entities are not regulated by the AUC and their distribution and transmission charges continue to be set by the applicable regulator (by municipal councils or the boards of directors for the Rural Electrification Associations ("REAs",

consortia of rural electric distributors) and natural gas co-ops. Electric pricing is determined based on the electricity clearing exchange operated by the Alberta Electric System Operator (AESO), whereas natural gas pricing is determined based on the procurement costs of the competitive retail provider.

Alberta's electric and natural gas delivery is served by a handful of investor-owned and municipally-owned utilities. There are two investor-owned electricity utilities, ATCO Electric and Fortis Alberta; and municipally owned utilities, like Enmax (Calgary). In addition, Lethbridge and Red Deer have municipally-owned distribution systems, there are 44 Rural Electrification Associations, and Medicine Hat is connected to the grid for standby power only and produces and distributes its own electricity and natural gas. Companies providing natural gas delivery service are AltaGas Utilities, ATCO Gas, Medicine Hat's gas distribution utility, and natural gas co-ops and other smaller entities (56 co-operatives, 16 first nation bands, 12 towns, 6 villages, and 5 counties for a total of 95).

6.2 Considerations and questions for stakeholders on new funding and administration options for Alberta

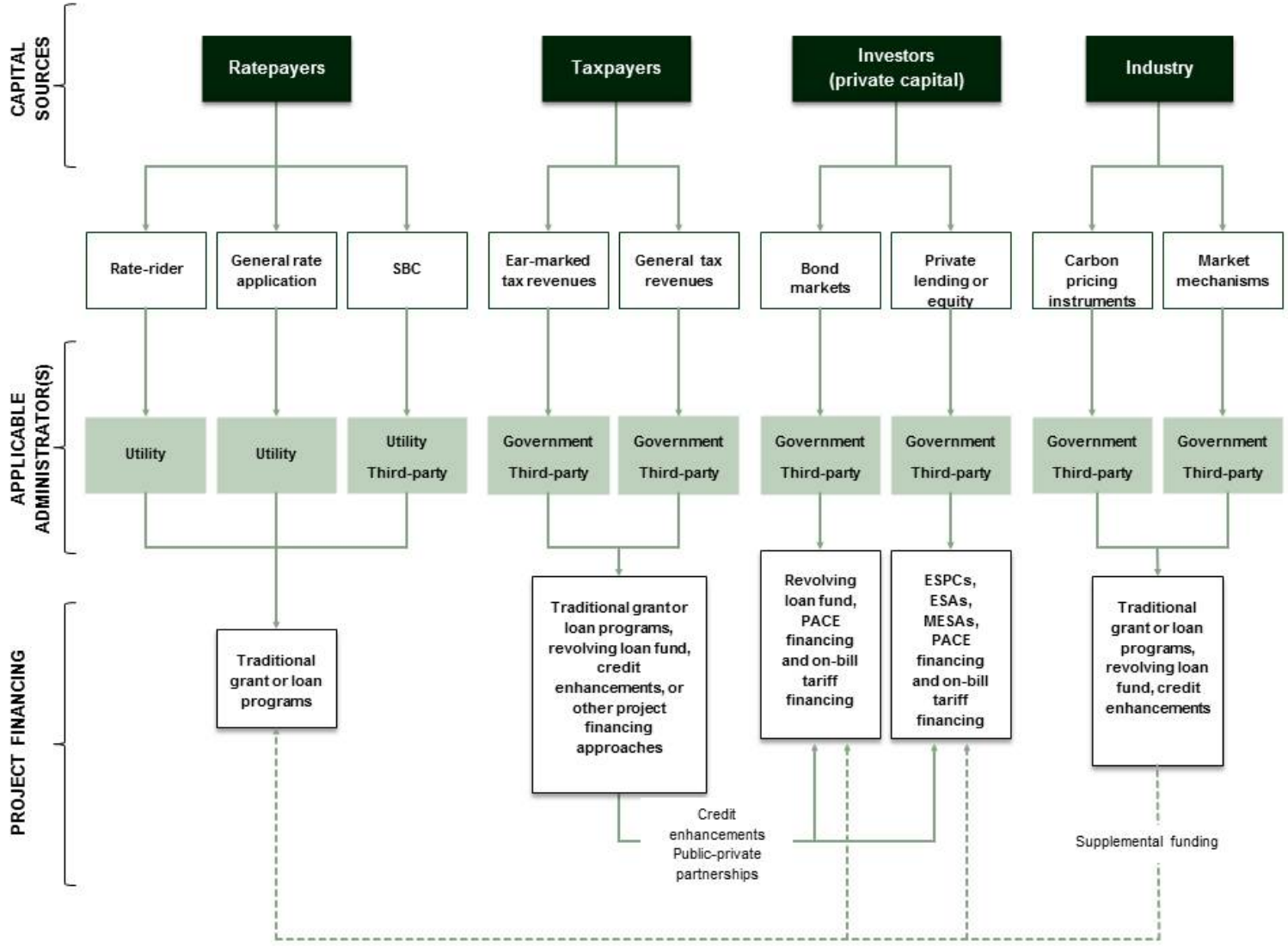
Given the scale of additional investment needed to capture the full, cost-effective potential for energy-efficiency improvements in the province, and the importance of having stable, long-term programs to mobilize the required investment, Alberta should reconsider how energy efficiency is funded and administered in the province. So, what are some of the questions to be answered when appraising the options? Possible combinations of funding and administrations options are summarized in Table 3.

