LESSONS FROM THE CIF EXPERIENCE IN SCALING-UP ENERGY EFFICIENCY: CASE STUDY REPORT

CARBON TRUST

CTF CLEAN TECHNOLOGY FUND

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The $8 billion Climate Investment Funds (CIF) accelerate climate action by empowering transformations in clean technology, energy access, climate resilience, and sustainable forests in developing and middle income countries. The CIF's large-scale, low-cost, long-term financing lowers the risk and cost of climate financing. It tests new business models, builds track records in unproven markets, and boosts investor confidence to unlock additional sources of finance.

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The Carbon Trust is an independent, expert partner of leading organisations around the world, helping them contribute to and benefit from a more sustainable future through carbon reduction, resource efficiency strategies and commercialising low carbon technologies.

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CONTENT

1. INTRODUCTION

Purpose of the study

The Climate Investment Funds (CIF) were established in 2008 to provide scaled-up climate financing to developing countries to initiate transformational change towards low carbon, climate resilient development. Channelled through multilateral development banks (MDBs), the CIF encompass two funds: the Clean Technology Fund (CTF) and the Strategic Climate Fund, which includes three targeted programs – the Forest Investment Program (FIP), the Pilot Program for Climate Resilience (PPCR) and the Program for Scaling up Renewable Energy in Low Income Countries (SREP). Contributor countries to the CIF have pledged more than USD 8.3 billion to fund preparatory activities and investments in 72 countries.

The CIF Administrative Unit, in collaboration with the CIF's multilateral development bank (MDB) partners, sought to undertake an analytical exercise to draw lessons from the experience of the CIF and international finance institutions in supporting investment in energy efficiency. The aim of this study was to better understand the effective use of public finance – in particular concessional climate finance provided through the CIF – in scaling up investment in energy efficiency, mainly in middle income countries.

The study created a common framework to analyse and evaluate the whole portfolio of CIF-funded energy efficiency programs. The framework was used to prioritise 8 programs out of the 43 comprising the portfolio, looking at drawing lessons across a variety of dimensions, including sectors (e.g., industrial, residential, buildings), program models (e.g., credit lines, energy efficiency funds, utility financing, public financing, guarantees, etc.), and scale of beneficiaries (e.g., households, SMEs, large industry). Finally, these lessons were discussed in two invitation-only dialogues featuring a broad selection of energy efficiency stakeholders including MDBs, commercial banks, funders, and governments from a number of countries where the CIF is active.

The study also set out to explore how concessional finance can best be utilized to attract institutional investors to invest in energy efficiency (e.g., through investments in funds or facilities). Energy efficiency can offer very high returns, but the actual level of risk of underlying investments is poorly understood by institutional investors. In the effort to scale up investments, the participation of institutional investors would be key. However, the perceived risks of energy is remain high, and there are few examples of funds that are returning the expected value to investors. The aim of this research was to systematize the current understanding of institutional investors and insurance funds' reluctance to invest in energy efficiency and find appropriate countermeasures that could be pursued by the MDBs using concessional finance.

The lessons generated through this work will inform future efforts by the CIF, its MDB partners, and other public and private actors supporting and/or undertaking investment in energy efficiency on how best to realise this opportunity. This analysis will focus on demand-side energy efficiency.

1.1 Methodology

Prior to this project, the Carbon Trust undertook an independent study looking into energy efficiency best practice, entitled: *Available, Attractive, Too Slow?* This study involved the development of a common assessment framework for examining publicly-financed energy efficiency programs as part of our thought leadership project.

The study looked at 10 case studies across 4 different continents, whilst leveraging insights from over 15 interviews with leading development banks, commercial investors, program implementers and non-governmental organisations. This work was used to develop a framework that sets out the most important questions that need to be asked when designing an effective energy efficiency program or intervention. This framework formed the basis for the analysis and categorisation of the CIF-funded case studies in the present this study.

The overriding question is to ask whether the CIF-funded programs contributed to creating sustainable change. To explain why they did, or did not, our framework asks five preceding questions (Figure 1).

These questions form a systematic architecture for how to think about designing effective (in terms of GHG emission reduction and energy savings) and sustainable (via continued private sector investment) programs. The framework was refined according to further literature study, as well as collaboration with Thomas Dreessen, our technical expert, and the CIF Administrative Unit. This led to a number of question that were asked of every CIF program, as illustrated in Table 1.

Figure 1: Common assessment framework

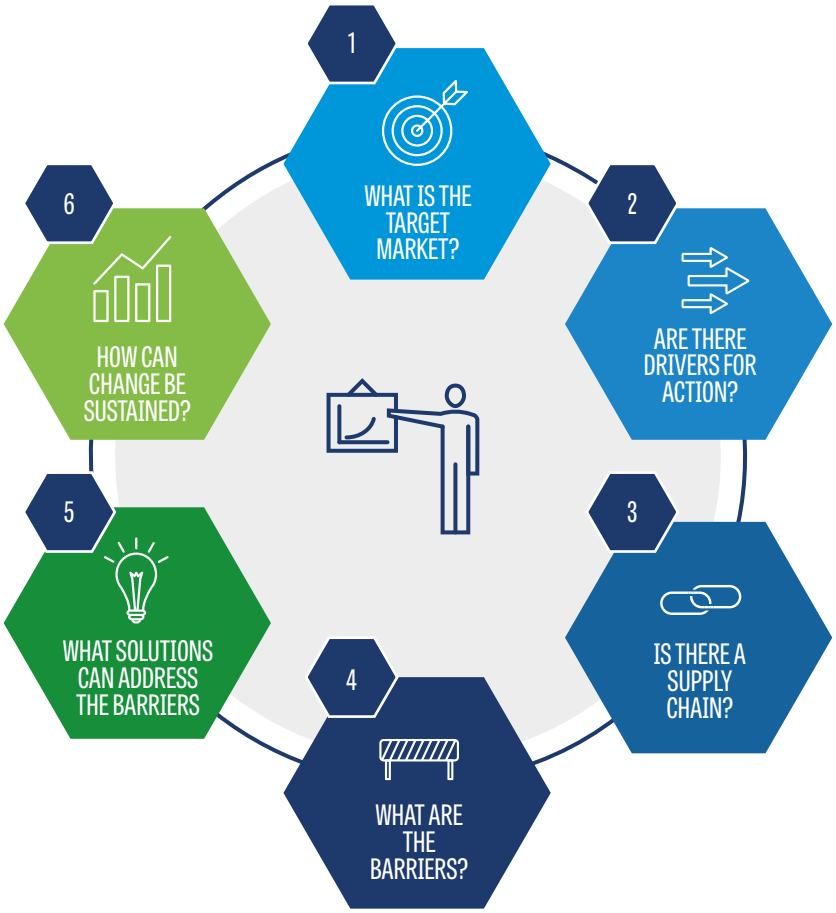


Table 1: Framework questions

Target market	Drivers	Supply chain	Barriers	Solutions	Impact & sustainability
• What sector? • What size of organization? • What market scale? • Eligibility of technologies and/or organisations	• Are the drivers supportive (positive) or subversive (negative) for EE? • Policy: targets, standards, regulations, pre-existing support • Economic: energy price, productivity, competitiveness	• What bodies are delivering the program? • Sources of capital: CIF, MDBs, host governments • Financial intermediaries: local banks, leasing companies, utilities • Suppliers and consultants: equipment and service vendors, eg ESCOs	• What are the major barriers preventing EE deployment? • Awareness and commitment due to unfamiliarity and hassle • Technical expertise and solutions are insufficient • Financial resources are limited and/or unaffordable	• What are the instruments for addressing the barriers? • Forms of technical assistance (TA) – such as marketing training, auditing • Financial instruments – such as credit lines, guarantees, on-bill financing	• Impact: # of recipients; amount of funds disbursed; energy and CO2 savings; cost effectiveness • Sustainability: transfer of skills; continuation of lending; follow-on programs

Identifying and appraising the **target market** is the foundation of any program. Understanding its size, projected growth and opportunity for energy efficiency outlines the 'size of the prize.' Getting to grips with its priorities, supply chain and financing determines the delivery model of an energy efficiency program. Misdiagnosing the target market will lead to an ineffective solution package, and limited impact. The major target markets for demand-side energy efficiency are: residential; small- and medium-sized enterprises (SMEs); industrial and commercial; and vendors (energy efficiency service providers, such as ESCOs).

Drivers are economy- or sector-wide issues that can support or undermine the business case for EE, ahead of any other factors. Economic drivers include energy prices, carbon prices, and export competitiveness. Policy drivers include standards, regulations and incentive mechanisms. Supportive drivers are essential for sustainable markets and energy efficiency program can help create favourable drivers and ameliorate negative ones.

The objective of a **supply chain** is to connect finance to bankable projects – uniting the financial and technical elements of energy efficiency. For an effective market there must be flows of:

- Information to build essential knowledge, skills and behavioural change;
- Available and affordable finance to make energy efficiency investments; and
- Technology from trusted suppliers.

Understanding the capabilities, limitations and commitment of the whole supply chain is vital. Issues that prevent the aforementioned flows include: a gap in the supply chain, without a suitable local organisation to fill it; capacity or skills shortage within key institutions or companies; synchronisation between organisations; and indispensable trust between the members of the supply chain that allows them to work together successfully.

Effectively identifying the most influential **barriers** across a supply chain will determine the optimal solution package. Leveraging extensive local knowledge is key to the success of any program.

Interlinking financial and technical barriers define the energy efficiency problem and can broadly be attributed to three overarching areas:

- Awareness and commitment;

- Technical solutions and expertise; and
- Financial resources – consisting of access to finance, return on finance and liquidity.

It is important to highlight here that the lack of finance in a market does not necessarily correspond to financial barriers – finance requires a pipeline of projects.

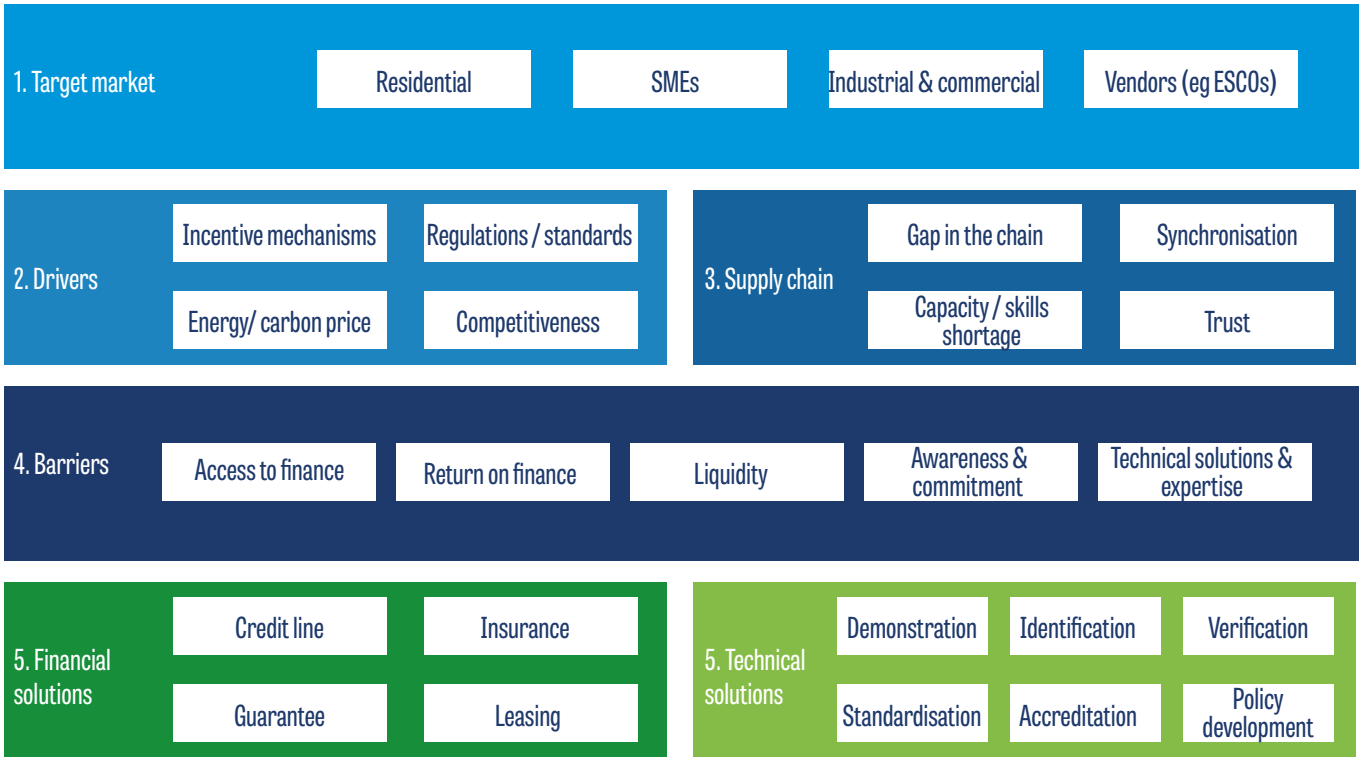
Solutions employed by programs often include both financial instruments and technical assistance. Synchronising the financial and technical elements is essential – including feedback loops. Solutions should be created and stress-tested with input from the supply chain – accounting for their required risk and return thresholds. Where possible, simplicity and standardisation are indispensable for reducing transaction costs, ensuring efficient implementation and enabling scale-up.

This study focuses on a range of solutions that target the financial and technical barriers faced in emerging energy efficiency markets. From the financial perspective, credit lines and guarantees are explored in-depth in this report – with similar case studies to follow on leasing and insurance. In addition, the importance of technical solutions that can demonstrate, identify, verify, standardise and accredit energy efficiency opportunities, investments and players are highlighted alongside policy development.

Across these 5 stages of the framework it is possible to map out a suite of features that define them – as per the descriptions above. Figure 2 below outlines this in a simple format. This is a working basis for attempting to indicate which features are often found together in energy efficiency programs. In the case studies that follow below, we highlight which features were prominent in each instance. The aim is to lay the ground for an easy-to-understand tool that can identify which solutions are most appropriate given the prior conditions across the target market, drivers, supply chain and barriers.

Finally, **impact** is about realising KPIs, such as CO2 savings; sustainability concerns the strength of the market, and its continued activity, post-program. The focus should be on how the market will continue without concessions. On the technical side there needs to be sufficient transfer of expertise across the whole local supply chain. On the financial side the program should leave in place adequate tools, confidence and skills to sustain energy efficiency investments under business-as-usual conditions. Future programs should be explicit in how they will achieve these goals. MRV is a key feature, which should be improved between MDBs to share lessons and push the market to the required scale.

Figure 2: Map of key features across the framework components



1.2 Case studies

The following pages look in-depth at two different financial instruments - credit lines and guarantees – and the technical assistance components that accompany them from the perspective of six case studies:

1. EBRD's Sustainable Energy Financing Facility in Turkey;
2. IDB's EcoCasa and
3. Energy Savings Insurance in Mexico;
4. IBRD's Partial Risk Sharing Facility in India;
5. IFC's Sustainable Energy Finance Program in The Philippines and
6. Commercializing Sustainable Energy Finance Program Turkey's.

The analysis evaluates the case studies through the lens of our framework, outlined above, before coming to conclusions on how best to employ these instruments and the accompanying technical assistance most effectively in the future.

After this, there is a section that focuses on the potential role that institutional investors can play in energy efficiency markets. It examines the following key questions:

1. Who are institutional investors?
2. How does energy efficiency fit within their investment portfolios?
3. Has anything been done already to catalyse institutional investment in energy efficiency?
4. What interventions could the CIF and MDBs put in place to catalyse more institutional investment in energy efficiency?

2. CREDIT LINES

2.1 Mechanics

Credit lines are the most common instrument found across the CIF's energy efficiency portfolio: they are found in 39% of programs; whereas guarantees make up 18%. They are an instrument that the CIF and their MDB partners are familiar and experienced with delivering; not just with energy efficiency, but across wider markets too. Their flexibility enables them to be useful across different sectors, depending on the terms that the originator attaches to them. For energy efficiency, they are useful for recalibrating the financial proposition of investments, but they have their limits as to what they can achieve on their own.

Purpose

Credit lines address the limited liquidity in energy efficiency markets, increasing the willingness of financial institutions to lend to, and end-users to invest in, energy efficiency projects.

Method

A credit line is the injection of capital from a donor, MDB, government or a private institution to a financial intermediary who is able to on-lend to their clients. The terms of the original loan are set by the originator to incentivize lending to energy efficiency. This means that they are at the very least ring-fenced for that purpose. Moreover, they are often lent at attractive terms: with reduced interest rates and/or longer tenors to encourage financiers to go beyond business-as-usual, and lend to energy efficiency projects, by offsetting the extra transaction costs associated with expanding into a new market.

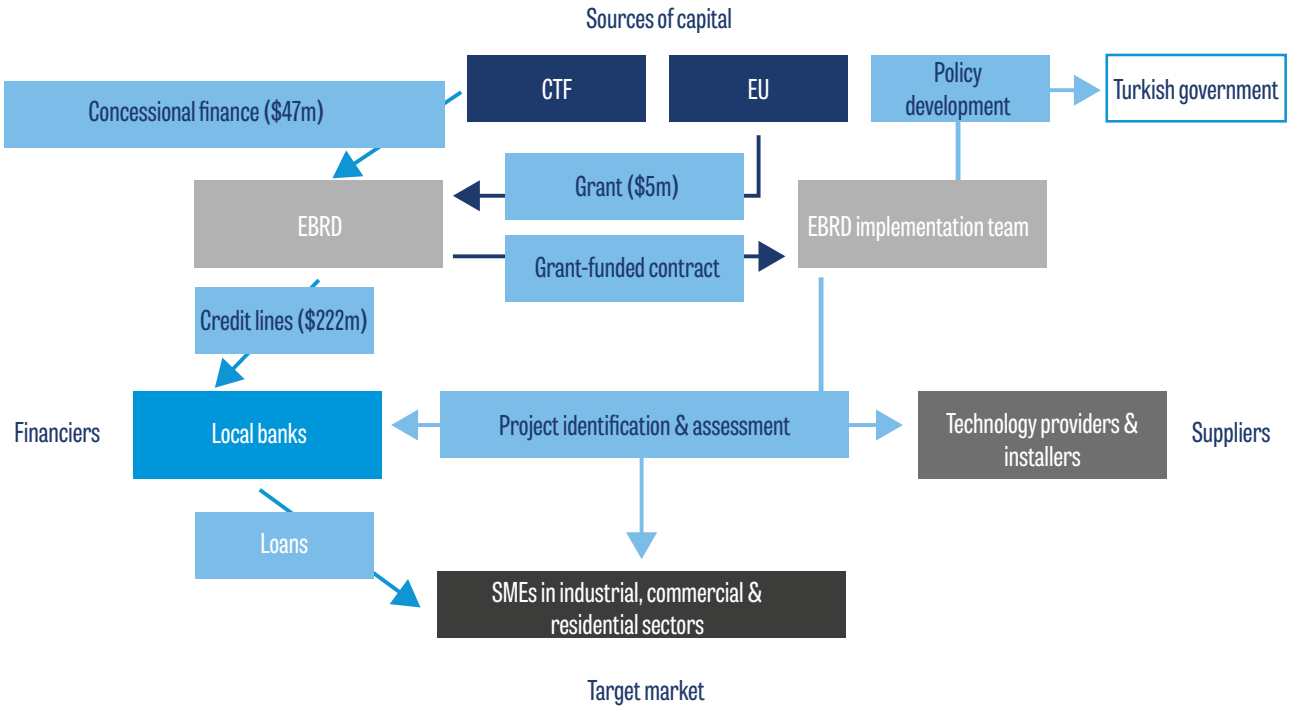
As mentioned above, credit lines can be used to address energy efficiency in any sector due to their inherent flexibility. Indeed, it is a positive that the institutions charged with on-lending the capital can disburse their funds in ways that they are most comfortable with (depending on the terms set by their creditor). However, international institutions and governments are only comfort themselves when they can see that the intermediary is of sufficient strength to handle and repay the credit line. Therefore on-lending often requires a well-established financial sector, and it is highly beneficial if the originator has a positive existing relationship with the recipient.

