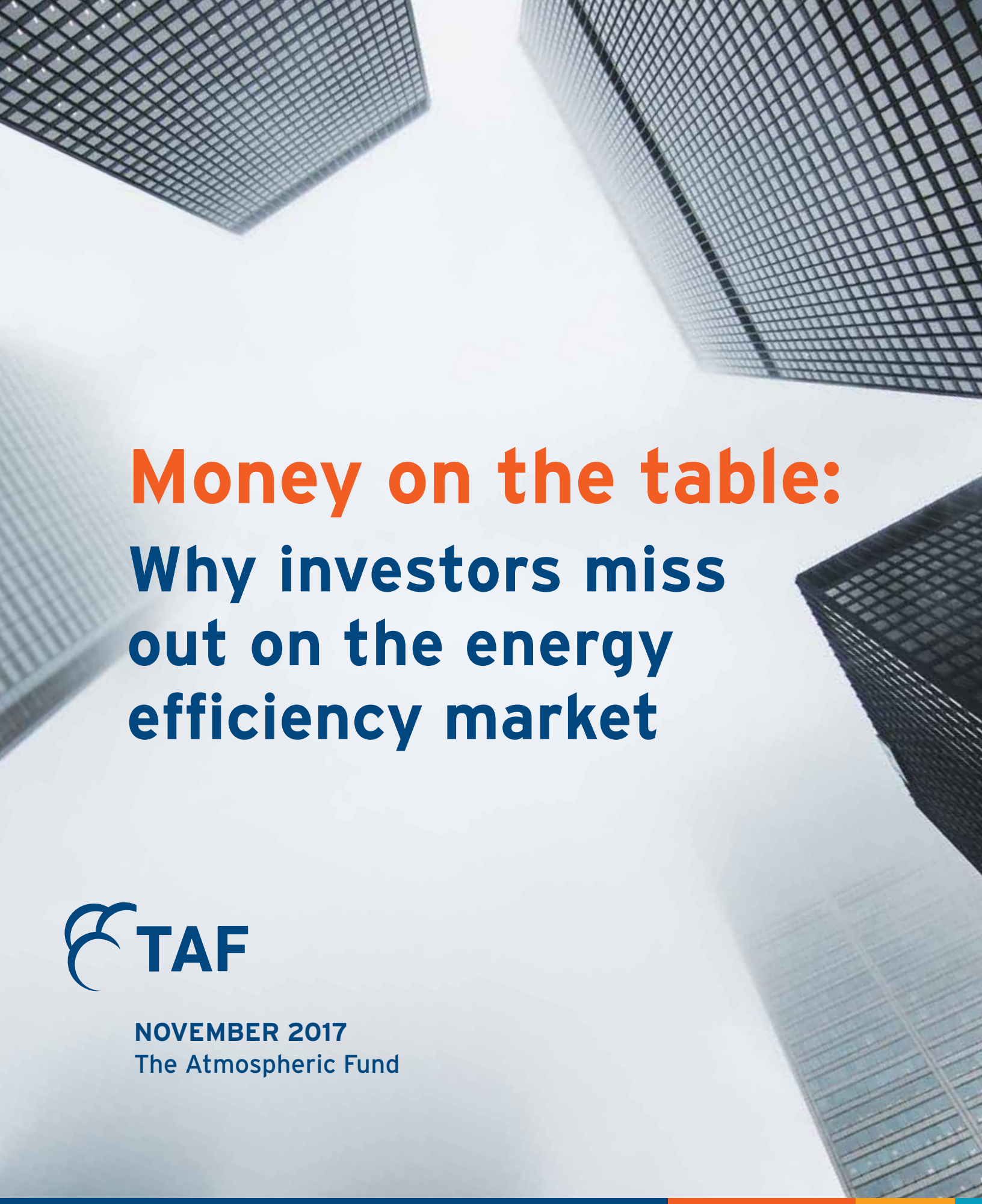

Money on the table:

Why investors miss out on the energy efficiency market

TAF

NOVEMBER 2017
The Atmospheric Fund

ABOUT THE ATMOSPHERIC FUND (TAF)

www.taf.ca

Founded in 1991 by the City of Toronto, TAF's mission is to invest in urban low-carbon solutions to reduce carbon emissions and air pollution. To date, TAF has invested more than $50 million, helping Toronto save more than $60 million in energy costs, and contributed to a city-wide reduction of carbon emissions of 24 per cent below 1990 levels.