When appraising different administration options, it is worth noting that the delivery of programs (e.g., using an ESP as a third party contractor) can be examined independently. Any delivery option may be combined with each administration option, in which case the delivery options can be appraised independently.

Some potential combinations of funding and administration approaches are obviously not realistic. To our knowledge, there is not one example of utilities receiving tax dollars on an ongoing (recurring annual) basis to provide energy-efficiency programming. The optics of government providing tax dollars to a private sector energy-efficiency administrator with clear conflicts of interest likely makes this option unfeasible. Do stakeholders agree with this conclusion?

It is possible for a government agency to administer a surcharge, like an SBC, but we suspect it is unlikely that the majority of Albertan stakeholders would support a government agency collecting money from ratepayers - it may be viewed as a 'stealth' tax or an attempt at 'larger' government. Hence, the option of a government agency administering SBC funds is not considered further. Do stakeholders agree with this conclusion?

Table 3 Plausible administration and funding options for energy-efficiency initiatives in Alberta



6.2.1 Utilities – Rate case, rate-rider or SBC

Distribution utilities in the province could function as administrators of energy-efficiency initiatives. Each has an applicable oversight body, whether it is the AUC, municipal council, or board of directors. Funding could come through periodic general rate applications, other ongoing rate-based mechanisms, an SBC, or a combination thereof.

Some key questions for stakeholders to consider include:

- Is equitable coverage of energy-efficiency programs in Alberta desirable? Not all distribution utilities may want to administer energy-efficiency initiatives (especially those municipally owned, REAs, or natural gas co-ops). Should they be mandated to manage initiatives (is legislation required)? Can they be incented to provide programs? How? Is the answer to these questions dependent on, or affected by, the funding option(s)?
- Given the strong disincentives IOUs face to run successful energy-efficiency initiatives on a large scale, what mechanisms would be required to overcome these disincentives and what would it cost ratepayers?
- What capacity would the AUC and other bodies overseeing non-regulated utilities need to effectively oversee utility-administered energy-efficiency initiatives? Would the mandate of the AUC (or any other oversight bodies) need to change in order for it to provide effective oversight?
- How could the multiple distribution utilities be best coordinated in administering energy-efficiency initiatives?
- Would new legislation or legislative amendments be required to facilitate the introduction of a separate surcharge on utility bills dedicated for energy efficiency? Given the possibility of multiple oversight bodies, who would oversee the setting, and collection of the SBC? Does it have to be coordinated across the province? Can different levels of surcharge be levied by different utilities to match the needs of their customer base? Should the surcharge apply to both electricity and natural gas? Should the monies be collected centrally and redistributed back to each utility or be retained by the utility?

6.2.2 Third Party – SBC, ear-marked tax revenue, general tax revenues, private lending or equity

An independent third-party administrator could be funded via general tax revenues, an ear-marked tax, private lending or equity, or an SBC. In the latter case, money would flow from the distribution utilities to the AUC and into a fund. The AUC would disperse funds to the third-party administrator on a regular and ongoing basis in accordance with an energy-efficiency plan submitted by the third-party administrator and approved by the AUC.

An independent third party could also be funded – wholly or partially – by private (lending or equity) capital – for example, through a bond issue or in partnership with a private FI. However, as stressed in Section 4.5, to attract private capital into an unknown area like energy efficiency the third party would likely need public 'seed' money to leverage and ramp-up interest from private FIs – for example, to support credit enhancements that reduce risks and encourage FIs to provide capital at commercially attractive terms.

Some key additional questions for stakeholders to consider include:

- What would be involved in setting up an extra-budgetary fund for energy-efficiency initiatives (for example, where would the money come from? Would legislation be required? What would govern ongoing disbursement?
- The AUC seems to be the obvious oversight body for the third-party SBC model. Would legislation be required to establish the regulatory arrangements between the AUC and a third-party administrator? What capacity would the AUC need to develop to provide effective oversight?
- Would new legislation or legislative amendments be required to facilitate the introduction of an SBC on utility bills dedicated to energy efficiency?
- Who would oversee the setting and collection of the SBC? Should the surcharge apply to both electricity and natural gas?
- Is it possible to set up the legal framework to enable a third-party administrator to use a general rate application to fund energy-efficiency programs?
- If private lending or equity is used as a capital source, the capital provider must be remunerated for their investment (repayment of principle and interest/rate of return). Hence, all energy-efficiency initiatives funded by private capital require a repayment vehicle of one kind or another – and the administrator needs to be confident that the initiatives selected for implementation generate energy cost savings at least equal to the repayments (otherwise projects are not cash-flow neutral to property owners). Would the requirement for initiatives to effectively pay for themselves and compensate investors significantly limit the range of feasible projects? What market segments would be excluded? What type of projects or technologies would be excluded? What is the most appropriate project financing model (e.g., PACE, ESA, MESA, etc.)? How is the choice of financing model influenced by policy goals and target market segments? Which model is most amenable to public-private partnerships?