Target barriers

Credit lines provide a ring-fenced source of capital that incentivizes lending for energy efficiency, particularly when they are provided at concessional rates. Therefore, the primary barriers they target are the limited available capital for energy efficiency as well as the lack of incentives and demand for committing to new investments – both for financiers and end-users. They are the optimum instrument for facilitating lower costs of finance and longer tenors, particularly if they are sourced from donors, such as the CIF, or international financial institutions, such as MDBs, who can access cheaper credit through their strong balance sheets.

Whilst credit lines can be an important feature for injecting liquidity in the market, they are not an instrument that will de-risk investments on their own. They do not change the risks that the performance of the technology or the loan recipient will struggle to repay the credit, nor that the financier will be protected against such.

Figure 3: TurSEFF structure



Furthermore, they are insufficient for building the necessary capacity and skills to develop and deliver energy efficiency investments. A credit line can provide the capital with which to work, but it requires individuals and organisations with the appropriate knowledge and confidence to disburse them effectively. If this does not exist, significant attention and resources need to be concentrated on technical assistance that can help to nurture such.

2.2 Case studies

2.2.1 TurSEFF

Target market

From 2000 to 2010, Turkey's economy nearly tripled in size, whilst its population grew by 14%.[1] These trends manifested in a significant increase in energy demand – amounting to an average annual rate of 7 per cent from 2005 to 2013.[2] From a macroeconomic point of view, this burgeoning demand for power was increasing stress on the grid; whilst at a microeconomic standpoint, the reduction of tariff subsidies was increasing the importance of saving on energy costs.

However, in 2010, there was a distinct lack of energy efficiency financing in the country. Although Turkey represented a strong market for new financial products, given its robust financial sector and positive policy framework, the Turkish Sustainable Energy Financing Facility (TurSEFF) represented one of the first sustainable energy products on the market. The EBRD leveraged financing from the CIF and the EU to complement its own capital to set up a pioneering lending product and technical assistance for Turkey's financial sector.

Due to its novelty, the facility was given a broad mandate – not focusing specifically on sectors or technologies but energy efficiency and renewable energy in general. This decision was the result of market research that concluded pushing the sector as a whole would be most beneficial given the immaturity of the market. Moreover, this agnostic approach enabled TurSEFF to act as a test run, uncovering the sectors which needed little help and others that were most difficult for future initiatives to target the areas of most need.

Whilst there was no direction on specific sectors or technologies, the program tended to target SMEs – businesses revenues under €50m per year or

1 Data.worldbank.org. (2017). Turkey | Data. Available at: http://data.worldbank.org/country/turkey.

2 EBRD (2014), *Sustainable Energy Initiative, Case Study: TurSEFF*. Available at: http://www.ebrd.com/downloads/sector/sei/TURSEFF_Case_Study_Jan_2014.pdf

below 250 employees. SMEs make up a significant portion of the Turkish economy, yet historically they had struggled to access finance. Therefore TurSEFF represented an opportunity to help this underserved sector grow as, well as mitigate energy costs and greenhouse gas (GHG) emissions.

Eligible recipients were screened by the participating banks' own credit assessment, before they set the final terms of the finance. The project itself had to demonstrate minimum energy or GHG savings of 20%, in addition to a minimum IRR of 10%.

Drivers

Initially, the policy framework was more encouraging for renewable energy as opposed to energy efficiency. The existence of feed-in-tariffs for renewable energy was unmatched by an equivalent energy efficiency policy framework.

However, the strong government desire to reduce impact of fuel imports on energy security, particularly with a rapidly increasing energy demand, increased the focus on energy efficiency as a solution. In 2007, the Energy Efficiency Law set out mandates for energy management in key industries as well as building momentum for supporting services and voluntary agreements.[3]

The positive attitude and approach of the Turkish Government was important for the set-up of TurSEFF. Once it was up-and-running, with the aid of EU funding, the EBRD worked alongside the government to finalise the first national Energy Efficiency Strategy Plan, which set an overall energy intensity reduction target of 20 per cent by 2023 when compared with 2008.[4]

The EBRD's work in Turkey is fairly unique in that it is engaged on policy work as well as a financing program. Importantly, this is a two-way relationship: the track record of the successful TurSEFF program has been vital for building their reputation with both the EU and the Turkish government, enabling them to engage in successful policy dialogue, which in turn promotes more sustainable energy investment. It is also important to note the context that, at the time, the Turkish Government was implementing pre-accession steps towards integrating with the EU.

Beyond the policy drivers, there was a strong economic argument that TurSEFF could help grow a local supply chain in a new market. This was appealing for the government as it sought to promote the growth of new ventures and jobs in its booming economy.

Supply chain

Across the supply chain, experience and awareness with energy efficiency was limited to heavy industry. Therefore the program had to cast its net wide to build up the necessary skills to nurture a new market.

The program was flexible in its approach regarding what channels were used to provide the finance for energy efficiency investments. These distribution channels enabled the participants to expand into the sustainable energy space as they felt comfortable. Whilst this was on the whole beneficial in such an immature market, allowing finance to flow, in certain instances limits had to be put in place. For instance, the vendor channel (where suppliers sought debt to expand their operations) was easier for banks, and the existence of local suppliers who they trusted was a big pull for committing the program, but it had to be limited to 20% of the total portfolio because it is harder to guarantee impact.

Overall 7 banks participated – covering 60% of all banking assets in Turkey - via commercial negotiations on the terms of the program. Banks were selected based on their branch networks, size (preferably large) and their client base (preferably SMEs), along with their desire to participate and expand into the market with dedicated teams.

A project consultant was procured by EBRD to administer the technical assistance to the financial institutions – highlighting the gap in the local supply chain. At first they employed one relationship manager per bank to help with training and pipeline generation. Following iterations of TurSEFF have seen the technical assistance budget gradually reduced and more tasks and responsibilities shifted to local experts and the banks themselves in order to promote self-sufficiency within the local market.

Barriers

The barriers were identified and assessed by consultants hired by EBRD to run a market assessment. The study focused on uncovering the market potential and hindrances to sustainable energy and its finance through research and interviews.

Overall, despite a strong banking sector, there was an endemic lack of familiarity and trust in energy efficiency investments in the Turkish market. Financiers and end-users lacked awareness and familiarity with energy efficiency, and so misjudged the benefits and risks. Consequently, there was a significant need to prove the potential of energy efficiency and demonstrate its low risk.

Addressing the lack of understanding requires building up the necessary capacity and skills. Prior to the program, the participatory financial institutions were unable to evaluate and process energy efficiency proposals, and the extra

3 ABB (2011), *Turkey: Energy efficiency report.* Available at: https://library.e.abb.com/public/bcfe8957cb2c8b2ac12578640051cf04/Turkey.pdf.

4 Government of Turkey (2012), *Energy Efficiency Strategy Paper 2012-2023.* Available at: http://www.eie.gov.tr/verimlilik/document/Energy_Efficiency_Strategy_Paper.pdf.

transaction costs associated with audits and feasibility studies were off-putting. This limited the availability of the necessary long-term funding required for energy efficiency investments.

Solutions

Credit lines are a tried and tested instrument that the EBRD is experienced in delivering. It set terms with each bank through commercial negotiations. By blending the CTF's concessional finance with its own, the EBRD could offer credit lines at rates that would interest the banks. In short, concessional finance could offset the extra transaction costs incurred with expanding into the energy efficiency market. Moreover, the longer tenors (5 years from EBRD; 15 years from CTF) and grace periods (2 years from EBRD; 7 years from CTF) enabled banks to pass on the benefits to consumers, whose investment paybacks would be sufficiently covered.

Regarding the loans to end-users, each transaction administered by the banks would have its own individual characteristics – including whether they were secured with collateral or not. This provided the banks with a large degree of flexibility according to their clients and products.

However, initial disbursement of the funds was slow. This was indicative of the time it required to upskill the individuals within the banks and reorganise their internal structures to incentivize the disbursement of TurSEFF capital, given that this new endeavour was outside of previous lines of business.

A fundamental feature of the initial success was, therefore, the technical assistance component. Free technical assistance amounted to training, capacity building, project appraisal and monitoring for banks and their clients. This was provided by an expert consultancy, with the objective of transferring the skills permanently to the banks.

In the original iteration of TurSEFF, each bank had its own individual consultant. As subsequent programs have commenced the technical assistance budget – in effect a concession – has been reduced. Now the technical assistance offering has been localised, with only the project manager is not from Turkey, whilst some of the costs have been transferred to the banks, such as due diligence and monitoring. This process indicates how to nurture the long-term sustainability of the market.

Figure 4: Map of TurSEFF's key features across the framework components

Key: orange = relevant; white = not relevant; green = positive driver

Table 2: Loans disbursed under TurSEFF by sector, number and size

Sector	Total number of loans	Average loan size in $ million (rounded)
Commercial buildings	14	0.92
Large-scale industrial	88	1.72
Residential	1	0.05
Supplier	40	0.56
Small-scale	195	0.13
Vendor finance	32	1.50
Total	**370**	**0.7**

Impact and sustainability

TurSEFF led to GHG savings of 0.65 MtCO2e / year. This includes renewable energy, which accounted for 1/3 of the loans, as well as energy efficiency. For the energy efficiency projects in particular, energy savings amounted to 1.5 TWh/year, equal to 0.12% of national energy demand or c. 250,000 Turkish households. In terms of cost, that meant the program helped to save c. $500 million / year of oil equivalent.

Approximately 240 energy efficiency projects were financed, with a very low level of non-performance. The average loan was $0.7 million, with a range of $0.05 – 1.7 million. This indicates that the program was successful in reaching SMEs, with the amount of finance per project at a modest level. Moreover, with the exception of the residential sector which represented only 1 project, there was an impressive spread amongst different sectors and technologies (Table 2).[5]

The impact of the technical assistance package was highly praised by both the implementation team of the EBRD and participatory financial institutions.[6] It underpinned their skills and confidence in co-investing their own capital. This could be seen to contribute significantly to an overall leverage factor of 1:35, given that $50 million from the CTF and $7.5 million from the EU helped to catalyse up to $2 billion of sustainable energy projects.

5 EBRD (2014), *Sustainable Energy Initiative, Case Study: TurSEFF*. Available at: http://www.ebrd.com/downloads/sector/sei/TURSEFF_Case_Study_Jan_2014.pdf

6 Interviews with EBRD and Garanti Bank.

The success of TurSEFF is evident in the numerous follow-on initiatives that it has spawned. These include further versions of the facility, with the third iteration foregoing concessional finance, but including a smaller package of CTF-funded technical assistance, as well as more specialised programs. For instance, TuREEFF targets the residential sector, whilst MidSEFF focuses on investments that require between €5 and €50 million in credit. The agnostic approach taken by the original TurSEFF enabled the EBRD to test which sectors were easier to reach, and which required more attention – therefore leading to follow-on programs that could address the greater need.

Lessons

Some of the key factors of success for the TurSEFF program relate to its flexible design. By keeping the eligibility criteria for potential projects wide, the program gave the participating banks enough freedom so that they were comfortable expanding into a new market. Furthermore, it allowed the market demand to determine which projects should be financed, aiding the disbursement of funds on the one hand; and helping to identify particularly difficult sectors on the other. In sum, the flexibility in the design of the program allowed it to adapt to different circumstances and paved the way for more targeted programs for those areas of the market that were initially hard-to-reach.

Whilst the flexibility in the program helped ease the process, the technical assistance, initially free of charge to each bank, was fundamental in building the necessary capacity and expertise to drive change in the market.

The technical assistance complemented the access to the dedicated credit line and without it, it is highly likely that the full disbursement of funds would not have been realised, let alone the subsequent programs that could build off the back of the experience of the first edition of TurSEFF.

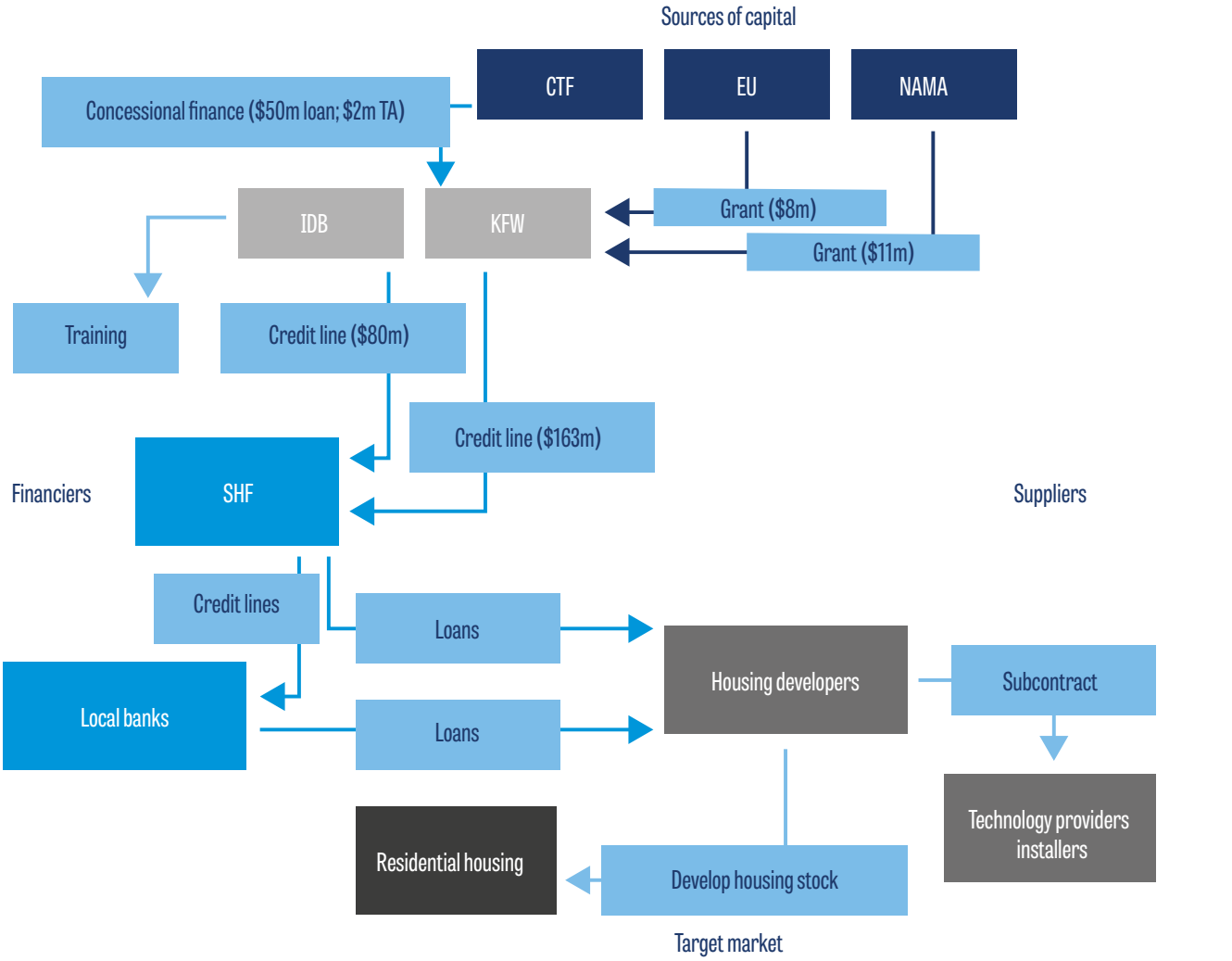
Beyond the design features, it is important to appreciate the wider contextual factors that played a key role in the success of TurSEFF. The supportive policy environment was significant in encouraging both the banks to participate, the demand from end-users and the ability of the EBRD to work with the Turkish Government to advance energy efficiency policy further.

This positive environment was in no small part due to the energy deficit that faced Turkey, meaning that energy efficiency was perceived as an economically effective solution by the government. In addition, the ability to cut costs through energy savings was important for an export-driven economy that cares about price competitiveness. These positive drivers set the scene for TurSEFF to take advantage and promote energy efficiency investments across different sectors.

Building relationships with the participatory financial institutions was another key success factor. The access to, and relationships with, a strong financial sector underpinned an effective implementation process that convinced a large number of banks to sign-up. It helped drive a significant change in the banks, whereby dedicated teams were dealing with sustainable energy finance – another important pillar of the success of the program.

Added to that, the strong reputation of the EBRD, which was enhanced by the effectiveness of the delivery team, helped to catalyse productive relationships across the Turkish market, and is evidenced by their ability to roll-out further initiatives with their clients.

Figure 5: Ecocasa structure



2.2.2 Ecocasa

Target market

The population of Mexico had been growing at an average of 1.6 million per annum from 2000 to 2012,[7] leading to significant demand for extra housing. Each year, around half a million homes are developed to satisfy this demand.[8]

The residential sector is the cause of c. 17% of Mexico's energy use,[9] and therefore represents a significant opportunity for energy efficiency to mitigate GHG emissions. The Mexican Government had set a target, as part of its Special Climate Change Program (PECC 2009-2012), of delivering GHG mitigation of 1.2 $MtCO_2e$/year as of 2012 through the sector.[10]

However, consumer demand for energy efficient housing is limited. There are major cultural barriers, whereby buyers prefer to spend their budget on larger and/or better equipped residences, as opposed to more energy efficient buildings. Moreover, subsidies for energy tariffs reduce the incentive for demand-side energy efficiency improvements, and therefore homeowners are unlikely to drive the emergence of an energy efficient residential sector.

This problem is particularly acute in the lower-income housing bracket. Specifically, the development of any energy efficient housing is limited because compliance with the relevant regulations is uncommon.

In an attempt to rebalance incentives, an Infonavit (National Housing Fund for Private Sector Workers) green mortgage program (Hipoteca Verde) provided subsidies for homeowners that applied for loans to finance a range of eligible energy efficient technologies. Prior to Ecocasa, Hipoteca Verde had provided over half a million green mortgages, 42% of which included subsidies.[11] Its success had played an important role in kick-starting the market, yet the demand in the market was reliant on its subsidies.

Ecocasa took a different approach to trying to influence the behaviour of end-users. Instead it focused on creating a supply of energy efficient homes for lower-income households. The objective was to catalyse the market by taking an indirect route to the end-users, by incentivizing the construction of homes that represented at least a 20% reduction in GHG emissions or 12kg CO_2e per m^2.[12]

Drivers

As outlined above, the Mexican Government has been very committed to reducing its emissions through energy efficiency initiatives in the residential sector. This public commitment was key for building momentum and an emerging supply chain, laying the ground for a further intervention in the shape of Ecocasa.

However, whilst the incentive mechanisms have proved to be important, it is significant that in principle regulation would drive energy efficiency in new housing developments without the need for incentives. However, in practice regulations around energy efficiency were often not adhered to.

Moreover, demand for energy efficiency was limited due to the cultural biases and energy subsidies outlined above. The low energy prices reduced consumer incentives to pay a premium for energy efficient housing. These negative drivers were key issues that needed to be circumvented if energy efficiency was to reach scale in the sector.

Supply chain

Ecocasa was at an advantage because it could build upon, and further develop, an emerging supply chain. In the lower-income market, most houses sold are eligible for Infonavit's green mortgages program, so developers already had experience using Infonavit-eligible technologies.

The Federal Mortgage Society (SHF), one of Mexico's national development banks, is a strong public institution through which the Ecocasa credit lines could flow. It has a mandate to strengthen the housing market; promote access to credit; provide an adequate supply of housing; and supply liquidity at prices that accurately reflect the risk of investments.[13] In addition, its pre-existing relationship with the IDB, with previous mortgage-related programs, made it an ideal partner for the Ecocasa initiative.