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ACKNOWLEDGMENTS

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The views expressed here are those of The Atmospheric Fund and do not necessarily reflect the views of the City of Toronto or the Province of Ontario.

Executive Summary

Energy efficiency retrofits are profitable, yet investment remains timid in Canada. The potential for cost-effective energy efficiency improvements in buildings represents a multi-billion dollar investment market, yet only a fraction is currently being exploited, primarily in Class A buildings. Facing the same market failure, public sector lenders in other jurisdictions have taken corrective actions to help jumpstart capital markets, with considerable success.

The barriers to investment in energy efficiency retrofit projects in the commercial sector can be grouped into two main categories:

Project barriers on the building owners' side:

- These include uncertainty about project performance and savings, competing capital priorities, limited capacity, extended paybacks, and limited understanding of the business case for efficiency.

- Governments and utilities across Canada are working to overcome these barriers through incentive programs, sharing performance data and outreach initiatives, and other enabling strategies, with considerable effectiveness.

Financing barriers on the lending side that cause capital market failures:

- Lenders have a poor grasp of efficiency risk-return profiles; an information gap leads to a confidence gap, which in turn leads to an investment gap.

- Inadequate underwriting and risk management; traditional techniques are used to assess what is actually a new asset class, resulting in turned down or overlooked investment opportunities.

- Partial access to project value stream; the lack of specialized financial products that recognize the structure of individual commercial retrofit projects means that the volume and scale of lending needed to reap the full benefit of this market opportunity is not achieved.

This second set of barriers that lead to capital market failures is the focus of this paper. In contrast to project barriers, failures on the investment side are not well documented, compounding lenders' poor understanding of the risks and returns associated with retrofits.

In the face of these market failures, public and quasi-public lenders in other jurisdiction have stepped in to demonstrate and de-risk investment opportunities in the commercial energy efficiency retrofit space. With the emergence of the Canada Infrastructure Bank and various provincial/territorial programs to advance the Pan-Canadian Framework on Clean Growth and Climate Change, Canada is in a strong position to help move the needle on this key pillar of clean growth. The key is using public capital and proven methods to de-risk longer-term investments and create products and services that help investors capture the full value stream of the commercial energy efficiency retrofit space. This will jump-start investment to the benefit of both investors and the public.

What are energy efficiency retrofits?

Building upgrades that reduce the use of electricity, natural gas and water in buildings are commonly referred to as energy efficiency retrofits and can include the building envelope, HVAC equipment, and building operations. Excellent retrofits are guided by an investment-grade audit and use proven, off-the-shelf products including variable-speed motors, efficient lighting, insulation, condensing boilers, automation systems, and low-flow water fixtures. An integrated, multi-measure retrofit can reduce energy use by 20-30 per cent and generate a double-digit Internal Rate of Return (IRR).

The following evidence of capital market failures in the efficiency investment space was identified by consulting lenders (banks, public lenders, and specialized investors), reviewing literature from sources including the World Bank, and examining case studies that highlight successful lending practices from public and quasi-public lenders that address these failures.

The conclusion is clear: market failure in the energy efficiency investment space can be detected and corrected. What we need are strategic actions by public and quasi-public lenders, as examples at home and abroad show, to demonstrate and de-risk this investment opportunity. As the saying in the energy efficiency financing industry goes: "There are $20 bills lying on the ground, and people are not bending over to pick them up!" What is Canada waiting for?

Market Failure #1: Poor grasp of efficiency risk-return profiles

DESCRIPTION

Efficiency retrofits are often complex projects that most financial institutions are not familiar with. Unlike other asset classes, standardized protocols for planning and presenting retrofit projects for financing are not in common use. However, the Investor Confidence Project (ICP) and the Efficiency Valuation Organization's International Energy Efficiency Financing Protocol (EVO-IEEFP) could fill this gap. Right now, each project is routinely treated as a unique investment. Few analysts and bankers specialize in these types of projects and thus lack the technical knowledge to underwrite them.