6.2.3 Government – ear-marked tax revenues, general tax revenues or private lending or equity

In this case, the government would establish an executive agency or use an existing department or agency to function as a dedicated administrator of energy-efficiency initiatives. The

distinguishing feature of this option is that the agency would report directly to government, who would act as the oversight body.

Some key additional questions for stakeholders to consider include:

- Is there an existing government department or agency that is well positioned to take on administration of energy-efficiency initiatives? If not, what are the costs of establishing one?
- Will stakeholders view such an organization as being sufficiently independent of government, trustworthy, and efficient?
- How would the choice of department or agency affect its propensity to engage the private sector and form public-private partnerships?

6.3 Supplementary capital from a regulatory or market-based mechanism

In line with practices in other jurisdictions, monies collected through regulatory or market-based mechanisms is viewed as a supplementary – and not a primary – capital source for energy-efficiency initiatives, perhaps supporting credit enhancements like LLRs. As emphasized in Section 4.3.3, there exists a strong economic and environmental case for using some of the CCEMF to fund demand reductions in sectors not covered by the LFE Regulations.

Some key additional questions for stakeholders to consider include:

- What precisely would the funds be used for? For instance, in some jurisdictions, funding from regulatory and market-based mechanisms is used to help ensure an acceptable distribution of energy cost savings between consumers and administrator. Monies raised could also be used to support credit enhancements if private lending and equity capital is to be leveraged.
- How might the CCEMC and AESO and their stakeholders view this proposal?

7.0 Criteria for appraising funding and administration options

A set of agreed criteria is needed to ensure a thorough, consistent, and unbiased appraisal of the options presented above. Based on an extensive literature review of criteria employed in other jurisdictions when appraising funding and administration options, C3 suggests the following criteria be used as a starting point for screening at options for Alberta.

Funding criteria

Criteria	Description
Safe from reallocation	Funds are safe from reprioritization or redistribution for objectives other than energy efficiency and clean energy
Stability	Enables stable, recurring funding over time (five or more years)
Acceptability	Is likely to be supported by the majority of the general public
Adequacy	Funding levels are commensurate with the scope of energy-efficiency efforts targeted
Rapid implementation	Can be implemented with minimal delay and resource expenditures; that is, it does not require changes to legislation or regulations
Short-term rate impacts	Minimizes and/or mitigates short-term increases in utility rates
Expropriates energy cost savings	Requires some energy cost savings to be recovered by administrator via a repayment vehicle
Flexible	Funding levels can be rapidly (say, within year) adjusted to reflect changing opportunities and market conditions

Administration criteria

Criteria	Description
Established organization	• Minimal time and resource expenditures during transition from new to old model • Minimal gap in the provision of initiatives (to maintain continuity) • Administrator(s) has ❶ a long track record of diverse, successful programming, ❷ expertise and knowledge in program design, and evaluation, ❸ existing positive relationships with consumers and other market players
No conflicts of interest	• Single purpose energy-efficiency mandate • No conflicts of interest with that mandate
Cost-effective administration	• Successful delivery of mandate (and associated goals) at minimum administration cost
Coordination	• Minimizes redundancy in activities, roles, and energy-efficiency initiatives • Provincial wide geographic • Centralized and consistent communication and branding of energy-efficiency initiatives • Ability to work with all stakeholders
Adaptability	• Can rapidly adjust portfolio of initiatives to changing opportunities, varying results, and market conditions
Independence	• Free of external (e.g., political) influence in delivery of mandate (and associated goals)
Acceptability	• Is likely to be supported by general public - the option has a high level of public trust

8.0 Moving forward

With a view to encouraging key stakeholders in Alberta to reconsider how energy-efficiency initiatives in the province are to be funded and administered in the future, this paper has:

- Outlined why new approaches to the funding and administration of energy efficiency would be valuable in Alberta;
- Separately identified a complete set of viable funding options and administration options;
- Considered how the administration options could be paired with the funding options;
- Presented a set of commonly accepted criteria against which the options could be appraised; and
- Identified some key questions that need to be addressed by stakeholders going forward.

C3 looks forward to discussing with the Government of Alberta how best to inject the research and knowledge summarized in this paper into discussions relating to the development of provincial and national energy efficiency and resource sustainability strategies.

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