The SHF performs an intermediary role within the Mexican financial sector, where it lends to commercial financiers who then provide credit to end-users. It was therefore in a strong position to manage the Ecocasa credit lines, with its local knowledge and relationships, enabling it to easily provide to loans to participating commercial financial institutions, as well as directly to housing developers itself.

7 Data.worldbank.org. (2017). Turkey | Data. Available at: http://data.worldbank.org/country/turkey.
8 Interview with SHF.
9 Ashden Award for Sustainable Buildings (2015), *Winner case study summary: EcoCasa, Mexico*.
10 IDB, *CTF-IDB "EcoCasa" Program: Mexico Energy Efficiency Program, Part II*. Available at: https://www.climateinvestmentfunds.org/sites/default/files/PID_Mexico%20ECOCASA%20Program.pdf.
11 Ibid.
12 Ibid.
13 Ibid.

Lastly, a pre-existing ecosystem of technology providers, with at least some experience installing energy efficient technologies in the residential sector, meant that Ecocasa did not have to begin building a supply chain from scratch. This ensured that it could focus its attention and resources on the key barriers, as opposed to having to engage in a comprehensive upskilling process to build a viable supply chain.

Barriers

The most important barrier to energy efficient housing was that it was not an attractive financial investment for end-users. The combination of the additional upfront cost of efficient technology, alongside the subsidies for energy costs, diminished the potential business case for residents. This was compounded by the fact that most consumers are not encouraged to go out of their way to improve houses in which they may eventually move out of, and hence miss out on the full financial rewards. Both the lack of a business case and the perceived hassle stymied demand for energy efficient improvements to housing.

This demand issue had negative ramifications upstream. Broadly speaking, the housing developers and technology suppliers were both capable of providing energy efficient housing. However, without the requisite demand, there was not an opportunity to develop a credible track record.

The lack of financial incentives also translated to the construction industry. To build energy efficient housing would mean investing extra capital for potentially little extra return – given that the demand for green housing, and its extra costs, was limited. Consequently, there was a lack of available capital for scaling an energy efficient housing stock.

Solutions

Credit lines were chosen to increase the liquidity in the market as well as providing incentives for housing developers to build energy efficient homes – certified by the Ecocasa standard. Managed by SHF, the credit lines could be disbursed to housing developers directly, or via commercial financial institutions.

The credit lines were a mix of blended KfW and CIF finance. The CIF component was leveraged to offer concessional terms to the participatory banks. The terms of the credit line ensured that the developers or the banks would receive a preferential rate of 255bps below the market rate. For small developers, this was a significant bonus given that they develop stock more slowly, but for large developers this did not make much of a difference because they can turnover new developments far more quickly.

In order to access the concessional credit line, the developers had to build houses that were at least 20% more efficient than an industry-standard benchmark. How to achieve that 20% improvement was up to them, and the program was not prescriptive, for example, in detailing eligible technologies. This flexibility was important for attracting developers to the program because it gave them the freedom to pursue this new venture with their own ideas and expertise.

Moreover, to drive demand for the Ecocasa houses, these properties were also eligible for Infonavit's green mortgage program. Therefore, the supply-side incentives provided by the Ecocasa credit lines were complemented by the demand-side incentives of the cheaper mortgages through Infonavit. This double-sided approach could stimulate both sides of the market in order to achieve the scale-up of energy efficient homes and impact in avoiding GHG emissions. However, it is important to note that developers have to make clear what technologies or elements are counted towards Ecocasa, and towards Hipoteca Verde, to prevent them double-stacking their benefits.

However, the credit line was not deemed sufficient to grow the market. Indeed, technical assistance, funded by the CIF, has been the other key instrument. This has included hands-on capacity-building training conducted with over 1,000 companies and more than 20 banks. Developers have been provided with assessments of, and recommendations for, cost-effective energy efficient technologies, and have undergone match-making with relevant experts. Workshops with experienced companies, such as from Germany and Spain, banks and developers facilitated networking and learning opportunities. Lastly, promotional events and awareness-raising campaigns were targeted at both the industry and the consumers.

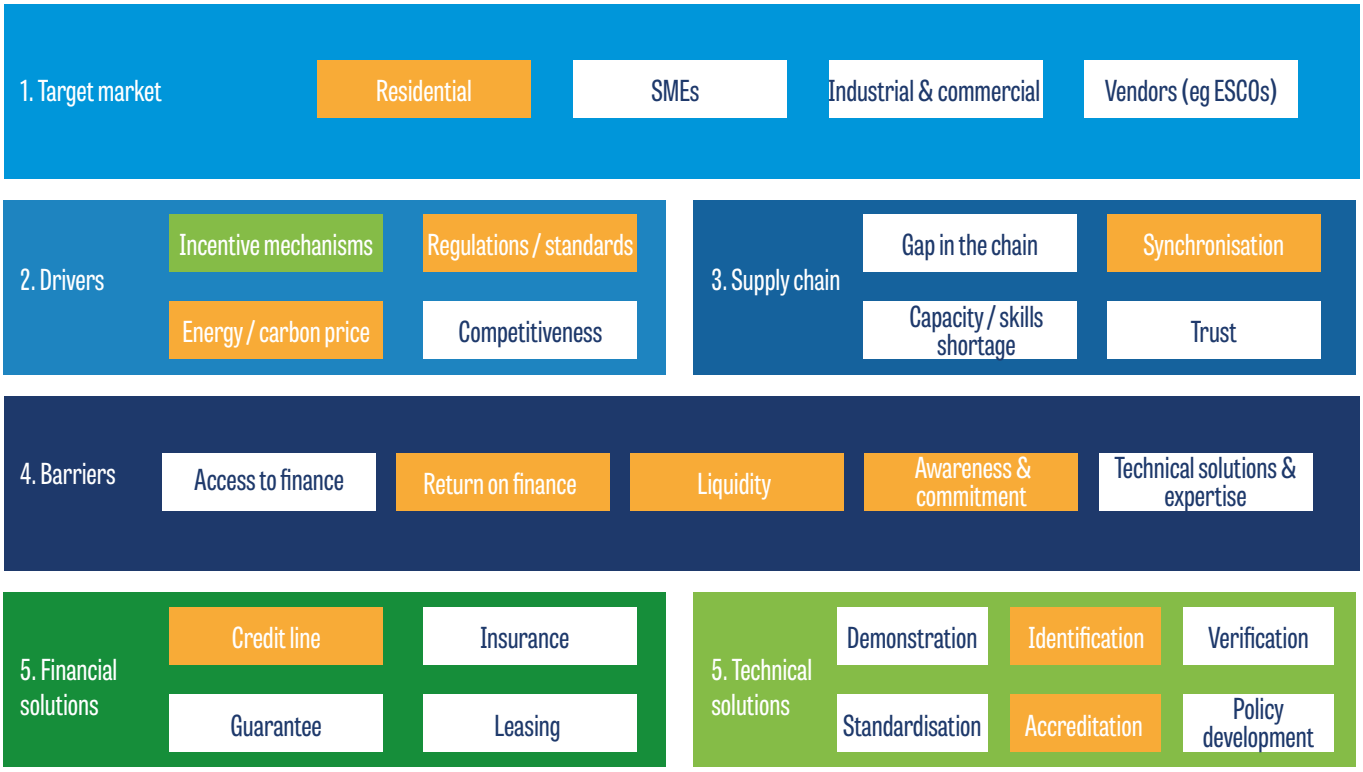
Impact and sustainability

To date, Ecocasa is an example of a very high impact energy efficiency program. Its targets have been met with 45,269 houses built to date (as of 24 August 2017), with projected savings of 1.4 million tonnes CO_2e over 40 years.[14]

However, a question mark remains over how dependent the market is on the subsidised financial support that the credit lines, and the complementary Infonavit green mortgages,

14 Ecocasa.gob.mx. (2017). Inicio. Available at: http://www.ecocasa.gob.mx/Paginas/Inicio.aspx [last visited 24 August 2017].

Figure 6: Map of Ecocasa's key features across the framework components



Key: orange = relevant; white = not relevant; green = positive driver

represent. The short-term sustainability of the market was boosted by an injection of additional KfW funding, but whether the program has ensured enough skills transfer and engendered robust confidence in the energy efficient housing market after the expiry of concessional finance remains to be seen.

In the long-term, policy changes will be crucial to consolidate the emerging market. This refers to both enforcing existing regulations and, hopefully, integrating the more ambitious Ecocasa requirements into the future policy and regulatory framework. This last point highlights how credit lines, and other instruments, can be very useful in the short-term, but for true sustainability the drivers have to be aligned to promote, rather than subvert, energy efficiency.

Lessons

The Ecocasa approach has proved successful in addressing a notoriously hard-to-reach corner for energy efficiency – the residential sector. By targeting suppliers, the initiative could circumvent the entrenched barriers of a lack of consumer demand and willingness to pay extra for energy efficient improvements.

However, the success of Ecocasa must be caveated by the fact that it had the opportunity to take advantage of an emerging market. This is thanks to the complementary work of the Infonavit Green Mortgages program, which began nurturing a nascent supply chain that the Ecocasa initiative could leverage. The coordination between the two programs was helpful for driving uptake from developers and consumers, who both could access attractive finance. The double-sided approach is perhaps a useful template for addressing the residential sector in other countries.

Looking at the design of Ecocasa itself, the flexibility offered to developers in pursuit of 20% energy savings target enabled them to be creative and find the solutions most acceptable to their experience and expertise. This

process was aided by useful capacity building, workshops and awareness-raising that facilitated skills and technology transfer. These components enabled the disbursement of funds by building the essential knowledge, confidence and familiarity in a new a market.

2.3 Evaluation

Credit lines are a very familiar instrument for MDBs and the most common instrument when constructing an energy efficiency program. They are therefore relatively easy to deploy and can provide a much needed injection of liquidity into a marketplace. However, on their own, that is all credit lines can provide: liquidity. If liquidity is not the main and only problem in the market, then the credit line will be insufficient on its own.

Here it is important to note that a lack of lending to energy efficiency projects is not necessarily symptomatic of a lack of available capital. Instead, it is imperative to understand that other factors may be preventing the flow of credit, such as: insufficient returns on investments; perceived high risks; or an absence of investment-grade projects.

In order to address these issues, credit lines must offer something beyond a new source of capital. The benefit of MDBs lending to local financial institutions in developing countries is that they can provide credit that is often on more favourable terms than is available locally. Their strong balance sheets enable them to leverage funding at rates and tenors that is simply inaccessible for financial institutions that lack track records or are vulnerable to high foreign exchange risks.

Yet even then, the terms on offer from MDBs are not always favourable enough to spur investment in new ventures, like energy efficiency, which require time and resources to set up new services and products, adding to the transaction costs. This is where donor finance, such as that offered by the CIF, can fill a need by offering concessional terms that offset many of these initial costs and attract financiers to the table. Furthermore, these attractive terms can be passed onto end-users if the program allows – catalysing greater demand.

The concessional terms of the CIF money, blended with that of MDBs, has consistently been highlighted as a key success factor across not just the case studies above, but the wider CIF energy efficiency portfolio. In sum, the existence of donor funds is vital for kick-starting new markets, and with only a limited number of available sources, the CIF will continue to play a key role in the function.

Despite their effectiveness, it is important that concessions are regarded as temporary measures. For building sustainable markets, programs that utilise concessions must plan an exit strategy that encourages lending at commercial rates to consolidate energy efficiency investments as business-as-usual. Over-reliance on cheap finance will subvert this ultimate goal.

Another key caveat is that just providing concessional finance, alongside extra liquidity, is not sufficient for scaling-up energy efficiency markets. In both the case studies above, there was a clear need to develop the skills and capacity to deliver such finance. Therefore, technical assistance was shown to play an essential role.

Without the necessary process of upskilling the financiers, connecting them to suppliers and helping to develop and appraise potential projects, the credit lines would have struggled to be disbursed. This is most clearly evident with the TurSEFF example, where disbursement was delayed until the banks were comfortable and confident enough dealing with energy efficiency lending.

In order for this assistance, and the credit lines, to be successful, the financial institutions have to be well-placed with the target market – such as the SHF in Mexico – and committed to growing their business offering. There is no substitute for commitment and having a strong working relationship with the MDB appears to be another, regularly-cited key factor of success for utilising credit lines.

Taking a wider view, credit lines were successful in both these instances when there was either strong institutions in place, such as the Turkish banks, or an emerging marketplace for the credit to find traction, as the Mexican residential example shows. The flexibility on offer with the credit lines, allowing the institutions and companies to plot their own approach beyond the minimum efficiency improvements, highlights that they can be a useful tool for leveraging the participants' local knowledge, and ensuring that they are pursuing practices that they are confident and comfortable with. There remains an inherent danger that the financiers will fail to step outside of their comfort-zone and drive significant market transformation. Overall, this perhaps indicates that credit lines require markets that are ready for scaling-up, as opposed to completely novel ones, to have success in financing energy efficiency investments.

3. GUARANTEES

3.1 Mechanics

Purpose

To encourage financiers to lend to energy efficiency investments that would otherwise be perceived as too risky.

Method

An MDB will help set up a facility that acts as a reserve for losses incurred by financiers lending to energy efficiency projects. This is often provided for a premium that the beneficiary has to pay. The presence of donor funds, such as the CIF, enables the facility to be provided at a concessional rate or underwrite the first losses with grant finance that expects no return.

Target barriers

The primary focus of a guarantee mechanism is the high perception of risk. This could be associated with the technology and its performance, due to unfamiliarity with energy efficiency and its cash flow based on future cost savings; or because there is high credit risk associated with the end-users, such as SMEs with a limited balance sheet. By reducing the high perception of risk, guarantees can improve the access to finance for end-users.

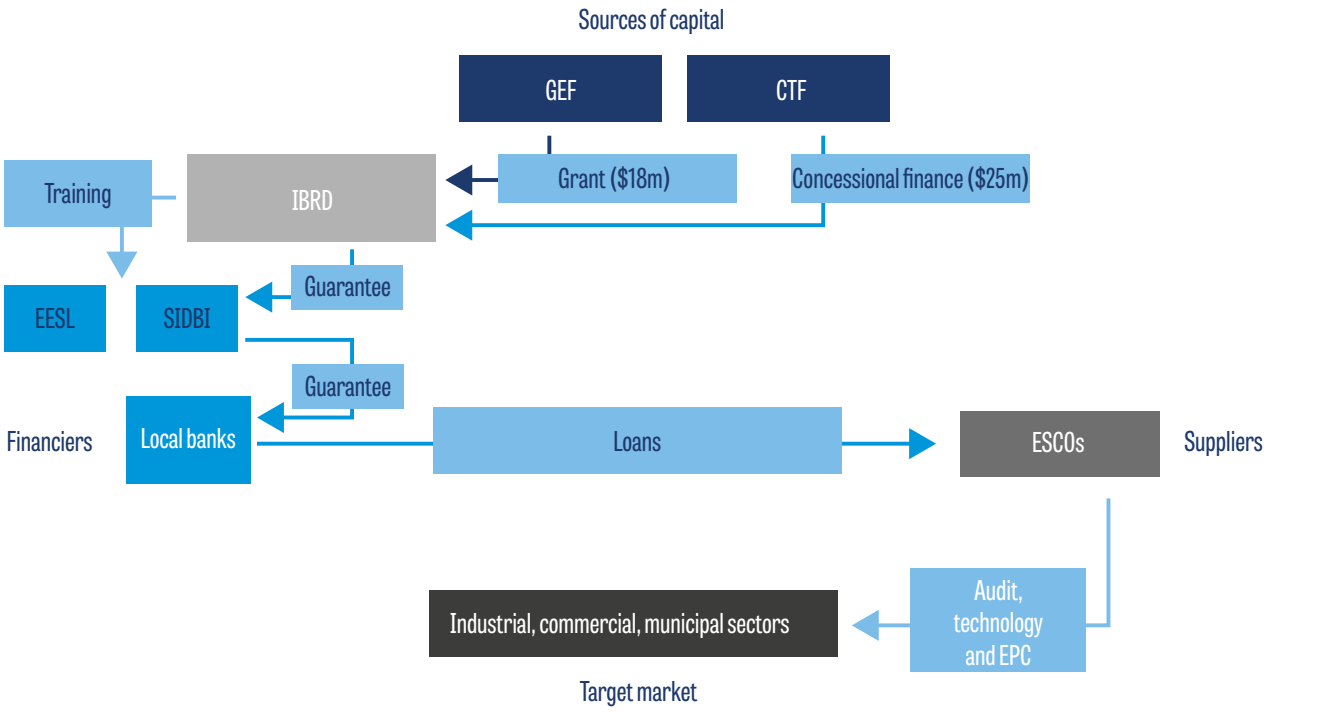
Whilst it is not their primary function, by reducing the risk of lending to energy efficiency projects, in theory guarantees could also reduce the cost of capital for end-users. In addition, if the guarantee is sufficient to encourage financiers to lend without demanding collateral requirements from their clients, they can be seen to promote access to project finance and drive up demand. However, there is little evidence of this currently across the world.

However, guarantees are not suited to off-setting transaction costs and can actually be an added hassle for banks as a result of the necessary reporting to access the funds if losses are incurred. Moreover, whilst they can encourage financiers to lend to projects that they otherwise would not, they will not build the expertise necessary to disburse the finance to these projects if it does not pre-exist. Therefore, once again, technical assistance will have to play a fundamental role in complementing the guarantee mechanism to ensure appropriate skills are in place for effective lending.

3.2 Case studies

3.2.1 India PRSF

Figure 7: India PRSF structure



Target market

To fuel its growing population and economy, India's appetite for energy is vast and increasing. In 2010, it was the fourth largest consumer of energy in the world, using an estimated consumption of 460 million tonnes of oil equivalent (Mtoe).[15] This figure continued to rise to a reported 780 Mtoe in 2014,[16] and the trend is set to continue with electricity demand alone projected to more than triple on 2014 levels by 2030.[17] Importantly, this increase in demand is not being met by new sources of generation, with 2014 also showing a peak demand deficit of 4.5 percent.[18]

Whilst these numbers highlight the size of the challenge, they also underpin a significant opportunity. The World Resources Institute estimated that the Tenth Five-Year Plan set by the Indian Planning Commission would indicate an investment potential of $9.77 billion, which could translate to 183.5 billion kilowatt hours (kWh) and 148.6 million tons of CO2 from 2007 to 2012.[19] If energy efficiency continues to become more prominent, these numbers will grow exponentially, representing the development of a burgeoning national industry and a massive opportunity for investors.

Concurrently, energy efficiency is a high priority for the Government of India. It is necessary not only to manage the increasing energy demand, but also to enhance energy security and address climate change mitigation goals. To address the issue, the Government has put in place a National Mission for Enhanced Energy Efficiency (NMEEE). This piece of legislation is an umbrella for a variety of policies and regulations that aim to catalyse greater deployment: from setting mandatory energy saving targets for particular industries, to implementing financing instruments geared to help incentivize market growth. Moreover there are awareness-raising initiatives, including the National Energy Conservation Awards, whilst advice is provided as part of an official Certification and Accreditation Program for Energy Auditors.

Alongside the government-backed initiatives, there are many existing interventions from international institutions that aim to support and promote energy efficiency in India. There has been a focus on developing the financial offering for energy efficiency through programs such as JICA's Financing Scheme for Energy Savings Projects in MSME Sector.

The Indian financial sector itself is strong and very liquid, with a growing energy efficiency portfolio. As two strong examples: i) the commercial bank ICICI was running a $836 million portfolio in energy efficiency and renewable energy lending in 2015; whilst ii) SBI had commissioned 20 loans specifically designed for energy efficiency, as well as facilitating 60 energy audits and as of 2009. [20]

However, these positive developments are still insubstantial in the context of the need and opportunity that energy efficiency in India signifies. In particular, it was clear that financial institutions perceive high risks that limit the investment in energy efficiency, stunting the growth of the market.