EVIDENCE

The evidence of lenders' poor grasp of efficiency project risk-returns is seen in three key failings:

Misunderstanding project performance:

Lenders generally don't understand retrofit measures and how to evaluate performance (i.e. the bill savings at the root of the returns), and therefore tend to over-estimate risk and under-estimate value. This is compounded by the mistaken impression that retrofits involve new, unproven technologies, despite the fact that most measures used for commercial building retrofits are standard, off-the-shelf goods and services.

> *"The root cause of current market barriers / inefficiencies is existing lenders' insufficient understanding of the risk profile and track record of [energy efficiency] projects."*

Booz & Company, 2013

Retrofit performance dynamics not recognized by lenders:

Lenders often don't understand the subtleties of multi-measure projects, and focus on simple payback rather than the net-present value or total return on investment. This creates a bias against comprehensive retrofit projects. Instead lenders favour cherry-picking single measures with quick payback and lower upfront costs, which deliver fewer energy saving benefits.

> *"Lenders often have limited experience with low-carbon projects, have little awareness of the opportunities, and lack the technical knowledge capacity to appraise them. Investors are sensitive to the lack of transparency regarding government policies and tend to overestimate technology risks and levels of capital needed."*

World Bank, 2012

Overestimation of risk:

Lenders tend to overestimate technology risks and underestimate the value energy efficiency offers as a hedge against energy price uncertainty. Since they do not have access to a clear track record of projects in this field, lenders overestimate the risk profile of such investments.

> *"Another important kind of information asymmetry includes the financiers' lack of information or knowledge of the commercial viability of green technologies... [resulting] in excessive risk aversion by investors towards... energy saving technologies."*

G20 Green Finance Study Group, 2016

TAKEAWAY: An information gap concerning energy efficiency technologies leads to a confidence gap, which ultimately leads to an investment gap.

KEY SOURCES:

- Green Infrastructure Finance (World Bank, 2012)
- G20 Green Finance Synthesis Report (GFSG, 2016)
- New York State Green Bank (NYSERDA, 2013)
- State Clean Energy Finance Banks (Berlin, Hundt, Muro, & Saha, 2012)
- Sustainable Infrastructure Imperative (GCEC, 2016)
- The UNEP-SEFI Public Finance Alliance (UNEP, 2008)

Market failure #2: Inadequate under-writing and risk management

DESCRIPTION

Standard underwriting techniques do not accurately value energy efficiency retrofit projects, nor do they leverage risk management tools available to other asset classes. Retrofit projects exhibit different cash flow streams than more traditional investments (high upfront costs coupled with low operating costs), different risk structures (variable bill savings), different credit profiles (debt service is linked to savings rather than income), and different social and environmental externalities (e.g. reduced air pollution, increased public health).

EVIDENCE

This market failure manifests itself in a number of ways in Canada and around the world:

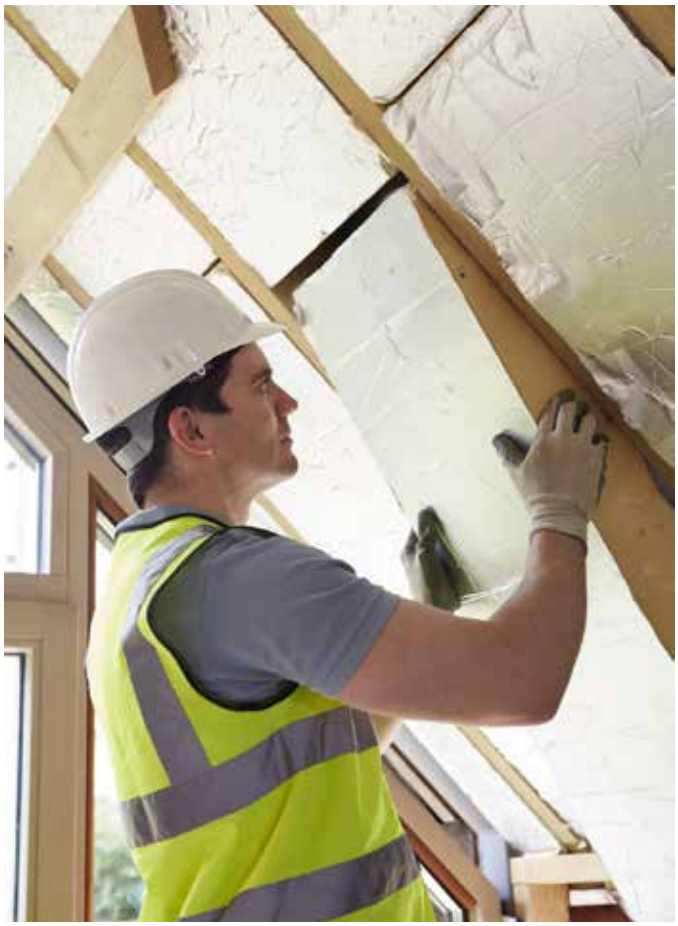
Under-utilization of risk management tools:

In contrast to conventional energy projects, performance guarantees, insurance of the projected savings, and credit enhancements are rarely used in commercial energy efficiency retrofit projects. The limited scale of most retrofit projects and perceived uncertainty often result in disproportionately high transaction costs for complex financing arrangements and other risk management tools.

> *"Because of perceived higher technology risks and return uncertainty, risk management products (e.g. insurance) are more expensive for [energy efficiency] technologies."*
>
> United Nations Development Programme, 2011

Heavy discounting of future cash flow:

Commercial retrofit projects are predicated on high up-front capital requirements, followed by a steady stream of energy bill savings through the operating years. This is especially problematic as multi-measure retrofit projects routinely have payback periods longer than the normal five-year mortgage. Instead of using more appropriate measures such as net present value (NPV) or profitability index (PI), investors often gauge projects in terms of payback, favouring projects that return invested capital in two



to three years. This approach excessively discounts future cash flows and significantly restricts the number and range of energy efficiency retrofits that pass investment decision-making screens. While investors value projected revenue generation, e.g. from new products, the avoided expenses associated with energy efficiency are not given the same value.

> *"Given the upfront characteristics of the cash flows, the higher the [hurdle rate] used when considering the investment decision, the more disadvantaged a green investment would be when compared, for example, against a typical coal-fired plant."*
>
> World Bank, 2012

Undervaluing projects due to externalities:

Externalities are not fully accounted for in the private valuation of retrofit investments. This is true of both negative externalities such as carbon emissions, and positive externalities such as social co-benefits.

> *"The positive externalities—cleaner air, reduced emissions, ecosystem service, [increased comfort and many others]—can be hard to calculate and ever harder to monetise to become a return for the investor."*

Global Commission on the Economy and Climate, 2016

Significant segments of the commercial sector are unable to access financing for retrofits:

Small and medium-sized businesses struggle to access capital for profitable energy efficiency retrofits—largely as a result of complex credit-worthiness assessments and split incentives. This leaves a significant segment of commercial buildings unable to access financing.

> *"Overall Kreditanstalt für Wiederaufbau (KfW) loans have been a big success: from 1996 to December 2004 they provided over 330,000 loans spread out over 850,000 buildings. Some 95% of those loans were for refurbishment and have had an especially important role in upgrading the energy performance of the building stock in East Germany [that would not have had access to financing]."*

Baden, Fairey, Waide, & Laustsen, 2006

The mortgage insurance industry has caught on, but it hasn't trickled down to lenders:

CMHC and Fannie Mae have created "energy efficient mortgages", which increase borrowing limits but require no additional down payment or income requirements, thereby recognizing the value stream generated by efficiency upgrades. Despite the mortgage insurance industry's willingness to take on this risk (more debt for the same property), lenders do not promote these products, and still rely on conventional mortgages. Since lenders generally focus on products they can sell quickly, easily and in high volumes, the lack of streamlined, specialized efficiency financing products presents a barrier to energy efficiency work.