The International Bank for Reconstruction and Development (IBRD) therefore embarked on a program to mitigate such risk and increase the deal flow in this emerging market. The Partial Risk Sharing Facility (PRSF) intends to encourage financiers to support key market actors like ESCOs with improved access to finance, mobilizing over $127million of commercial financing to push the market to the next level.

As is common across the world, both ESCOs and SMEs face similar financial problems. In particular, their lack of track record, balance sheet and therefore creditworthiness is a major obstacle to securing debt finance for new investments.

This problem is exacerbated in relation to energy efficiency. The fact that the cash flow from energy efficiency investments is due to future *promised* savings means that financiers perceive these investments as higher risk. As a result, ESCOs and SMEs seeking to invest in energy efficiency struggle to access the necessary external finance.

The IBRD had been active in the Indian market for a number of years and understood that although much progress had been made, this major barrier prevented the market from reaching its true scale. They estimated that there was a potential market of c. $5 billion/year for demand-side energy efficiency in India[21] and that there was a significant opportunity to address both ESCOs and SMEs in one program. The primary focus is to de-risk energy efficiency investments for scaling the ESCO market so it can serve the following sectors: industrial, commercial buildings, municipal street lighting and SMEs.

15 TERI (2013), *Indian Energy Sector: An Overview*. Available at: http://bookstore.teri.res.in/docs/books/TEDDY_2013_Sample_Chapter.pdf.

16 IEA (2014), Total Primary Energy Supply. Available at: http://www.iea.org/stats/WebGraphs/INDIA5.pdf.

17 Government of India (2015), *India's Intended Nationally Determined Contribution: Working Towards Climate Justice*. Available at: http://www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf.

18 Central Electricity Authority (2014). *Load Generation Balance Report 2014-2015*. Available at: http://cea.nic.in/reports/annual/lgbr/lgbr-2014.pdf.

19 World Resources Institute (2009), *Powering Up: The Investment Potential of Energy Service Companies in India*. Available at: http://www.wri.org/publication/powering.

20 World Bank (2015), *Project Appraisal Document for a Partial Risk Sharing Facility for Energy Efficiency (PRSF) Project*. Available at: http://documents.worldbank.org/curated/en/968091468048913492/pdf/PAD9800P1289210R20150000201000UO090.pdf

21 Interview with IBRD.

Drivers

The supportive policy framework in India provides a very important and strong foundation for an energy efficiency program to find traction. It helps promote awareness of the opportunity for end-users, as well as commitment from suppliers and financiers to stimulate scale-up of the market.

The Energy Efficiency Act of 2001 provides the primary legal framework to support energy efficiency, with secondary regulations such as building codes, standards, audits and industrial sector targets, emerging from it. This has underpinned to growth of a nascent energy efficiency supply chain, with greater understanding and visibility of what energy efficiency means and the changes it necessitates.

However, the IBRD identified that there is a lack of available finance to help implement the associated policies achieve significant scale in the market. This was indicated as a key motivation for the program, and it is important to highlight that the pre-existing policy framework represented a positive, but not fully formed, driver for action on energy efficiency. Accordingly, India could be regarded as a maturing market that required a targeted intervention to overcome a crucial barrier, but not one that was wracked by multiple problems at once.

Supply chain

Prior to the program, there had been a significant amount of time and resources spent growing an ESCO market in India. For the past 20 years, ESCOs had been benefitted of direct and indirect bilateral aid.[22] Ongoing initiatives include financing schemes run by the World Bank,[23] JICA[24] and USAID.[25]

This nurturing process has led to a substantial, if immature, market. 130 ESCOs are accredited and rated from 1 to 5 by the Bureau of Energy Efficiency via a robust testing of performance, products and financial credibility. Such initiatives help to underpin trust in a new business model but appear to be insufficient at reducing the high perceptions of risk on the part of financiers, whose credit is fundamental to really growing the market.

As a consequence, the program intends to engage financial institutions to make them more comfortable with lending to ESCOs. Whilst, as previously mentioned, many have experience with energy efficiency and even have dedicated teams and products, they lack the skills and confidence to lend to the ESCO market at scale. The key objective of this program is to provide them with these two assets, and duly grow their track record.

A fundamental cog in the supply chain for this program is the Small Industries Development Bank of India (SIDBI). This public financial institution has a mandate to support the growth of the Indian SME market, and hence aligns well with the aims of the program. Moreover, they have some of the most extensive experience with energy efficiency in India, having worked with the World Bank, JICA and GEF on other programs in the sector. Their mandate and experience positions them well to act as a conduit between the IBRD, which only serves the public sector, and commercial banks and businesses seeking finance for energy efficiency.

Whilst SIDBI can provide its own capital directly to ESCOs and businesses under the program, it can also lend to other financial institutions seeking to expand into the market. In order to participate, other financial institutions must set up their own energy efficiency team and abide by minimum standards of performance set by the IBRD.

The initiative also supports the development and growth of Energy Efficiency Services Limited – a super-ESCO that is backed by the Indian Government. The technical assistance provided to this entity is for the purpose of stimulating pipeline generation and demonstrating the business case for energy efficiency, and ESCOs, to engender greater trust and confidence in the market.

Overall it is important to note that the Indian supply chain is far more advanced than many other countries. This means that the program can find capable and willing participants to isolate and target the most influential barrier, as opposed to having to kick start a market from scratch.

22 Interview with IBRD.

23 SIDBI, *Revolving Fund Scheme for Financing End to End Energy Efficiency Investments in MSMEs (4E Financing Scheme)*. Available at: https://www.sidbi.in/files/4E_Financing_Scheme.pdf.

24 SIDBI, *JICA – SIDBI Financing Scheme for Energy Saving Projects in MSME Sector (Phase III)*. Available at: https://www.sidbi.in/files/Brochure_Industrial.pdf.

25 USAID (2016), *Partnership to Advance Clean Energy-Deployment (PACE-D) Technical Assistance Program.* Available at: https://www.usaid.gov/sites/default/files/documents/1861/PACE-D-Brochure-Feb-2016-1.pdf.

Barriers

As emphasised so far, the access to finance was identified as the primary barrier. Neither the liquidity in the market, nor the cost of capital, were cited as major problems. It is the high perception of risk when assessing loan proposals to ESCOs and SMEs that prevented the finance flowing to energy efficiency investments. This was due to a combination of the complicated and unfamiliar transactions based on future energy savings and the limited track records and balance sheets of ESCOs, leading to poor credit ratings.

This conclusion was based of many pre-existing studies of the energy efficiency market in India and the previous experience of programs run by the IBRD and its affiliates. This meant that they did not undertake a fresh analysis but reviewed the situation based on published information.

Beyond the primary financial issue, other significant barriers include the lack of technical capacity amongst both financiers and end-users to identify and evaluate energy efficiency opportunities. This prevents investable propositions from being realised and stymies both the supply of and demand for finance.

Furthermore, this issue is compounded by the lack of standardisation of energy performance contracts (EPCs) which ESCOs rely on to guarantee the savings to the end-user, and revenues for their financiers. Without standardised contracts, banks are unlikely to invest the time and resources in each transaction. Moreover, there is a consequent lack of trust on behalf of potential customers who often lack the familiarity with energy efficiency without having to decode unique contracting arrangements.

Importantly, once the program had begun another significant barrier emerged – the capacity within the banks themselves. This was not initially highlighted as a major obstacle, but once the program kicked off it was clear that extra attention and resources were necessary for enabling the banks to lend to ESCOs.

From this experience there are two key lessons: i) a program must be flexible enough to respond to barriers that emerge during the implementation, and not just the design, phase; and ii) that even in markets that appear relatively experienced at the outset, technical assistance is a fundamental feature for developing the indispensable skills and capacity to nurture a new market, and they will need to undergo continuous improvement until the market is self-sufficient.

Solutions

The proposed solution to tackle the primary barrier was a guarantee. It was chosen because it was the access to finance, not the finance itself, that was the major problem. Therefore reducing the risk exposure of financiers would unlock lending, as opposed to changing the terms of the finance. This issue highlights how the Indian market was on its way towards maturation, and that unpicking one key barrier was identified as holding back growth, as opposed to the multi-faceted problems often faced by less mature markets.

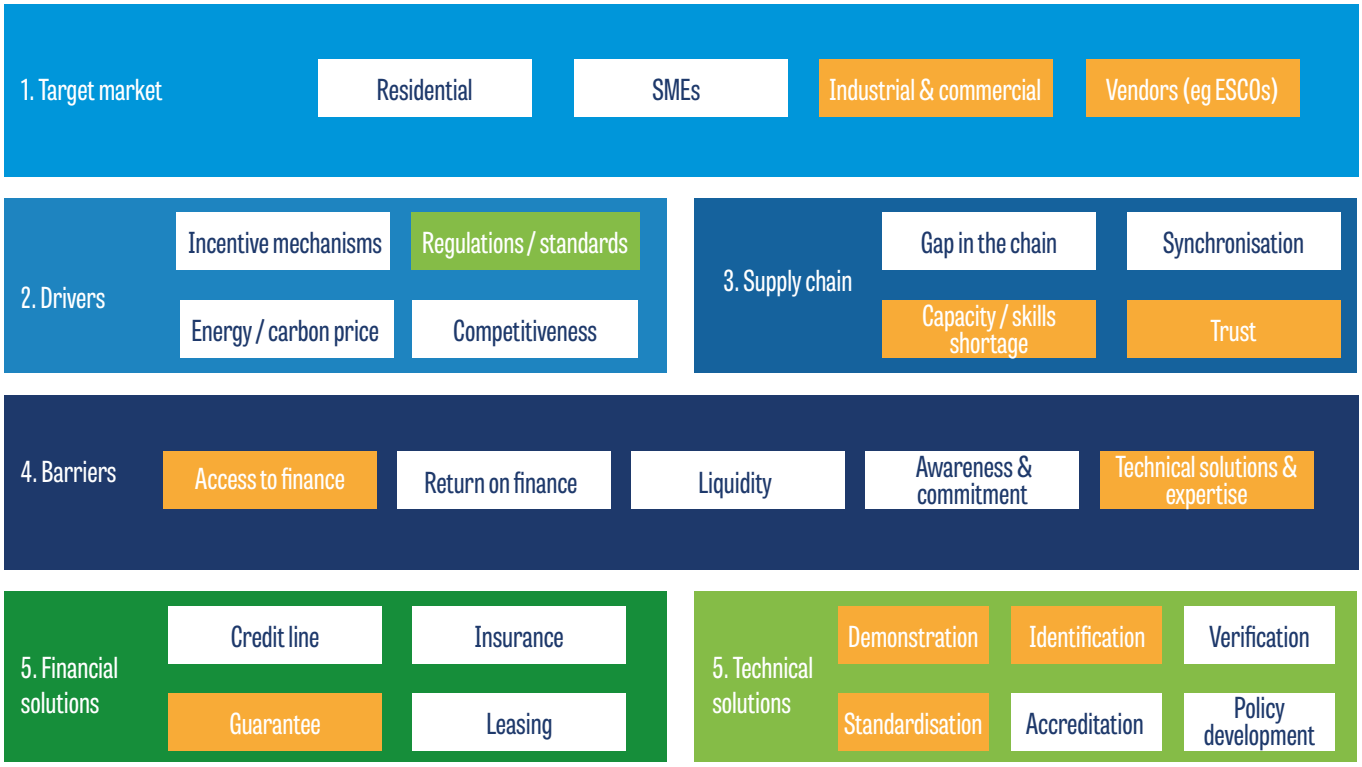
The guarantee itself functions as a buffer for losses up to 75% per project – the remaining 25% is covered by the ESCO. It is worth a total of $37m and funded by the GEF, which will take first losses up to $12m, and the CIF, for the following $25m. The tenor is 5 years, but it is envisaged that if the funds are not called they can roll on – a conservative estimate is that this may happen twice.

Out of the GEF money, $6m was ring-fenced for SIDBI to guarantee its own loans, whilst the remainder had to cover the lending of other participatory banks. In order to incentivize lending to energy efficiency projects on the basis of their merit alone, in contrast to the creditworthiness of the recipient, these participating financial institutions could secure a better guarantee fee if they did not ask for collateral from their clients.

The guarantee mechanism is complemented by $6m of technical assistance money from the GEF to build up SIDBI and EESL capacity for providing finance, as well as building and sharing knowledge on standards and project appraisals more widely across the market. Significantly, there is a key objective for the technical assistance: to target the standardisation of contracts so that transactions can occur in a swift and trusted fashion, an important enabler for a market to reach substantial scale.

In line with similar projects, a key lesson learned is the necessity of having technical assistance alongside financial incentives. A combination of technical assistance, financed by part of the GEF funds of $6 million, along with financial incentives through CIF of $25 million and part of GEF funds of $12 million will, through risk sharing, demonstrate how the complex energy efficiency ecosystem can be unlocked trigger large-scale energy market transformation.

Figure 8: Map of India PRSF's key features across the framework components



Key: orange = relevant; white = not relevant; green = positive driver

Impact and sustainability

The program has only been ongoing since 2015, therefore the potential to measure impact and sustainability is limited. So far, SIDBI has financed two projects, one for street lighting and another for variable frequency drives via ESCOs; whilst two other financial institutions have lent to a total of 3 other projects between them. At this stage, it is estimated that by March 2018, 80% of the guarantee funds will be committed to cover projects if required.[26]

Given the possible scale of the Indian market, it is important to be aware that this Facility will only cover c. 1-2% of the entire market potential for energy efficiency in India (source: Ashok interview if not elsewhere). This indicates that although the program may play an important demonstrative role in the market, proving that energy efficiency investments are low risk, it is unlikely to cause an immediate transformation.

Wholesale transformation will require a great deal more in funding and time. The relative simplicity of the program lends itself to replication if the resources and commitment exists beyond its lifetime. In the short-term, to maximise its impact the results and lessons from this program must be disseminated across the country to leverage its role in this growing market.

26 Interview with IBRD.

Lessons

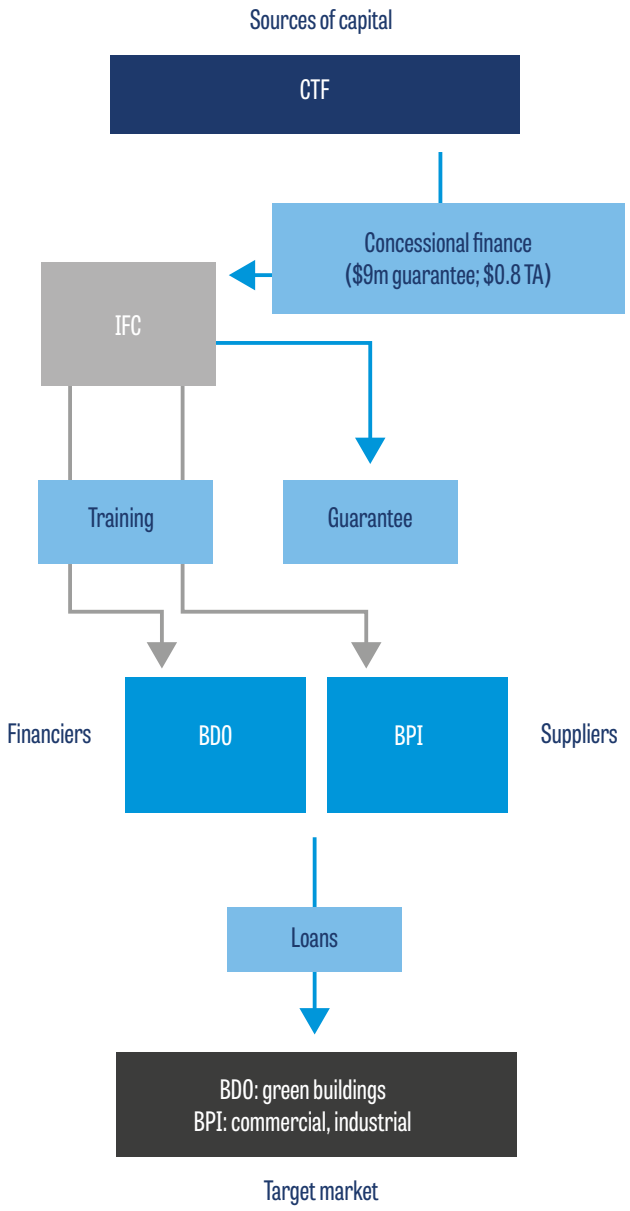
A key takeaway is that the program benefited greatly from prior capacity building work in the market, which laid the foundation in the market. This meant that the IBRD could isolate and target a key barrier, in the shape of access to finance, without being swamped by other equally pernicious problems. In addition, they were able to source capable and willing participants in the supply chain to deliver the program. These two features are indicative of any energy efficiency market that has already begun to mature, and therefore highlights that a guarantee solution in isolation is perhaps better-suited to markets where previous investment and resources have laid the groundwork.

There is no shortage of potential projects, ESCOs or money in the Indian market. The key factor determining the program's success will be how this program can build understanding, confidence and skills at conducting energy efficiency transactions so that they become normal practice. If this is achieved and the lessons disseminated, the program could catalyse the market by highlighting its potential value and, significantly, the ease with which financiers and ESCOs can partner and benefit together. To this end, continuous capacity building and standardisation will be crucial for embedding the practices necessary for a sustainable market.

Lastly, even though the Indian market is more developed than most, it is clear that there is a vital role for technical assistance to play in building the necessary skills and capacity to create a long-lasting market. This point emphasises that energy efficiency is still a very novel concept, and that training will play a continuing role until the supply chain is self-sufficient. Moreover, the manner in which this finding was uncovered, after the program had actually begun, highlights the value in being flexible when designing and implementing such initiatives so that they can respond to changing circumstances on the ground.

3.2.2 Philippines Sustainable Energy Finance Program

Figure 9: Philippines SEF structure



Target market

The Philippines was targeted by the IFC because although it had a strong and sophisticated banking industry, there was a dearth of 'green' finance on offer. Partly this was due to the lack of a real government push; and partly because there was a lack of knowledge and experience with energy efficiency and renewable energy investment.

The target sectors for each of the Filipino banks fitted with their existing client bases. BPI focused on the industrial and commercial sectors, whilst BDO concentrated on green buildings in addition to solar power. For both banks, the majority of the clients were SMEs. The only requirement for the clients was that their investment must show a 15% improvement in energy use per unit of production.

The benefit of banks utilising their existing clients is that implementation and disbursement can be quick and effective. This can lead to swift impact in terms of energy savings and help the banks to familiarise themselves with energy efficiency finance in a comfortable environment.

However, it must be noted that this approach is limited in its ability to take participants outside of their comfort zone and achieve market transformation. Therefore it is probably most appropriate for markets at an early stage of development, such as the Philippines, but more ambitious avenues should be pursued to galvanise sustainable energy efficiency lending.

Drivers

There is a strong business case for energy efficiency in the Filipino market given the high energy prices, which are the most expensive across the South East Asia region at c. $0.25/kWh. This means that implementing energy efficiency improvements are typically 1/3 – 2/3 the cost of adding new generation capacity, signalling that energy efficiency can have an important role as the 'first fuel' in the country.

However, there is a lack of effective policy to force the issue and realise the potential. Although the government has placed energy efficiency as a high priority, with regular blackouts a significant motivation, there is an absence of rules and regulations to promote sustainable energy projects.

This means that the Filipino market is underdeveloped, and requires overarching policy work to complement private sector initiatives if the market is to begin to scale-up. The IFC does not provide policy work as part of its SEF program, and therefore whilst its initiative is an important demonstrator of the value of energy efficiency, the market requires fundamental policy changes to drive sustainable transformation.

Supply chain

The Filipino banking sector is strong and liquid, but has little experience with green financial products and services. Alongside no pre-existing government support or other green finance-related programs in the country, this has meant that there is limited energy efficiency finance on offer in the market.

The banks themselves were selected based on the fact that they were privately-owned and previously known and deemed credit-worthy by the IFC. Furthermore, they were required to develop a core team who were responsible for administering the program within their organisations. This has been proven to be a key determinant of a program's success because it internalizes the objectives and practices necessary to deliver new products.

Due to the lack of experience in the Filipino market, the technical assistance components that were necessary to upskill the banks had to be provided by the IFC. This is indicative of a key gap in the local supply chain.

Barriers

Across the market, there was a lack of awareness as to what the benefits of energy efficiency are and how they can be delivered. This includes the Filipino Government, financial institutions and businesses. Consumers are becoming more aware, particularly given the high electricity tariffs that they face, but need support to commit to investing.

The financiers themselves lacked the knowledge, skills and capacity to deliver energy efficiency products to potential clients. They could not identify opportunities, nor correctly appraise the risk associated with them. Their high perception of risk was related to fears around the performance of the technology and how to properly evaluate it, with a revenue model based on future cost savings unfamiliar to them.

The absence of skills, and wariness of the risks, meant that they did not offer appropriate credit to end-users. The finance on offer did not match the payback periods of the energy efficiency investments and was associated with prohibitively high costs of capital.

Solutions

Given that the business case was already strong in the Philippines, the IFC decided to attempt to increase the flow of finance by reducing the high perceptions of risk. They offered their Risk Sharing Facility (RSF) and advisory services program with the objective to help banks take on loans they would otherwise avoid and develop their own green portfolio.

The structure of the RSF meant IFC and the Bank shared the risk on the portfolio 50:50, with the first loss cover on the IFC portion being provided by donor funds. The bank takes the first loss on its portion. A risk sharing fee was charged by IFC on the risk it was taking. The CIF money would cover the first 10% of the IFC's losses.

While both BPI and BDO availed of the risk share facility, only BPI was able to actively use theirs. Only BPI took up the option, leading to a c. $50m guarantee fund. This was partly due to BDO being subject to certain regulations that took 2 years to gain exemption from.[27] In addition, it perceived the additionality of the guarantee to be limited - as the largest commercial bank in the country, BDO is very liquid and was comfortable lending to green projects already without having to pay extra charges to access the guarantee.[28]

Importantly, even though the guarantee was in place, BPI insisted its loans were secured to collateral of their clients. This reveals that the guarantee was insufficient for convincing the bank to lend against the merits of the energy efficiency projects alone.

In addition to the guarantee facility, IFC provided technical assistance in the form of training on how to evaluate green projects and structure financial products as well as client mapping. This was provided at a discount rate, with the CIF funding 50% and the banks covering the remainder. As the program developed, greater contributions were required from the financial institutions, to a point where projects now generally require cash fees that cover costs.

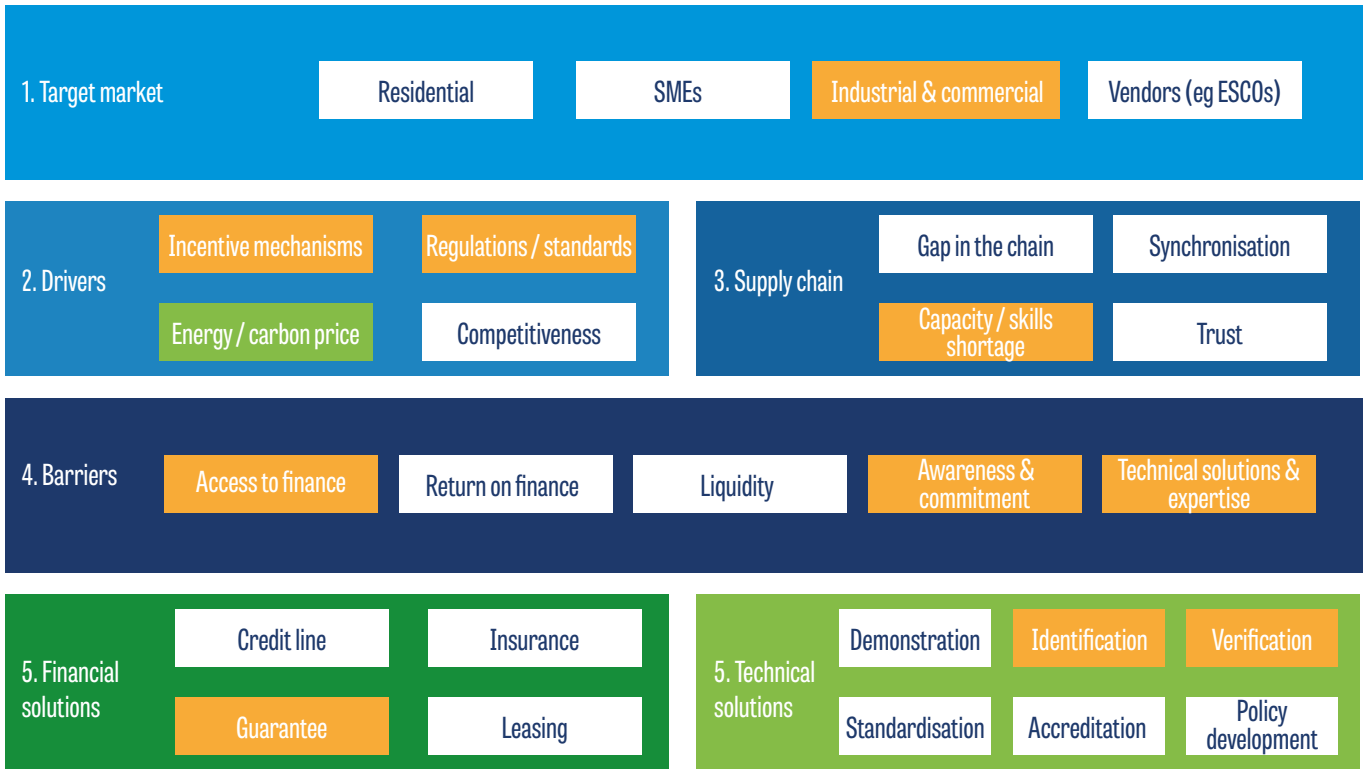
Both banks provided walk-through audits for customers and would evaluate potential projects for a fee. Typically the finance would cover 70% of the project cost and its tenor would match a simple payback calculation.[29]

Impact and sustainability

The program has been regarded as a significant success and won an award for Climate Change Innovations from

27 Interview with IFC.
28 Interview with BDO.
29 Interview with BPI.

Figure 10: Map of the Philippines SEF's key features across the framework components



Key: orange = relevant; white = not relevant; green = positive driver

the UN.[30] It resulted in 107 energy efficiency projects worth $231m, reaching over 500 entities, producing 400 reports and 100 workshops with 2,300 participants.[31]

Overall from 2009 to 2015, c. $3 billion was invested in green projects over the course of the program – inclusive of c. $880 million from IFC loans and co-investment from the banks and their clients.[32] This has led the IFC to conclude that the leverage from the technical support is arguably 1:356, where $1 of TA funding helped catalyse $356 of private sector funding.[33]

30 IFC (2017), *Press Releases: IFC Philippines' Sustainable Energy Finance Program Wins UN Award for Climate-Change Innovations*. Available at: https://ifcext.ifc.org/IFCExt/pressroom/IFCPressRoom.nsf/0/C93AD3E897E3E9DE85257C1D0029F848.

31 Interview with IFC.

32 Ibid.

33 Ibid.

Approximately one quarter of this investment was dedicated to energy efficiency projects. Using IFC's CAFÉ tool on an ex ante basis, the program has calculated c. $486m per year of energy savings, equating to c. 2Mt per year of GHG mitigated.[34]

Importantly, for BPI only 0.8% of the loans did not perform, and BDO state that no loans have defaulted.[35] This is a very strong signal that energy efficiency investments are low risk.

Lessons

Importantly the environment for the program was decidedly positive: a combination of high energy prices and reliable banking sector helped fund disbursement and program

34 Ibid.

35 Interviews with BDO and BPI.

success. The former underpinned the necessary demand for pipeline development whilst the latter ensured a smooth implementation of the program.

The strategy of utilising banks that were not only solid but also willing to engage with sustainable energy finance was important. Ensuring that each bank dedicated resource to the program meant there was a line of responsibility and helped formalise the practice of energy efficiency lending whilst building the necessary capacity to deliver it. Lastly, the provision of concessional funding from the CIF was key for delivering the highly successful technical assistance component, in addition to the first loss portion of the guarantee. The capacity building, and in particular the project evaluation capability, were cited by the banks are fundamental to the effectiveness of the program. Whilst both also appreciated the access to the IFC's global network of experts.

3.3 Evaluation

The key barrier that a guarantee focuses on is the access the finance. In theory, by limiting their exposure to losses, a guarantee facility can encourage banks to lend to projects that they would otherwise perceive as too risky. In both case studies, this has been shown to be true, with lending stimulated following the take-up of risk-sharing facilities.

However, beyond the access to finance, it is difficult to conclude that guarantees address other problems associated with energy efficiency. There is an argument that by reducing the perceived risks, a guarantee could cause the cost of capital to come down too. This would boost the available returns for end-users, and possibly encourage greater demand, but this link is not proven by the case studies in focus here.

Key determinants of the success of a guarantee facility include its cost and the extent of losses that it covers, as well as how easy it is to access funds in the eventuality of losses. If the guarantee does not provide enough additionality, or is too expensive, then banks are unlikely to sign up – as BDO in the Philippines proves. Key issues mentioned in these case studies and beyond include pari-passu, reporting requirements and strict project eligibility criteria. Accordingly, the terms of the guarantee should be worked out in collaboration with potential participants to ensure it is appropriate and effective at de-risking energy efficiency ventures.

Here the role of donor funds in providing concessional terms, including first loss options, can be key. Particularly in unfamiliar markets, such as energy efficiency, there is a need to incentivize the commitment of financial institutions. With MDBs likely to offer risk sharing facilities at commercial terms, the utilisation of donor funds to soften these can be seen as key to convincing financiers of their value. In fact, as the Indian example shows, there is the chance that the donor funds do not get fully used up, and therefore can continue to roll-on and promote further energy efficiency investments beyond their original lifetime.

Guarantees appear to be most appropriate for financial sectors that are already strong and capable of delivering their own credit to energy efficiency investments. In neither case study was a credit line supplied to boost the liquidity of the market. Therefore, appreciating that guarantees also focus on the access to finance, rather than its nature, this hints that they are most appropriate for markets that have moved beyond the early stages of development and are ready to try riskier endeavours if the right support can be provided.

As a result, prior capacity building and other experience with energy efficiency is a definite plus when choosing to deploy a guarantee. The initial success of the risk sharing facility in India is in no small part down to the emergence of a viable market that has benefitted from previous investment and programs to build the basic blocks of an energy efficiency supply chain.

However, even within relatively sophisticated financial sectors, technical assistance is an essential element in both of the case studies. This lesson is particularly clear with the Indian case study, where it was assumed that the participants were skilled enough before the program kicked off, only for their lack of capacity to emerge after it had begun.

Technical assistance for properly identifying, assessing and investing in energy efficiency projects is a vital complementary tool for ensuring that financiers acquire the necessary skills and tools to actually lend to projects. A guarantee on its own is insufficient. Indeed, BDO in the

Philippines only took up the technical assistance, revealing that it was perceived as of more value than the guarantee itself.

Although these case studies are evidence of the relative success of guarantee facilities, there are a couple of outstanding questions. The first is whether guarantees are able to push financiers to lend to end-users that would normally exist outside of their client base – in other words, mitigating not just the perceived performance risk of the technology, but also the potential credit risk of new clients, perhaps SMEs or residents who normally struggle to access finance.

The other issue is if guarantees can move beyond acting as demonstrative instruments, whereby they prove the business case in a limited set of examples for a limited set of participants, and actually catalyse significant scale by encouraging those who do not participate to also expand into the market. Unfortunately these case studies do not yet provide definitive answers to these questions.

4. LEASING

4.1 Mechanics

Leasing is a relatively novel financing instrument which is rarely deployed across the CIF-funded energy efficiency programs. In fact, only one case study utilises this tool – the IFC's Commercialising Sustainable Energy Finance program in Turkey.

In spite of its scarcity, leasing has the potential to be highly impactful in sectors where access to finance is particularly difficult. These are namely those populated by businesses with small balance sheets, limited collateral or a poor credit history which prevents them from accessing extra debt finance. SMEs are a typical example: leasing enables them to pay for investments without having to sustain burdensome capital requirements. In this vein, it could act as a key to unlocking energy efficiency in hard-to-reach sectors where credit lines and guarantees are insufficient for encouraging financiers to lend to end-users.

Purpose

Enable end-users to utilise energy efficient equipment without needing to make a capital investment that is put on the balance sheet of the company.

Method

From an MDB's perspective, their role is to provide the necessary credit and technical assistance to the leasing company so that they can expand their business into the energy efficiency market. The leasing company will purchase energy efficient equipment outright with this credit, and run it through its quality assurance processes to ensure it will perform as expected. The leasing company can then market the technology to the end-users.

The agreement between these two parties can take two forms: operating leasing or capital leasing. Operating leasing is a continuous contract where the end-user pays the leasing company a regular subscription fee for use, and often maintenance, of the equipment. Here the leasing company assumes permanent ownership of the technology. Capital leasing, however, means that the end-user eventually takes ownership of the technology after completing a certain amount of payments to the leasing company.

Target barriers

Leasing has the benefit of addressing a number of the key barriers found in energy efficiency markets. First, it mitigates the high upfront costs of energy efficient equipment. Instead of having to invest a large amount of capital in a one-off payment, end-users can pay for the equipment through regular fees, thus spreading the financial burden. This makes investing more appealing to end-users who have limited cash to invest.

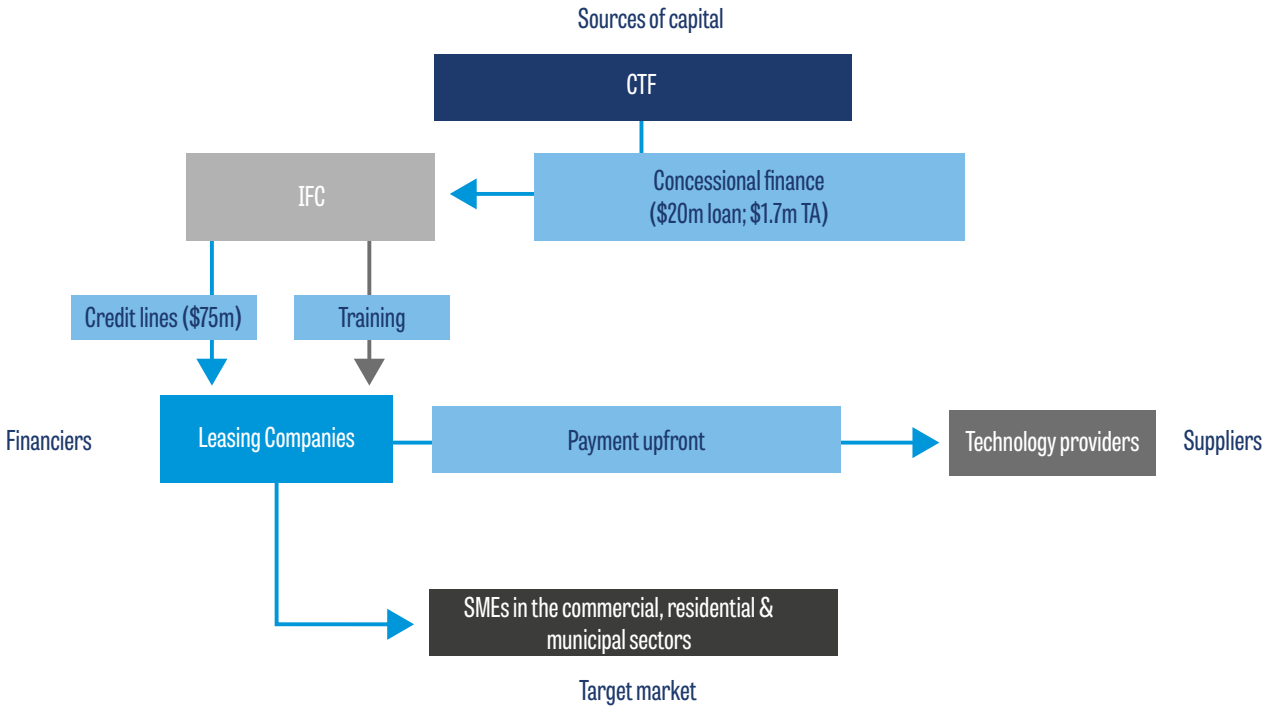
Moreover, as mentioned, leasing allows end-users to circumvent burdening their balance sheets and tying up collateral as security – unlike a normal bank loan. This means that end-users who typically struggle to secure debt finance, such as residents or SMEs, because of their limited capital and assets, are able to access appropriate financing for energy efficient equipment.

In turn, the fact that leasing companies buy the technology outright plays an important de-risking function. These companies can use their technical skills and expertise to test the equipment, providing assurance that it will deliver energy savings as expected. This reduces both their perception of risk because they are familiar with the technology, unlike typical retail banks, and the scepticism of the end-user.

4.2 Case study

4.2.1 Turkey Commercialising Sustainable Energy Finance

Figure 11: Turkey CSEF structure



Target market

Turkey has been a key geography for the CIF and their MDB partners. The long-standing dependence on energy imports and government commitment to new sources of sustainable energy helped make the business case for greater investment in renewable energy and energy efficiency. Therefore, towards the end of the last decade the Turkish Government began taking significant policy steps, such as with the 2007 Energy Efficiency Law and subsequent legislation.[36]

Importantly, with a number of initiatives looking to promote energy efficiency finance at the same time,[37] the IFC did not want to compete with other development financial institutions in the market. Over its history, it has had extensive experience dealing with SMEs and hence saw an opportunity for helping to scale-up energy efficiency deployment in a key part of Turkey's economy.

The SME sector in Turkey generates 25% of its GDP and represents 10% of its exports.[38] These figures underpin a strong motivation to improve competitiveness, in order for it to grow and thrive in the international marketplace. Reducing expenditure on energy costs represents a clear-cut opportunity to keep overheads down and drive profits towards productivity and expansion.

However, a common problem for SMEs is accessing appropriate finance for new investments. Due to their lack of assets, track record and balance sheet, they can struggle to secure the capital necessary from financiers who perceive them as too risky to lend to.

The IFC's solution was to explicitly target SMEs with an innovative approach to energy efficiency financing – leasing. This product could build off the strong and well-established leasing market in the country whilst addressing a key barrier to energy efficiency investments – inability of SMEs to access extra debt finance.

The program is technology agnostic notwithstanding the requirement that there must be a minimum 15% efficiency

36 See the TurSEFF case study in the 'Credit Lines' chapter for more information.

37 EBRD's TurSEFF and IBRD's Private Sector Renewable Energy and Energy Efficiency Program.

38 OECD (2016), *SME Policy Index: Western Balkans and Turkey 2016*.

improvement. This approach allows for flexibility in reaching SMEs that work across various industries, whilst setting an important benchmark to ensure impact. However, it is unclear how this 15% minimum performance standard was measured and enforced.

Drivers

As touched on above, there were strong macroeconomic drivers in place that helped establish a favourable policy environment for the program. For the former, Turkey had a long-standing energy deficit which meant it was importing increasing amounts of fuel to sustain its growing economy. The combination of growing demand and increasing dependence on energy imports heightened the danger of a potential power supply shortage, and encouraged governmental action.