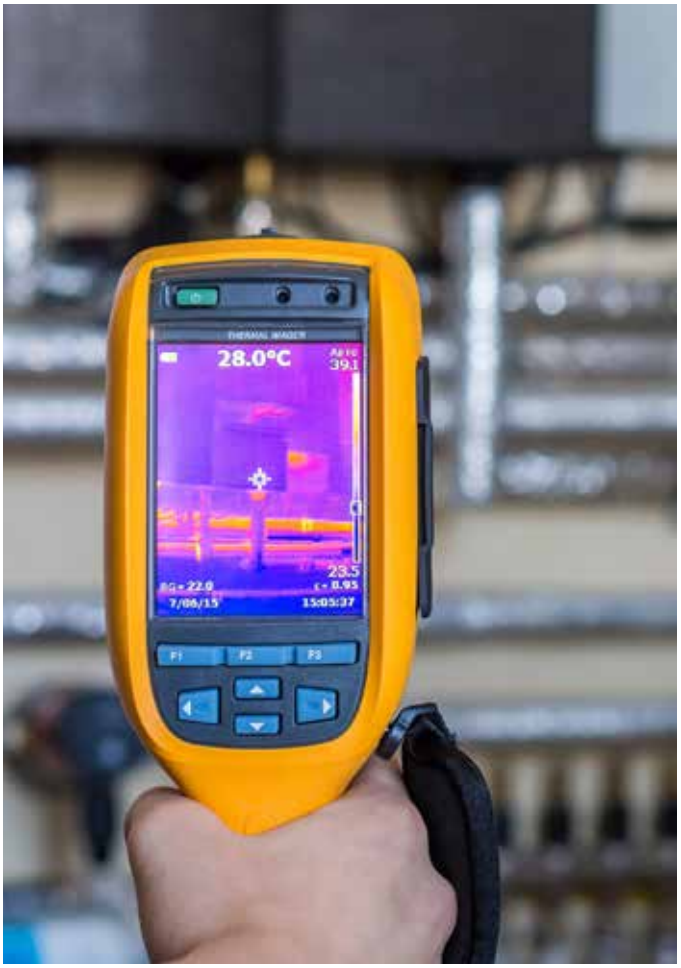
> *"Traditional GHG-emitting investments are supported by a sophisticated and well-organized financing and investment framework that is well established. In contrast, the framework for financing green investments is still in its infancy and its sponsors have limited experience in this market."*

World Bank, 2012

TAKEAWAY: Conventional techniques are still used to assess what is actually a new asset class, causing investors to leave money on the table.

KEY SOURCES

- Catalyzing Climate Finance (UNDP, 2011)
- Hurdling Financial Barriers to Low Energy Buildings (Baden, Fairey, Waide, & Laustsen, 2006)
- Toward a Green Investment Bank for Canada (Canadian Coalition for Green Finance, 2016)



Market failure #3: Partial access to project value stream

DESCRIPTION

The size, scale and structure of the capital outlay and cash flows of commercial energy efficiency retrofit projects make the value stream difficult to access for lenders in the absence of support. Public and quasi-public institutions in various other jurisdictions (see case studies on the following pages) have been highly successful in mobilizing untapped private capital through specialized financial products, addressing this market failure.

EVIDENCE

This market failure manifests itself in a number of ways in Canada and around the world.

Relatively small loan size insufficient for large investors:

Commercial retrofit projects are usually relatively small in scale, often falling short of thresholds that institutional investors typically seek. These investors want to sign a single $100 million cheque, not a hundred $1 million cheques. In the absence of project aggregation or standardized programs, large investors cannot access the robust value of these retrofit projects.

> *"[A] clean energy finance bank can serve a useful purpose in aggregating small-scale loans or pooling demand for commercial loans."*

Berlin, Hundt, Muro, & Saha, 2012

Split incentives on the borrower's side of the equation:

The benefits of energy efficiency are not always reaped by the person making the initial investment. A commercial building owner will not directly benefit from a retrofit's energy savings if the tenant pays the utility and maintenance costs. This added complexity requires specialized transaction structuring (e.g. green leases), further adding to transaction costs in the absence of economies of scale.