In response, the Turkish Government began to prioritise energy efficiency as a way to mitigate these issues by reducing dependence on energy imports and reducing stress on the power grid. Their approach manifested itself in the Energy Efficiency Law in 2007 – an umbrella piece of legislation that precluded rules and regulations for energy management, energy efficiency service companies and industry targets, amongst others. In addition, an efficiency strategy followed in 2012 which explicitly set a nationwide target of reducing energy intensity by 20% from 2008 levels by 2028. [39]

Whilst macroeconomic and policy strategies were important to secure government buy-in, for businesses it was energy bills and productivity that were most significant. As a result of a move towards a more cost-reflective tariff from 2008, energy prices were increasing for many consumers.[40] This raised the awareness of the value of energy efficiency and was a key driver in securing new interest and commitment from SMEs.

The Turkish example here emphasises how economic and policy drivers can combine to create powerful motivating forces for promoting energy efficiency. It highlights how macroeconomic concerns can translate to policy action at government level; whilst businesses are significantly influenced by energy prices as a positive driver for pursuing energy efficiency.

Supply chain

Market studies preceded the implementation of the program and identified leasing as a viable option for reaching these small - and medium-sized companies. Leasing companies in Turkey have been well-established since the 1980s and provide a range of technologies to the SME market.

Furthermore, at the time leasing companies had a strong incentive to expand their business offering to SMEs. In 2008 Turkey changed leasing law and accounting principles so that leasing became less popular – including hiking VAT for leasing from 1% to 18% (later revised to 8% for certain equipment).[41] Therefore leasing companies were facing decreasing demand and were looking for new markets to sustain their business model.

The 3 companies contacted were YapıKredi Leasing, Fınans Leasing and Iş Leasing. Across the companies, there was a range of exposure to energy efficiency financing: (in no particular order) one had almost no understanding of energy efficiency; another had very basic understanding; and one was familiar with it. This difference manifested itself in how long it took the companies to begin implementation, with the less knowledgeable ones requiring training. However this only lasted a matter of months.[42]

Barriers

The barriers were evaluated through a market assessment before the implementation of the program. The most fundamental barrier identified for SMEs was their inability to take extra debt on their limited balance sheets. With energy efficiency investments representing high upfront costs, this issue was compounded by the fact that there were no financing solutions on offer for energy efficiency that enabled SMEs to take on the investment without impacting on their capital structure. Moreover, bank loans were often inadequate at matching the payback times of energy efficiency investments.

In addition, poor awareness of the benefits of energy efficiency amongst both the leasing sector and across SMEs in general had prevented a market taking hold. This absence of awareness underpinned a lack of market maturity, and translated into the majority of the leasing companies being unfamiliar with the necessary experience and skills for delivering energy efficiency products.

Solutions

The IFC provided credit lines that were ring-fenced for energy efficiency investments to the 3 leasing companies. These credit lines were blended with concessional CIF money to create attractive rates that incentivized their utilisation. The softer rates could help offset the extra transaction costs associated with expanding into a new market and the extra requirements, such as additional reporting.

39 ABB (2011), *Turkey: Energy efficiency report*. Available at: https://library.e.abb.com/public/bcfe8957cb2c8b2ac12578640051cf04/Turkey.pdf.

40 World Bank (2015), *Turkey's Energy Transition Milestones and Challenges*. Available at: http://www.worldbank.org/en/news/infographic/2015/11/02/turkey-energy-transition-milestones-challenges.

41 Leaseurope (2008), *The Turkish Leasing Industry*. Available at: http://www.leaseurope.org/uploads/documents/articles-interviews/Bulent%20Tasar-September2008.pdf.

42 Interview with IFC.

In addition, the leasing companies received technical assistance, paid for by the CIF, to help build their awareness, understanding and capacity for marketing and executing energy efficiency investments. They would seek out opportunities with their SME clients before buying the necessary technology with the credit provided by IFC and CIF. Accordingly, the program exploited the leasing companies' existing contacts with the SME industry to create a pipeline of potential projects with the added assistance of technical assistance.

Once the technologies were secured by the leasing companies they could be delivered to the SMEs for a subscription fee. Two types of leasing were offered – operational and capital. The former amounts to a regular subscription fee that the end-user pays for the equipment that is permanently owned by the leasing company. In contrast, for capital leasing the end-user pays a fee to the leasing company until they have completed the contract and own the equipment outright themselves.

Both types are forms of unsecured financing. This means that the SMEs do not have to leverage their restricted balance sheets nor secure the investment to limited collateral. Instead the end-user could book the cost as an operating expenditure. This type of solution not only addresses concerns related to limited capacity for debt financing, but also with the cost falling under operating expenditure it is an investment that can often be approved by the energy manager, as opposed to having to go to the financial officer or board members. As a result, it can be easier to convince businesses to make such investments due to the energy manager's perceived familiarity with energy concerns and the fewer necessary levels of approval.

Moreover, leasing can provide an important de-risking role too. Leasing companies are able to use their skills and resources to appraise the technologies before purchasing them, ensuring there is a quality check on their performance. This translates to greater surety on the part of the financier (leasing company) that the technology risk is low, in addition to convincing the end-user that they will realise the savings that are promised.

Impact and sustainability

The program was very successful. All the funding was utilised and follow-on credit lines, have been sought and implemented by the leasing companies without CIF concessions. In 2014, Yapi Kredi Leasing sought a $96m loan from the IFC on fully commercial terms.[43] This is a clear indication of the sustainability of the initiative - it has provided the financiers with the skills and confidence to invest in energy efficiency as a business-as-usual venture.

Over 50 energy efficiency projects were financed across the 4 years of the program, saving a total of 0.2 MtCO2e/year.[44] A key factor in engendering the aforementioned confidence of the financiers is the fact that there were zero non-performing loans.[45] This exemplifies the low risks of energy efficiency investments.

Lastly, a strong indication that the program was successful in targeting the notoriously hard-to-reach SME sector is that the average size of an investment was $100,000.[46] This underpins the argument that leasing is an encouraging avenue to pursue for targeting SMEs as a market for catalysing the deployment of energy efficiency.

Lessons

The CSEF program is a strong example of how understanding the complexity and nuances of a local market is vital for the success of the program. In this instance, understanding the Turkish supply chain and the barriers that SMEs faced enabled the construction of an effective solution package. Focusing on this supply chain required intimate knowledge of its circumstances, such as the changing conditions for leasing companies, and highlights the value of an in-depth market assessment prior to the design of the a program.

Ultimately the success of the program in reaching the SME sector, which is often hampered by the lack of available financing options, indicates that leasing is an attractive option for scaling-up energy efficiency markets. Its ability to avoid burdening the limited balance sheets of smaller companies and the de-risking function it can perform reveals it to be a strong solution to a number of energy efficiency barriers. However, it is important to note that the Turkish market has a very developed leasing supply chain. Where this is not the case, the potential for a leasing solution to energy efficiency may be limited.

Additional success factors include the ability of the CIF money to secure the commitment of the leasing companies. The softer terms could offset additional costs resulting from expanding into a novel market, whilst the technical assistance was fundamental for building skills and momentum in delivering the services through these companies.

Finally, it is important to emphasise the significance of the favourable political and economic environment at the time. With increasing energy prices, a growing economy and new legislation there was an encouraging environment for the

43 IFC (2014), *Boosting Energy Efficiency in Turkey*. Available at: http://www.ifc.org/wps/wcm/connect/066c3e8046ef97db9395ff57143498e5/Project%2BSpotlight_TurkeyCSEF.pdf?MOD=AJPERES.

44 Climate Investment Funds (2015), *CTF Results Report*. Available at: https://www.climateinvestmentfunds.org/sites/default/files/meeting-documents/ctf_16_3_results_report_2015_revised_final_0.pdf.

45 Interview with IFC.

46 Climate Investment Funds (2017), *Commercializing Sustainable Energy Finance Phase II (CSEF II)*. Available at: https://www.climateinvestmentfunds.org/projects/commercializing-sustainable-energy-finance-phase-ii-csef-ii.

program to secure buy-in from both the government and the private sector. It was stated in interviews that repeating the program in today's conditions would be much more difficult as there is less of an appetite for energy efficiency without those key drivers.

4.3 Evaluation

As stated at the beginning of this chapter, leasing is an uncommon instrument used across the CIF's portfolio. However, as the CSEF case study shows, it appears to be one of the most successful – particularly at targeting the hard-to-reach SME sector. The utility of leasing in providing access to finance to end-users who would either i) find it difficult to commit due to high upfront costs, or, even if they do commit, ii) struggle to secure a bank loan due to the requirements, is important and unique amongst the instruments we have evaluated.

An added bonus with leasing is the fact that it is not related to capital expenditure. For a business this means that it can be classed as an operating cost, which holds a number of benefits: i) the aforementioned avoidance of burdening an organisation's balance sheet; and ii) it probably falls under the budget of an energy manager. This means that the person in the organisation who is most attuned to the costs of energy, and the benefits of energy efficiency, can make the investment decision. This circumvents the difficulties witnessed when financial and executive officers have to prioritise capital investments, and energy efficiency falls behind other priorities such as production growth.

Beyond mitigating the upfront costs and the capital or asset requirements, the importance of leasing companies being in a position to trial, and therefore de-risk, the performance of the technology is also significant. However, this highlights an important caveat – the leasing companies in a market must be trusted for their recommendation to hold value for the end-users.

Moreover, simply put, delivering a leasing solution in an emerging market requires there to be a pre-existing, and trusted, supply chain. Turkey's leasing supply chain was mature, with liquid and well-known companies able to leverage their skills and contacts to sell their new product – but this will not always be the case in other countries. Therefore, whilst the lessons from this case study are mostly positive, it is important to appreciate that their transferability may be limited and if leasing is to succeed elsewhere it may require a well-established supply chain already in place, or that efforts are expended to build such a supply chain before leasing for energy efficiency is attempted.

5. INSURANCE

5.1 Mechanics

An innovative solution to the persistent lack of trust in emerging energy efficiency markets is insurance. It represents a contractual obligation for the financiers to be reimbursed if the performance of the technology is flawed. For an unfamiliar investment, in the shape of energy efficiency, insurance could be a market instrument that underpins the guarantee of repayments.

It has so far only been trialled in Mexico by the IDB, along with partner versions getting started in Colombia and El Salvador, through its Energy Savings Insurance (ESI) initiative. As a result, the conclusions reached in this study are based on early findings when designing and implementing the Mexican program, and can only be judged as preliminary.

Purpose

Build trust in energy efficiency investments by counteracting the risk of the technology not producing the savings as expected through guaranteeing payments in the event of non-performance.

Method

Insurance works by a claimant paying a premium to an insurance company to secure reimbursement if the insured eventuality occurs. In this case, if the energy efficient technology does not realise its expected energy, and therefore cost savings, then the claimant can still repay their loan through the insurance payment. Who pays for the premium may vary: in theory it could be either the end-user or the technology supplier. In the case of the IDB's ESI program, it is the end-user.

For insurance companies to agree to this, there needs to be sufficient reporting requirements and verification so that they can trust, and price, this service appropriately. This can place extra burdens on the types of technology used, the correct installation of the technology and the monitoring of its performance. Therefore, it is important to note that an insurance scheme comes with added requirements to make it work.

Once enough investments are insured, the original insurance company can go to the re-insurance market. In effect, this means that they are insuring themselves against significant losses in this portfolio. This is often done in international markets and provides a safety net in case of large amounts of defaults. However, it also constitutes an extra transaction cost that will be factored

into the original premium requested from the end-users by the original insurance company. At the same time, this represents a way in which institutional investors can be engaged to support energy efficiency, as re-insurance companies are considered part of this class of financiers.[47]

Target barriers

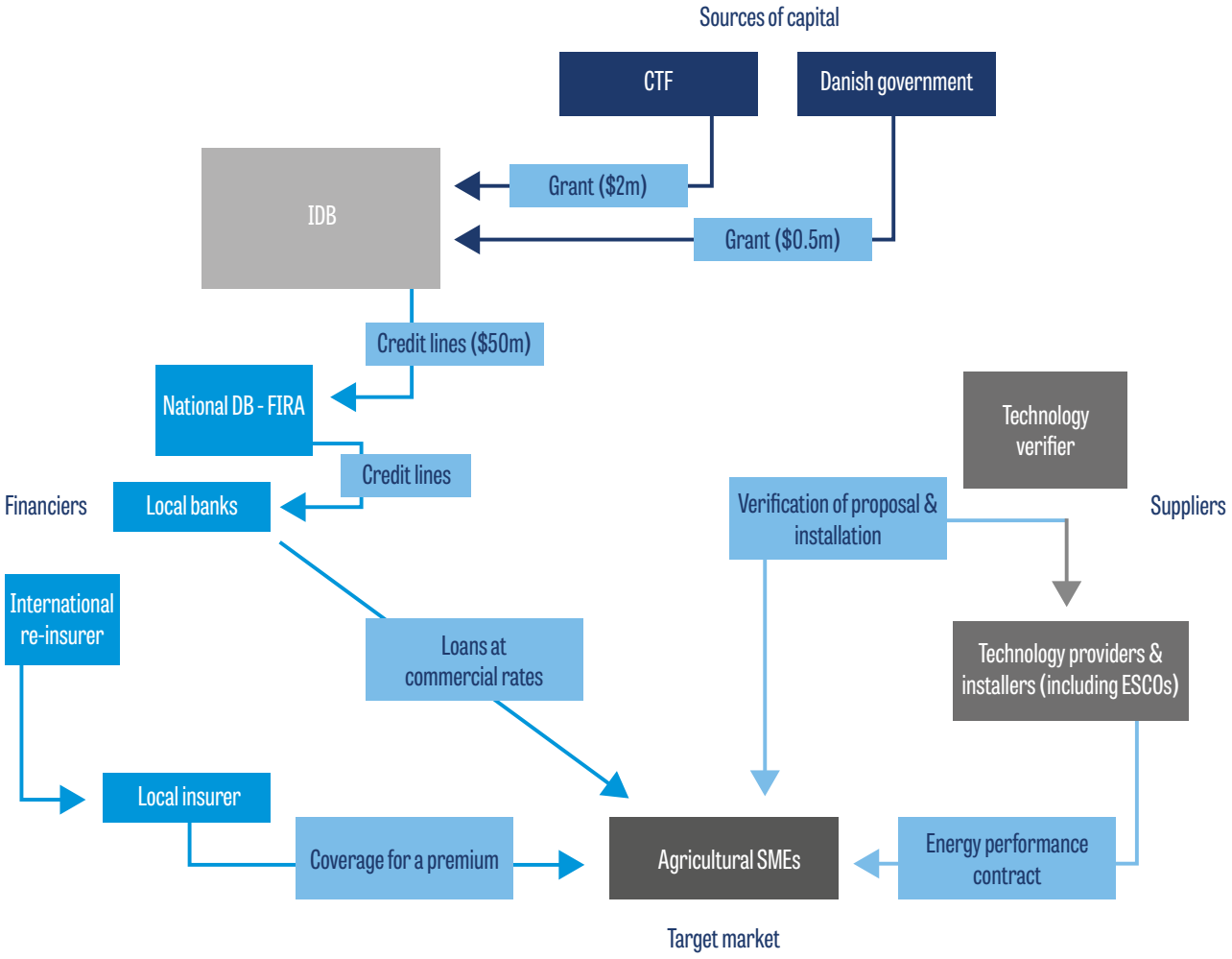
The immediate barrier is the lack of trust in energy efficiency investments paybacks. This particularly relates to the performance of the technology and the business model based on future cost savings. Insurance provides a contractual obligation that the end-user and their financier will receive the payments promised, and therefore acts as a key for unlocking access to debt finance.

This can have knock-on effects for other barriers. For instance, it could help convince banks to offer finance for energy efficient upgrades that have longer payback periods or encourage end-users to invest in equipment that may be disruptive to their business-as-usual operations, safe in the knowledge that their investment will be reimbursed if all else fails.

In the short-term, insurance could encourage greater commitment from end-users and financiers to invest in energy efficiency. In the long-term, the experience gained under the security of an insurance scheme could help permanently reduce perceptions of risk as investors become familiar with energy efficiency products and can price the cost of capital and length of tenor affordably and with confidence.

5.2 Case study

5.2.1 IDB Energy Savings Insurance



47 See chapter on 'Institutional investors' below for more information.

5.2.2 Target market

Each ESI variation is based on an initial prioritisation and market study in concert with the National Development Bank (NDB) client interests and their mandate (e.g. sectoral focus, company size range). Key considerations include: financial and non-financial barriers to energy efficiency; potential to reduce energy bills; potential volume for energy efficiency loans in the sector; type of enterprise; and available technologies (taking into account the sub-categories of potential to achieve and verify savings).

A distinguishing factor of the ESI program in Mexico when compared to other energy efficiency initiatives in the CIF portfolio is the tight focus on the target market. To illustrate, there is: i) a focus on the food processing sector; ii) a focus on size of organisations in SMEs; and iii) a select list of proven energy efficient technologies that are eligible.

These different levels of focus serve as a method for mitigating potential risks. They implicitly acknowledge that the market is immature when it comes to energy efficiency investments. By concentrating on a limited number of eligible organisations and technologies they decrease the likelihood of non-performing loans and increase the chances of being able to identify opportunities to build a pipeline.

For the former, it is because they can select participants and technologies that are more likely to perform. By limiting the eligibility to certain technologies, the end-users, financiers and technology verifier has good visibility and trust regarding their performance, which is vital for incentivizing the involvement of insurance companies.

For the latter, because efforts to raise awareness, as well as develop and disseminate business cases for investment, are easier within one sector. Furthermore, the focus on SMEs means that there are similar barriers identified, and therefore similar solutions required to promote energy efficiency.

SMEs in the food processing sector is an important sector in the Mexican economy but one that typically struggles to access debt finance from banks. Furthermore, the use of inefficient equipment is widespread, with energy efficiency a low priority, makes it a prime opportunity for an energy efficiency program that could assist on both fronts. From the initial pilot in Mexico, 100 energy efficiency projects are expected.[48]

48 Interview with IDB.

Drivers

In Mexico there is an increasingly supportive policy framework for energy efficiency. Under the 2015 Energy Transition Law there are roadmaps for reaching energy efficiency targets in the medium- (15 years) and long-term (30 years).[49]

Furthermore, the policy framework includes mandatory minimum energy performance standards, in addition to penalties for non-compliance. There are also labelling schemes across a range of technologies, with dedicated accreditation bodies.[50] Importantly Mexico also has standardized contractual arrangements for energy efficiency services, which lays to rest a key legal matter for scaling-up emerging markets.

However, to date this has been insufficient to drive significant energy efficiency deployment. Indeed, this case study highlights that a favourable policy framework is not enough without a well-functioning supply chain. The major issue is that there is a severe lack of trust in energy efficiency investments and in those who try to sell them.[51] This undercuts both demand in the market and the ability of service providers to build-up a track record.

Accordingly, the ESI program itself does not include policy work but focuses on establishing market instruments (contract, validation, insurance) within the existing, and therefore familiar, regulatory framework. There is an opportunity in Mexico to capitalise on the encouraging policy framework, and focus on building confidence in the private sector to make the most of it.

Whilst there is already positive policy emerging from the Mexican Government, for the national authorities the potential productivity and competitiveness gains played a role in encouraging their commitment to the ESI given that the program is aligned with national sector strategies. This is an indication that when the target market is well-aligned with the government's priorities it can make the design and implementation of a program easier.

Supply chain

The supply chain in Mexico is immature and lacks the track record to inspire confidence in its ability to deliver energy efficiency results. This feeling is associated with the

49 IEA, *Energy Transition Law (Ley de Transición Energética -LTE)*. Available at: http://www.iea.org/policiesandmeasures/pams/mexico/name-153753-en.php.

50 ESMAP, *Regulatory Indicators for Sustainable Energy – Mexico*. Available at: http://rise.esmap.org/country/mexico

51 Interview with IDB.

future cost savings model and, in particular, ESCOs, who are regarded with suspicion because they have failed to deliver promised savings and struggled to finance multiple projects at once.