> *"Misplaced or split incentives take place when agents responsible for [energy efficiency] investments are different from those benefitting from the resulting energy savings."*

United Nations Development Programme, 2011

Retrofit projects fall between established asset classes and stay under the radar:

Energy efficiency retrofits have yet to find a home in an established asset class. They don't fall under energy or real estate. Neither is energy efficiency recognized as a separate asset class. Specialized protocols and products that recognize the uniqueness of retrofit investments have not yet been developed, which prevents highly structured investors from entering the market. The Investor Confidence Project seeks to create the standardization and tools needed to recognize efficiency investments as an asset class.

> *"Institutional investors would love to see this class of asset... [but] they won't reach for it; it has to be on the platter, pre-cut."*

Ken Locklin, Managing Director, Impax Asset Management

TAKEAWAY: The lack of specialized, standardized financial products that recognize the structure, scale and dynamics of individual commercial retrofit projects prevents investors from participating in and reaping the full benefits of this market opportunity.

KEY SOURCES

- How to convince Wall Street to invest in energy efficiency (Justin Gerdes, The Guardian, 2013)
- State Clean Energy Finance Banks (Berlin, Hundt, Muro, & Saha, 2012)
- The Green Investment Bank (House of Commons Environmental Audit Committee)

Market Failure Fixes: Case Studies

These three market failures are not unique to Canada. Jurisdictions around the world have been grappling with the lack of lending for commercial energy efficiency retrofits. Many public and quasi-public organizations have taken action, often leading to a significant change in market behaviour, confirming the existence of market failure in the first place.

Case study #1: Proving the market via a track record of success

Public or quasi-public sector lenders have helped demonstrate the market size and returns stemming from commercial energy efficiency retrofit opportunities by building a track record of profitable ventures:

Engaging in select lending activities

Germany's Kreditanstalt für Wiederaufbau (KfW), the country's infrastructure bank, has offered energy efficiency loans for years. From 1996 to 2004, KfW provided over 330,000 loans covering over 850,000 buildings, and has been credited for improving the energy performance of the existing stock in former East Germany. In 2004 alone, these loans amounted to more than 4.4 billion euros (Baden, Fairey, Waide, & Laustsen, 2006).

Bulgaria's Energy Efficiency and Renewable Sources Fund, one of the first 'green banks', was initially capitalized with $15 million. With support from the Canadian firm Econoler, it provides loans, co-financing, and guarantees which has opened up the retrofit market for other investors. Formerly called the Bulgarian Energy Efficiency Fund, the fund has maintained a very low default rate (less than 2 per cent) and covers all its operating costs through returns.

The City of Toronto provides low-interest financing to municipal divisions, agencies, and community-based entities including social housing providers to support conservation, energy efficiency, and renewable energy projects. The interest rate provided is the City's cost of borrowing and is a fixed rate for the length of the funding agreement (up to 20 years).

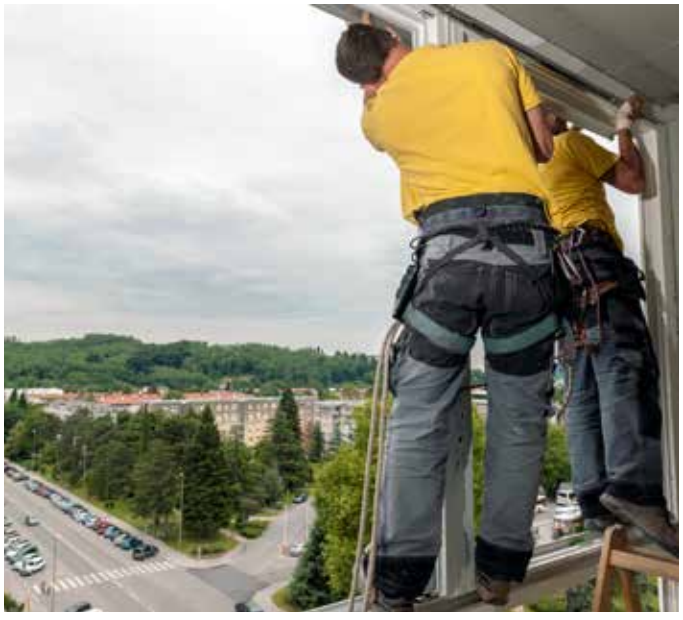
Piloting new financing models, and eventually turning them over to the private sector

In Canada, The Atmospheric Fund (TAF) successfully pioneered the Energy Savings Performance Agreement (ESPA™) with local clients in the institutional and social housing sector. A stand-alone for-profit company is set to commercialize the concept. Similarly, the Connecticut Green Bank sparked the Solarize Connecticut pilot, aimed at financing residential solar photovoltaic (PV) systems. The pilot evolved into a stand-alone lending product supported by private capital.

Providing energy efficiency investment performance data to support private sector appraisal

In Europe, public institutions have set up the DEEP (De-Risk Energy Efficiency Platform). DEEP provides detailed analysis on the performance of energy efficiency investments, with the explicit goal of "supporting the assessment of the benefits and financial risks" associated with these loans.

These activities validate and aim to remedy Market Failure #1, namely the information gap that leads to a lack of investor confidence. Such gaps result in high risk premiums, high interest rates, and low loan volumes. Addressing them has opened new markets and attracted new players to the efficiency financing space. Such activities only need to remain in the hands of public or quasi-public organizations until the private sector picks up the mantle.



Case study #2: De-risking longer-term investments

Public or quasi-public sector organizations have clearly demonstrated how the market's misunderstanding of the risks holds back investments in energy efficiency. By shouldering the risk themselves, they have mobilized billions in private capital that otherwise would have been left untapped.

Capitalizing and managing credit enhancements through loan loss reserves and loan guarantees

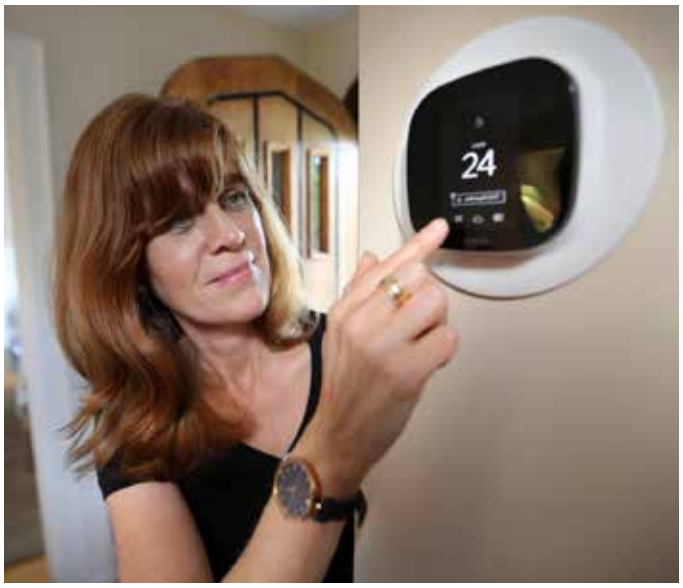
In 2014, the California Alternative Energy and Advanced Transportation Financing Authority established a $20 million loan loss reserve to cover any demonstrated mortgage lender losses resulting from Property Assessed Clean Energy (PACE) financing transactions. This small public investment has since unlocked over $2.5 billion in private lending for PACE improvements in the state. Similarly, the U.S. Department of Energy offers up to $4.5 billion in loan guarantees in support of projects in renewable energy, energy efficiency, efficient generation, transmission and distribution technologies.

Establishing first-loss position bonds

Establishing a stratified set of bonds to capitalize a pool of securitized loans can be an effective mechanism to reduce borrowing costs on the majority portion of the capital. By taking a first loss position on the first 10-20 per cent of bonds carrying, public lenders can sell the remaining 80-90 per cent as low-risk assets at a low interest rate (possibly AAA-rated). Governments or other quasi-public institutions (such as Green Banks) buy the first-loss bonds, while the private sector purchases the remaining low-risk bonds. The Rhode Island Infrastructure Bank used first-loss position bonds to capitalize the Efficient Building Fund, a revolving loan fund that finances energy efficiency and renewable energy projects in large public buildings.