To mitigate the high perception of risk, on behalf of both end-users and financiers, the ESI program aims to introduce additional parts to the supply chain that can absorb the risks. On one level, there is an accreditation service and energy performance contract to certify the performance of the technology. On another there is a third-party verification agent who can testify that the equipment has been properly installed. And lastly, an insurance agency is able to underwrite potential losses, with their own exposure to the risks of the investments insured by an international re-insurance agency.

In each respective country the ESI program is coordinated and managed together with the respective national development banks (NDBs) in the country, which were selected based on client demand and their executing capacity. For Mexico, this is FIRA – the bank mandated to provide financial assistance to the agricultural sector.

The benefit of utilising NDBs is that they are closely aligned with the priorities of the government as well as being attuned to the issues of the particular sector, enabling more effective implementation. However, to create fully-fledged private sector markets, the learnings that emerge within the development bank must be disseminated across their commercial counterparts to broaden the supply of finance.

Barriers

The barriers were evaluated through market assessment surveys and interviews with companies, technology providers and local financial institutions.[52] The investigation found that the lack of trust in the technologies and the suppliers was the pervasive obstacle, meaning energy efficiency was perceived as too risky and a low priority for investment.

Beyond this key barrier, there was poor awareness of the energy efficiency opportunity amongst end-users. This issue, combined with the lack of trust, caused a lack of a robust pipeline to interest the financial sector and sustain the energy efficiency service providers.

Financiers themselves perceived high risk due to lack of familiarity with the technology and the underlying revenue model based on future cost savings. Moreover, the perceived credit risk of lending to SMEs who lack collateral or have poor credit histories meant that funding for energy efficiency investments, particularly with sufficient tenors to cover the lifetime of the investments, was lacking in the food processing sector.

Solutions

To address this immature market, the IDB and its partners have constructed a multi-faceted and comprehensive solution package. Its aim is to mitigate the multiple barriers facing energy efficiency in the Mexican food processing industry, encouraging best practice and confidence so that the beginnings of a sustainable market can take root.

Credit lines with 8 year tenors from IDB, via FIRA, will supply capital to local banks, matching the payback of the technologies and underpinning the long-term loans for SMEs. The loans will be guaranteed by FIRA to mitigate the credit risks of the SMEs and alleviate their need to provide substantial collateral.

The pipeline of projects will be built through awareness-raising and promotional activities in the agroindustry and with local financial institutions. Additionally, there will be more hands-on efforts with thorough project assessment, monitoring and verification of the feasibility of investment proposals from suppliers. Promoting key case studies across the Mexican market and beyond will help to build momentum and display the track record of successful investments, reducing perceptions of risk.

Standardised energy performance contracts and validation procedures between suppliers and end-users will contribute to this de-risking process. Under these arrangements, customers only pay 75% of the cost of the equipment until the promised savings are realised, then the supplier can redeem the final 25%.

Furthermore, insurance paid for by a premium from the technology supplier will cover a further 25% of the cost. The local insurance company will re-insure internationally in order to offer lower premiums to the technology suppliers.

Therefore in total 50% of the investment is protected from under-performance. This represents a significant portion of the investment and should underpin greater trust in energy efficiency from both the end-users who buy the kit, and the local banks who finance such investments. The aim is that the multiple de-risking mechanisms – from performance contracts and verification, through to the insurance – should reduce the cost of capital for SMEs. On paper, this

52 Ibi d.

multi-faceted solution package should mitigate many of the key risks and enable the energy efficiency market to build that all-important track record for building trust and beginning to grow.

However, there is a caveat in that every stage in this process involves new transaction costs. As a result, effectively balancing the gains through de-risking the investments and the potential increase in transaction costs will be key to the success of the ESI program.

In addition, it is important that the program is communicated in a fashion that takes account of the different needs and expectations across the entire supply chain. The multiple stages could be off-putting for end-users or financiers who prefer to operate according to simple, business-as-usual actions. Therefore selling the program must prioritise being sensitive to their expectations and ensure it is as simple as possible to implement.

Impact and sustainability

The ESI program is an innovative idea that offers an impressive arsenal to combat the barriers to energy efficiency. As this program is currently at a pilot phase, with several technology providers having been validated and first projects in the assessment process, there is insufficient information to judge its impact and sustainability.

However, the combination of standardised energy performance contracts, project assessment and verification, and insurance against potential energy savings shortfalls, represents a notably comprehensive approach to de-risking the market.

As stated, the multi-faceted solution package requires a balancing act to align the benefits these solutions can provide and the transaction costs they may represent - in short, these extra process need to bring down the cost of capital sufficiently for end-users to increase energy efficiency investments and for financiers to supply finance at adequate rates.

Furthermore, its long-term success will rest on how scalable and replicable the model can be. This relates to moving beyond the food processing industry in Mexico, both in terms of sector and geography. The IDB is currently advancing with similar programs in hospitals and clinics in Colombia and SMEs in El Salvador.

Looking to the next generation of energy efficiency initiatives, the ESI represents a potentially significant route for incentivizing institutional investors as a new source of capital for energy efficiency markets. The benefit of the insurance mechanism is that it could help establish a secure cash flow, with the necessary guarantee of performance, so that the energy efficiency investments could be packaged (securitized) to sell to institutional investors confident of getting their returns.

Lessons

The ESI is an ongoing program therefore it is too early to provide complete answers at this moment. However, so far there have been a number of key factors of success highlighted by those involved with the program design and implementation.

Of vital importance is communicating effectively with the program participants (technology suppliers, local banks, insurers and end-users), in order to speak to each actors' interests to ensure ownership and constructive feedback. To illustrate, the local banks will react to different messaging and cost-benefit calculations when compared to technology suppliers, insurers or end-users. Therefore tailoring the message of the program to the audience is key to get this multi-stage supply chain to commit in its entirety. The utilisation of a local agency as a coordinator, in this case FIRA, is a crucial channel for accessing and understanding the different concerns across local supply chain.

Linked to this point is the need to simplify instruments where possible to reduce perceived complexity. Energy efficiency is often an unfamiliar and difficult sell to many newcomers. Therefore it is important not to over-complicate matters, particularly with this multi-faceted solution package, when convincing participants to commit.

Particularly in an immature market, a set of prioritised technologies can be helpful to start the program and build demonstration credentials. However, if the program is to achieve replicability and scalability, it should be structured flexibly to incorporate other technologies and sectors if demand exists.

Lastly, the measures taken to develop the pipeline, such as awareness-raising and project assessment, need to be synchronised with the finalisation of the financial package to ensure realistic expectations and delivery. It is important to not build expectations without being able to execute because this can lead to program to running out of momentum and tarnish it with a reputation for failing to deliver on its promises. If it materialised, this risk would undercut the primary aim of building trust in the market.

5.3 Evaluation

Using insurance as an instrument to de-risk energy efficiency investments is an innovative approach that can help to stimulate emerging markets. From the Mexican experience, outlined above, it appears that it is particularly suited to those markets that are very immature – where the business model and supply chains are not trusted to deliver the promised cost savings. The insurance mechanism provides a level of security that can convince sceptics to invest in the opportunity. From this perspective it is an instrument that can mitigate high perceptions of risk on the behalf of financiers (like a guarantee) *and* end-users (unlike a guarantee).

Although it is too early to fully evaluate the innovative approach at work, to be successful there are a number of factors that key stakeholders have highlighted as significant. First, there needs to be a potential pipeline of sufficient scale to interest insurance agencies to expand into this new market. This emphasises the need for substantial technical assistance through awareness-raising, advice and training that can help deliver the necessary quantity of projects and clients. In addition, to convince insurers it appears, at least in these early-stages, that the use of well-known and standardised technologies is important given their inexperience in the market.

From the perspective on end-users and/or suppliers who have to pay the premium, there needs to be a convincing case for them to do so. This means targeting investments with high enough rates of return that not only service bank loans and deliver profit but that can also pay the extra fee for insurers to safeguard the cash flow. Moreover, the extra reporting and monitoring requirements that may be demanded by insurers will add to the transaction costs for an investment. A potential mitigation could emerge if the cost of capital can be reduced by the banks feeling more secure in their lending with insurance backing it up.

These extra steps and the inclusion of additional actors, insurance and verification agencies to name a couple, to spread the risk so that banks and end-users feel comfortable financing energy efficiency investments brings a danger of adding layers of complexity to a market that is characteristically perceived as unfamiliar and a hassle. It is important to ensure that the insurance mechanism, and complementary measures, are kept as simple to understand and streamlined as possible to minimise the extra effort needed to both convince potential participants and proceed with implementation upon their approval.

6. INSTITUTIONAL INVESTORS

6.1 Introduction

An important additional element for this study was to assess what potential role institutional investors could play in supporting energy efficiency finance. The importance of this investigation is evident in the numbers: to limit temperature increases to 2°C, annual global energy efficiency investment must increase by a factor of nine to $1.1 trillion by 2035 and at current spending levels, public funds alone will be insufficient to meet this investment need.

Private sector funds are required to fill the investment gap and supply long-term funding for energy efficiency. Institutional investors hold large quantities of private sector capital that could be unlocked to provide significant liquidity in the market. However, currently this an underdeveloped opportunity. Therefore, public donors must begin to act to catalyse institutional investment in energy efficiency.

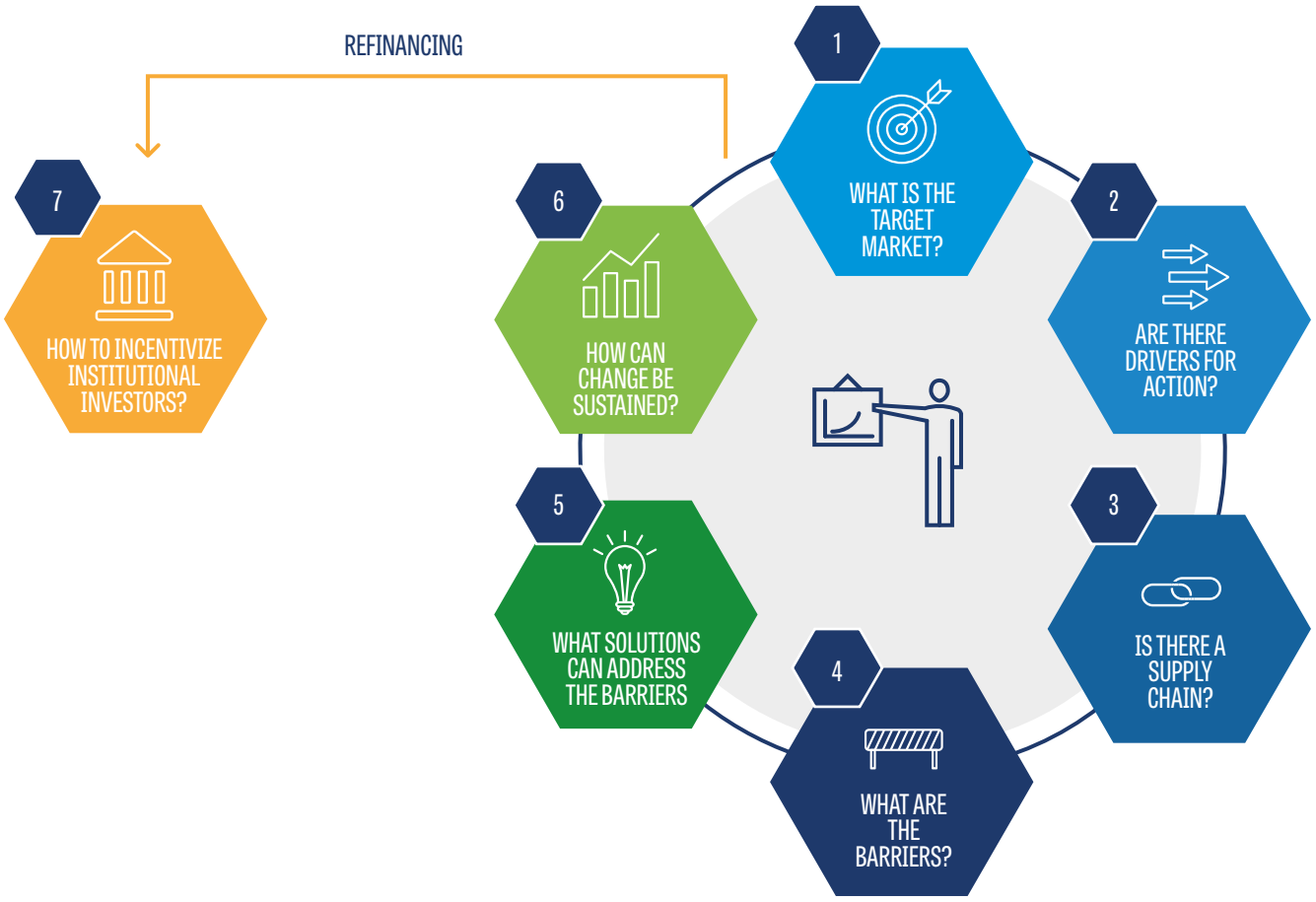
Figure 11 shows how this component of the analysis fits into the overall framework used to assess the CIF's energy efficiency portfolio.

This component of the study set out to answer a set of key questions via desk research and interviews with selected stakeholders. The questions were:

1. Who are institutional investors?
2. How does energy efficiency fit within their investment portfolios?
3. Has anything been done already to catalyse institutional investment in energy efficiency?
4. What interventions could the CIF and MDBs put in place to catalyse more institutional investment in energy efficiency?

The conclusions below are the result of work carried out together with Vivid Economics and the Climate Bond Initiative (CBI).

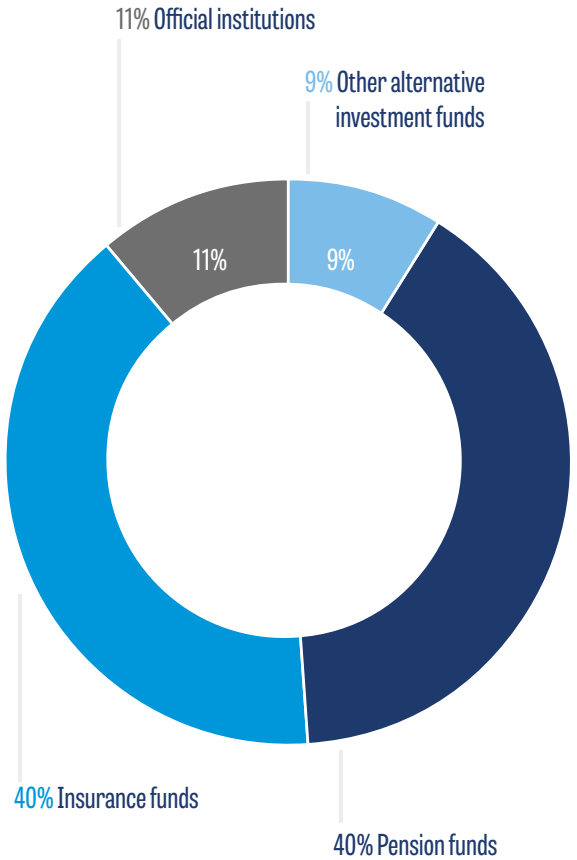
Figure 12: role of institutional investors within the energy efficiency assessment framework



6.2 Who are institutional investors?

Institutional investors is an umbrella term covering pension funds, insurance companies, official institutions and other 'alternative' investment funds. These institutions have over USD 100 trillion of assets under management globally. However, different institutional investors will have different aims and objectives, invest in different products, and be subject to different regulations.

Figure 13: breakdown of assets under management



Estimated distribution of AUM across institucional.
Source: WEF 2011

Pension funds use member-sponsored funds to invest in assets to save for their members' retirement. Pension funds must pay the scheme's (fixed) liabilities: their investment strategy follows the structure of their liabilities ('liability driven investment').

Insurers provide financial protection against losses at the cost of a premium. Insurers must be able to meet (uncertain) liabilities: their investment strategy follows the structure of expected liabilities

Official institutions include sovereign wealth funds and other public financial entities, such as public pension reserve funds.

Other 'alternative' investment funds covers a broad and heterogeneous range of investor types, including foundations and endowments.

Institutional investors' investment decisions are driven by certain constraints which determine their return needs. The allocation of institutional investors' capital is driven by mandates that influence allocation decisions – these represent specific objectives, investment horizons and risk tolerances, and also present constraints in terms of scale, liquidity, currency exposure and creditworthiness or ratings of assets.

Certain types of institutional investors may also seek to achieve particular financial or social objectives. In addition, regulatory constraints can also impact asset allocation. Institutional investors have long-term, reasonably predictable liabilities, which they seek to balance through their investment portfolio. As such, institutional investors tend to group investment products into two main categories:

- **Liability-hedging investments:** these are products that help ensure that the investor can meet future obligations**.** These products provide relatively certain cash flows.
- **Return-seeking investments:** these are products that enhance returns, increase the profitability of the company and enable more competitive product offerings**.** These products are riskier and deliver higher returns.

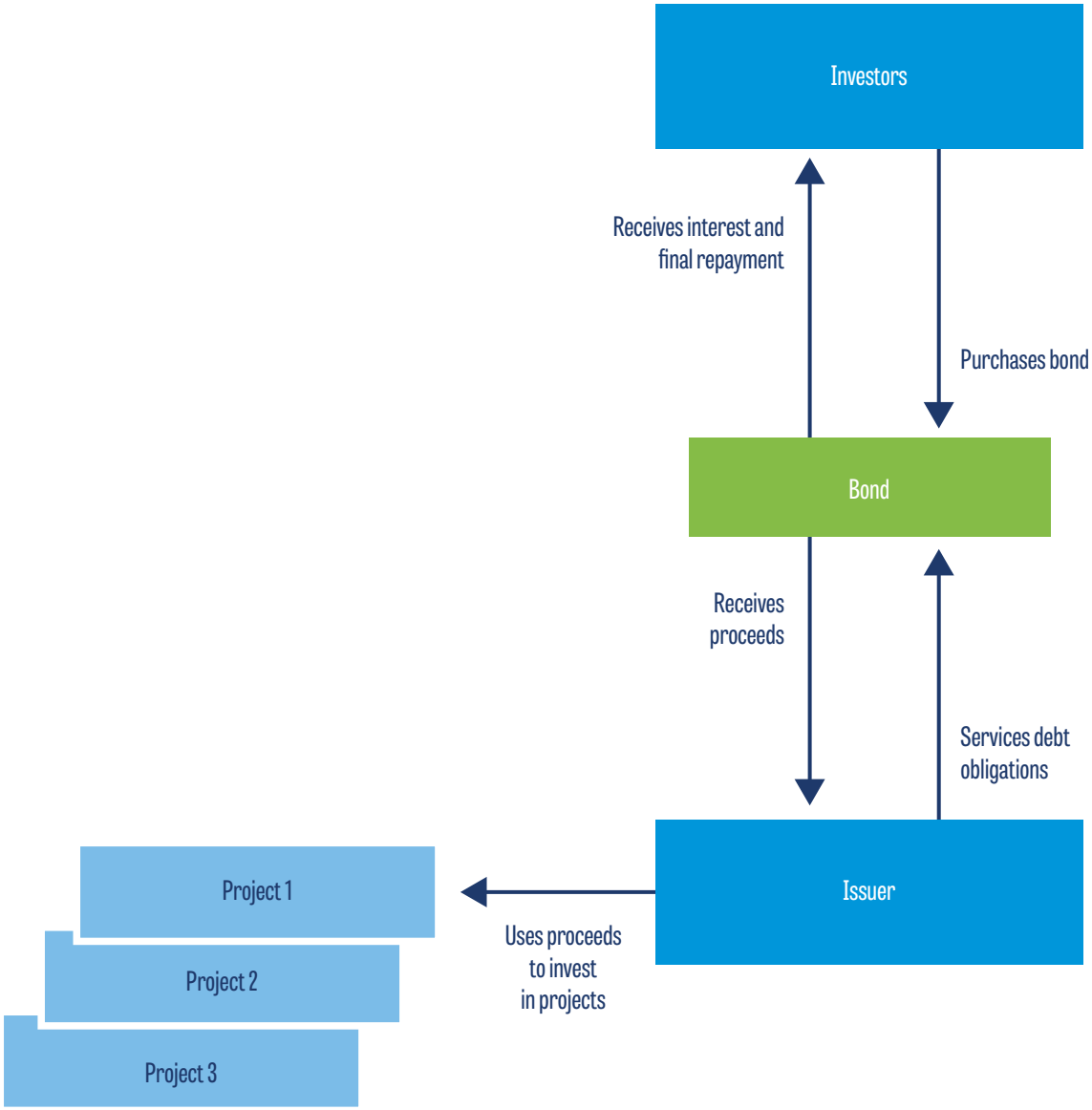
When investment decisions are made in-house, the following factors impact investment decisions (some of these factors also hold true for outsourced investment). First of all, whether in-house or outsourced, investment managers will tend to specialise in a particular product type, e.g. corporate bonds in European car companies. Furthermore, pension funds manage large quantities of capital on an annual basis, e.g. $1bn per year – this is ~$20m allocated *weekly*. As such, due diligence has to be done quickly. Finally, investment decisions are often put forward to an investment board. Boards may be more likely to approve familiar product types.