Developing tools to streamline transactions, reduce complexity and performance uncertainty

Several U.S. quasi-public institutions – including the Connecticut Green Bank, Colorado C-PACE, the New York City Energy Efficiency Corporation – have helped develop and implement the Investor Confidence Project. Its protocols standardize energy efficiency project finance to create investor-ready assets that can be more easily underwritten and resold in capital markets. The ICP also offers lenders brand recognition similar to the LEED building performance rating system, but with much lighter costs and complexity.



These activities provide compelling proof of Market Failure #2, namely difficulties in assessing and managing the risk of retrofit projects. In all the programs examined, the perceived risk has not materialized, and to date, the public lenders incurred little to no losses in de-risking lending activities in the commercial energy efficiency space. Instead, the new products generated substantial loan volumes.

Case study #3: Creating products and services that help investors capture the full value stream

Public or quasi-public sector organizations have helped jumpstart capital markets through products that benefit from an expanded value stream. This increases the applicability and attractiveness of efficiency investments:

Bringing incentives, carbon pricing, and other benefits of energy efficiency loans upstream

The Connecticut Green Bank combines funds from regional emissions cap-and-trade proceeds, federal U.S. tax credits and renewable energy credits to reduce interest rates. This supports cash-flow positive financing for building retrofits and distributed solar power generation through private lenders.

Integrating efficiency financing with deferred maintenance needs

A number of lenders recognized the opportunity to finance efficiency in large public and multi-family buildings. They couple deferred maintenance needs with efficiency upgrades and offer these comprehensive loans during the strategic facility refinancing period. Examples include the Rhode Island Infrastructure bank's C-PACE program, the Emerald Cities Collaborative municipal facilities program and the City of Toronto's HiRIS program.

Warehousing and aggregating commercial energy efficiency retrofit loans

The Connecticut Green Bank partners with lenders to offer a suite of financing programs, from C-PACE to low-interest loans. The institution warehoused and executed the first securitization of commercial efficiency assets, a portfolio of PACE loans, in 2014. It no longer needs to perform this function, as private investors now make direct investments.

These activities especially highlight Market Failure #3— investors struggling to access energy efficiency assets in a format that suits their needs. These creative products provide evidence that addressing this failure can fill the gap and help efficiency investments reach new markets, including the important secondary markets needed for sustainable recapitalization.

These cases are a small sample from the North American energy efficiency market. Additional actions have been undertaken in Europe (via the U.K.'s Green Investment Bank, which was successfully privatized after proving the market), Australia (via the Clean Energy Finance Corporation) and Japan (via the Green Finance Organization).

Conclusion

The demand for energy efficiency retrofit financing is not met by financial institutions as the large volume of ignored profitable investment opportunities shows. There are clearly two sides to the problem – the supply side and the demand side.

On the efficiency retrofit demand side, building owners and operators face well-understood and documented barriers. Primary among these is the poor understanding of the business case for energy efficiency upgrades, overestimated performance risks, internal competition for building owner capital, extended paybacks, and challenges accessing affordable capital.

This does not negate that there are also challenges on the capital supply side of the equation. While there is relatively little formal literature to cite, authoritative agencies like the World Bank, national and state governments, as well as academic and non-profit institutions have examined the issue. Likewise, many practitioners in the field have experienced the frictions.

Drawing on the information available, our analysis distilled the evidence into three forms of key capital market failures and subsequent implications:

1. Lenders have a poor grasp of efficiency risk-return profiles. This information gap leads to a confidence gap, which ultimately creates an investment gap.

2. Risk management tools are underutilized and standard underwriting does not fully consider the value of efficiency, limiting access to capital.

3. Lenders have not established specialized products to capture the full value stream of this new asset class, which hamstrings efficiency investments. Unreasonable credit assessments, along with high discounting of future savings, increase the cost of capital for efficiency investments, undermining the market demand.

Our research also found institutions that offer specialized financing products that alleviate these failures. These are promising solutions that show how to improve the supply of efficiency capital.

The case for strategic financing programs and products to open up this multi-billion dollar investment opportunity is clear. Here in Canada, boosting the energy efficiency of our building stock will help achieve our Pan-Canadian climate targets, create local clean economy jobs, and yield public health benefits. Inaction would mean leaving more on the table than just money.

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