According to their mandates and decision-making structures, institutional investors usually invest largely in **bonds** and **equities**, with very little exposure to **direct investment** and **alternative assets**.

6.2.1 Fixed income securities (bonds)

Bonds represent a large proportion of institutional investors' investment product allocation. In a bond, a bond issuer issues debt to raise funds from investors for a defined period of time and interest rate. Bonds usually have long tenors and fixed rates: institutional investors can use these to balance their liabilities. The risks associated with bonds are relatively easy to understand. Fixed income securities – particularly corporate and government bonds – are highly liquid, meaning that investors can sell them quickly without losing value.

Figure 14: Fixed income securities (bonds) example



6.2.2 Equities

In this context, equities refer to ownership of shares in funds. Ownership includes prospective dividends and capital gains: equities can be a valuable source of cash flow and long-term returns. Equity investment is also an investment in the management, experience and skills of the company itself. Investors expect that these skills will be used to create additional value from developing new assets, entering new markets and enhancing asset value.

Equities are typically riskier than debt (bonds): in the case of financial difficulties, shareholders can only lay claim to cash flows after debts have been repaid. The key equity type for institutional investors are funds. Direct purchase of equity might also happen – but we consider this as a separate instance (see 'Direct investment' below).

Figure 15: Equities example

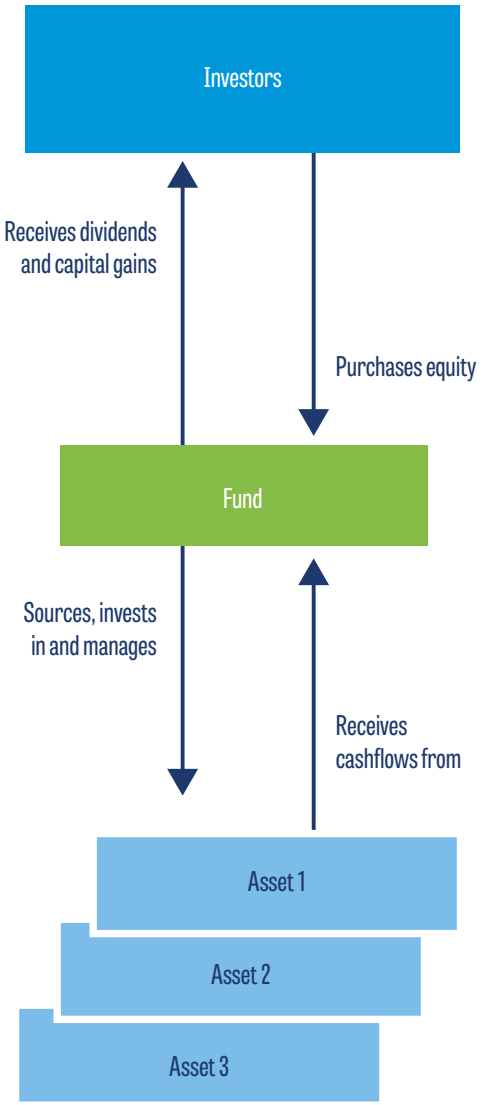
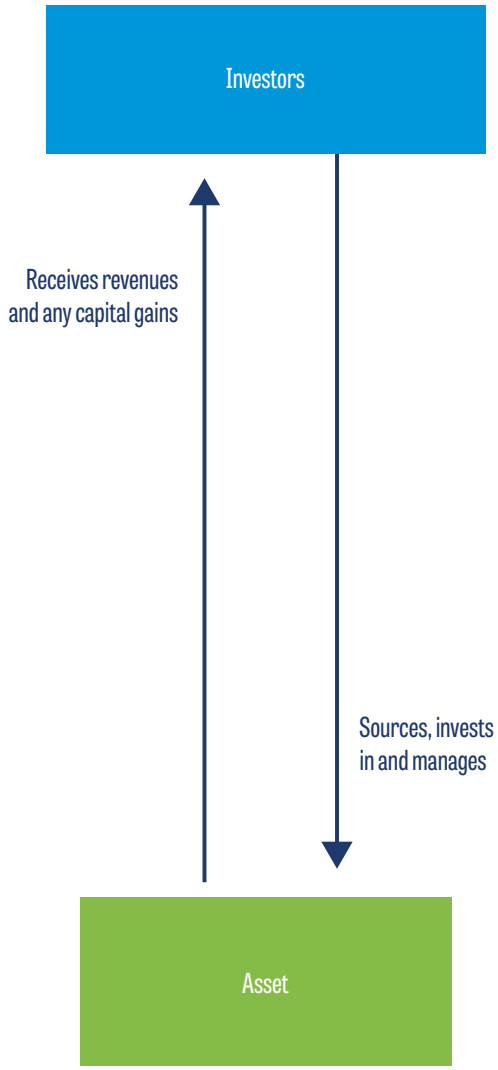


Figure 16: Direct investment example



6.2.3 Direct investment

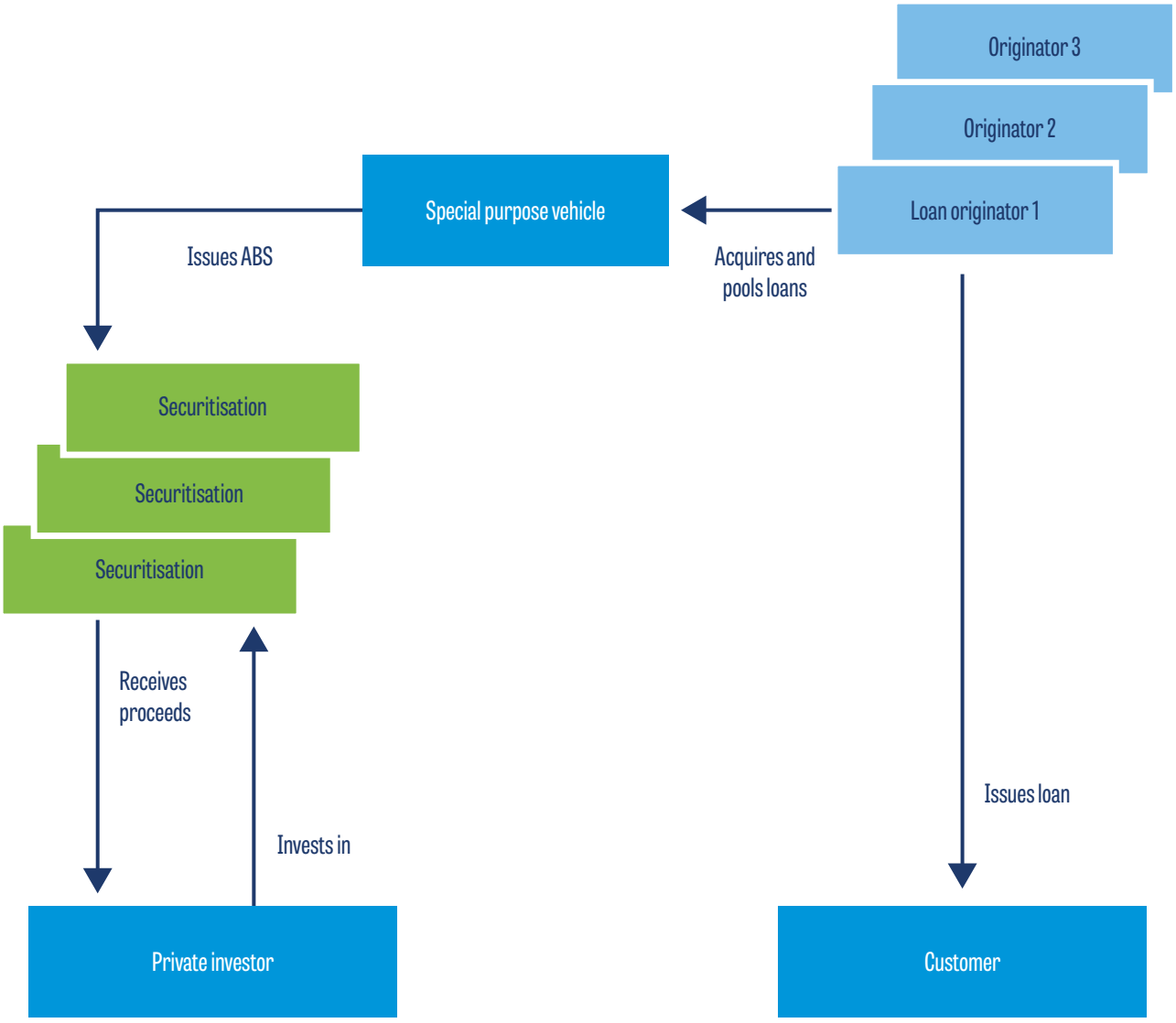
Some institutional investors may invest directly in assets – this means they will have to ensure that individual assets match their performance and cash flow expectations. In this context, direct investment would look like investment in project finance (debt or equity).

In order to make direct investments, institutional investors must have the necessary capabilities. Intermediaries can be used to perform due diligence and directly finance and manage investments instead of in-house resource, but this is expensive. Direct investment can commit capital and manage assets over longer time periods, which can align well with institutional investors' liability schedules. However, direct investments are usually illiquid and difficult to trade.

6.2.4 Alternative instruments

Alternative instruments includes investment in a range of financial vehicles and credit financial derivatives. A key alternative instrument are asset-backed securities (ABS). ABS are bonds backed by loans that are sold to investors directly through capital markets. Securitisation bundles together various types of contractual debt (usually loans). It transforms a pool of illiquid loans (and the future cash flows from individual loans) into tradable securities. ABS can be structured to contain different segments, or 'tranches' of debt, with different levels of risk, reward and maturity.

Figure 17: ABS example



Source: NAO, introduction to ABS

6.2.5 Implementation of different instruments

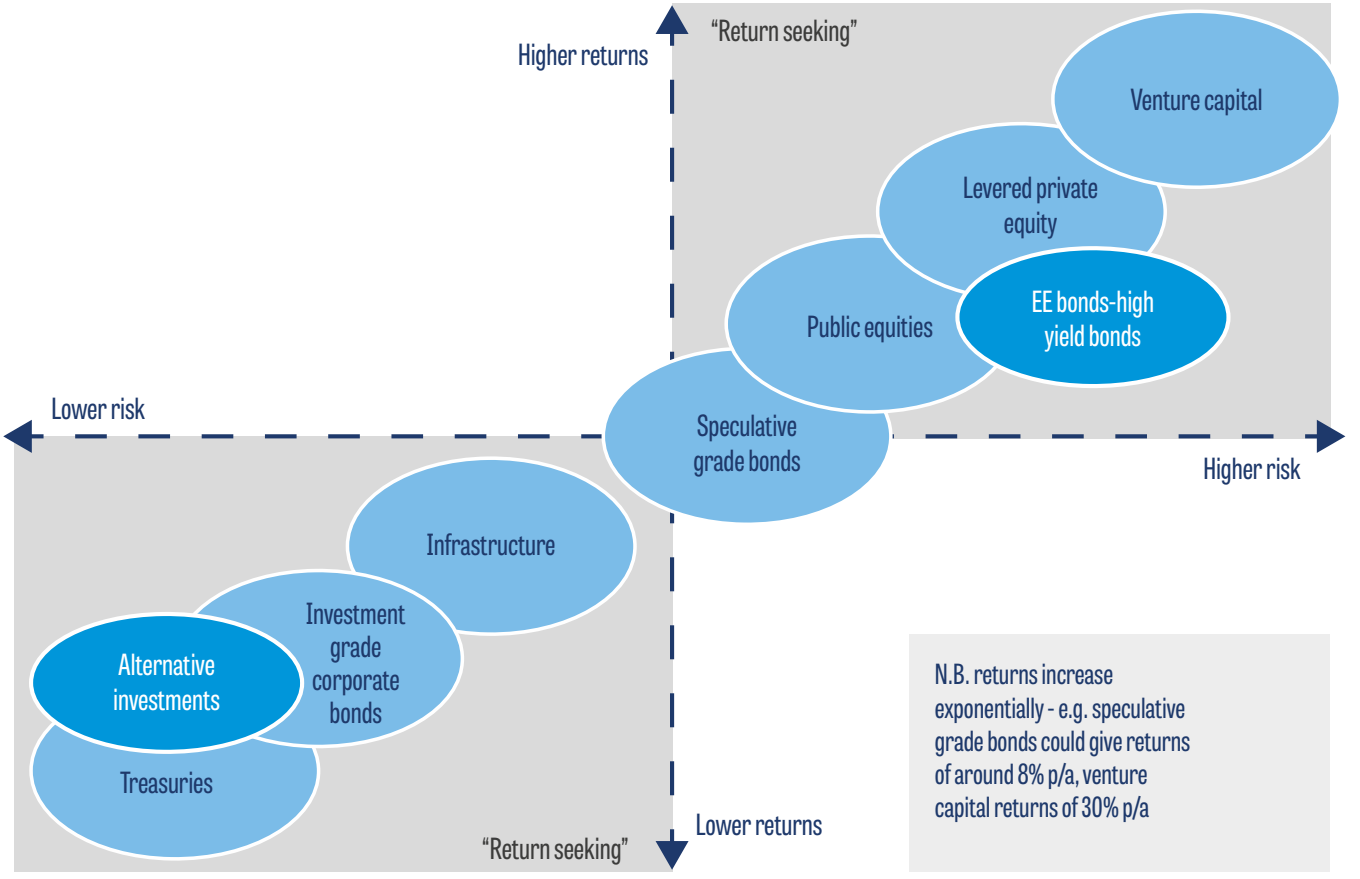
Each of the listed instruments exists on a risk-return continuum which is crucial for decision making (Figure 17). However, no instrument occupies a single space on the chart. The diagram presents stylised risk-return characteristics of key investment product categories. Equities and direct investment can lie at various points, depending upon the investment.

One essential tool to understand institutional investors is the capital lifecycle (Figure 18). This is usually composed of three main phases:

1. In **asset preparation**, developers undertake the steps required prior to securing financing;
2. At **financial close**, capital developers secure the finance required to develop an asset; and
3. **Refinancing** replaces the capital currently invested in the project with a new source of capital (e.g. securing a new loan, or selling the asset to a new buyer). This allows the replaced capital to be recycled into new investments.

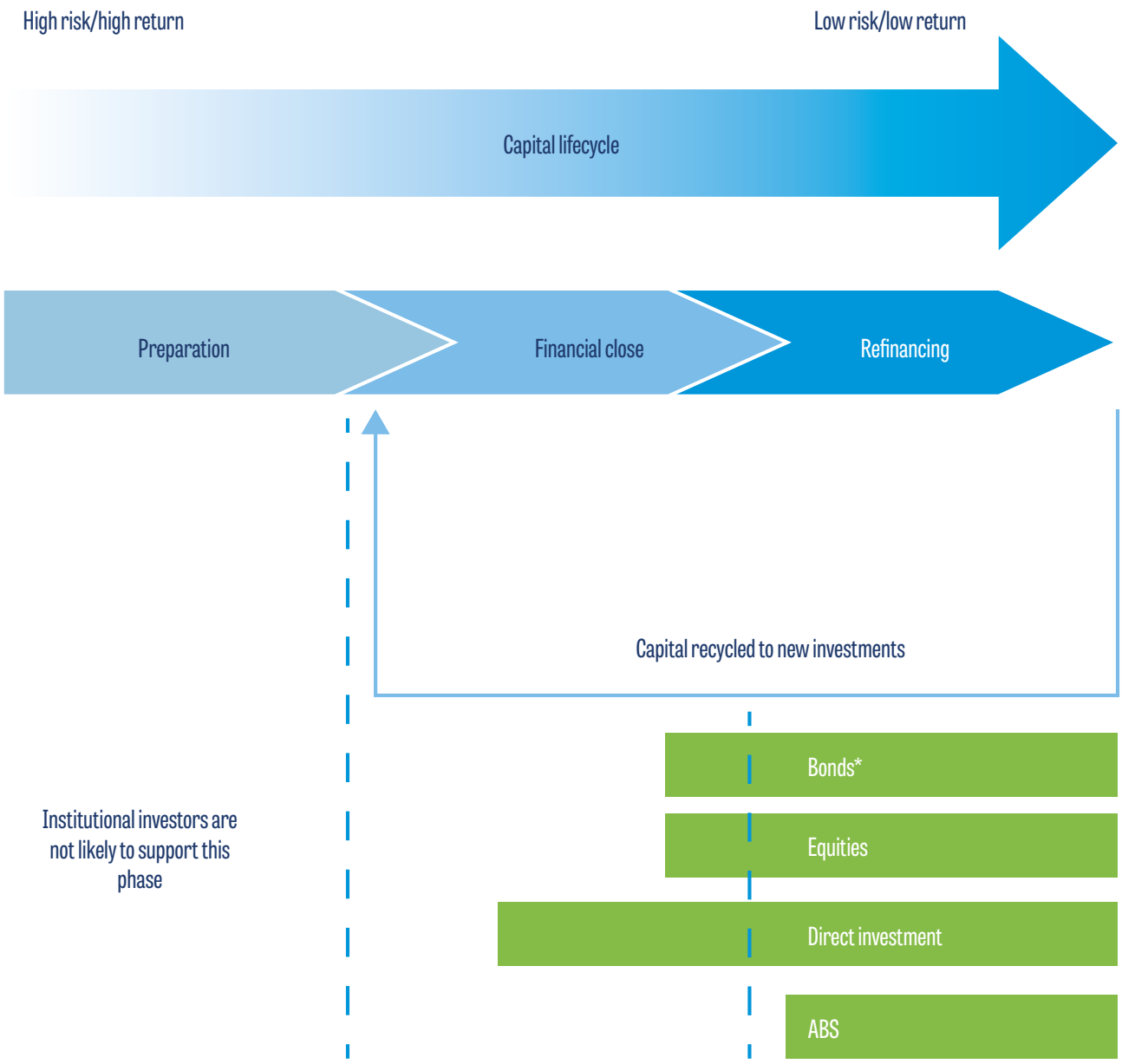
Institutional investors tend to invest at the refinancing stage, as this is lower risk (as assets are already operational and there are no development risks). According to OECD figures, ~20% of all bond proceeds are used for investment, ~90% for refinancing (~10% for acquisitions of existing assets, ~35% for refinancing, ~45% for reducing debt).[53]

Figure 18: Financial instruments placed on an illustrative risk-return continuum



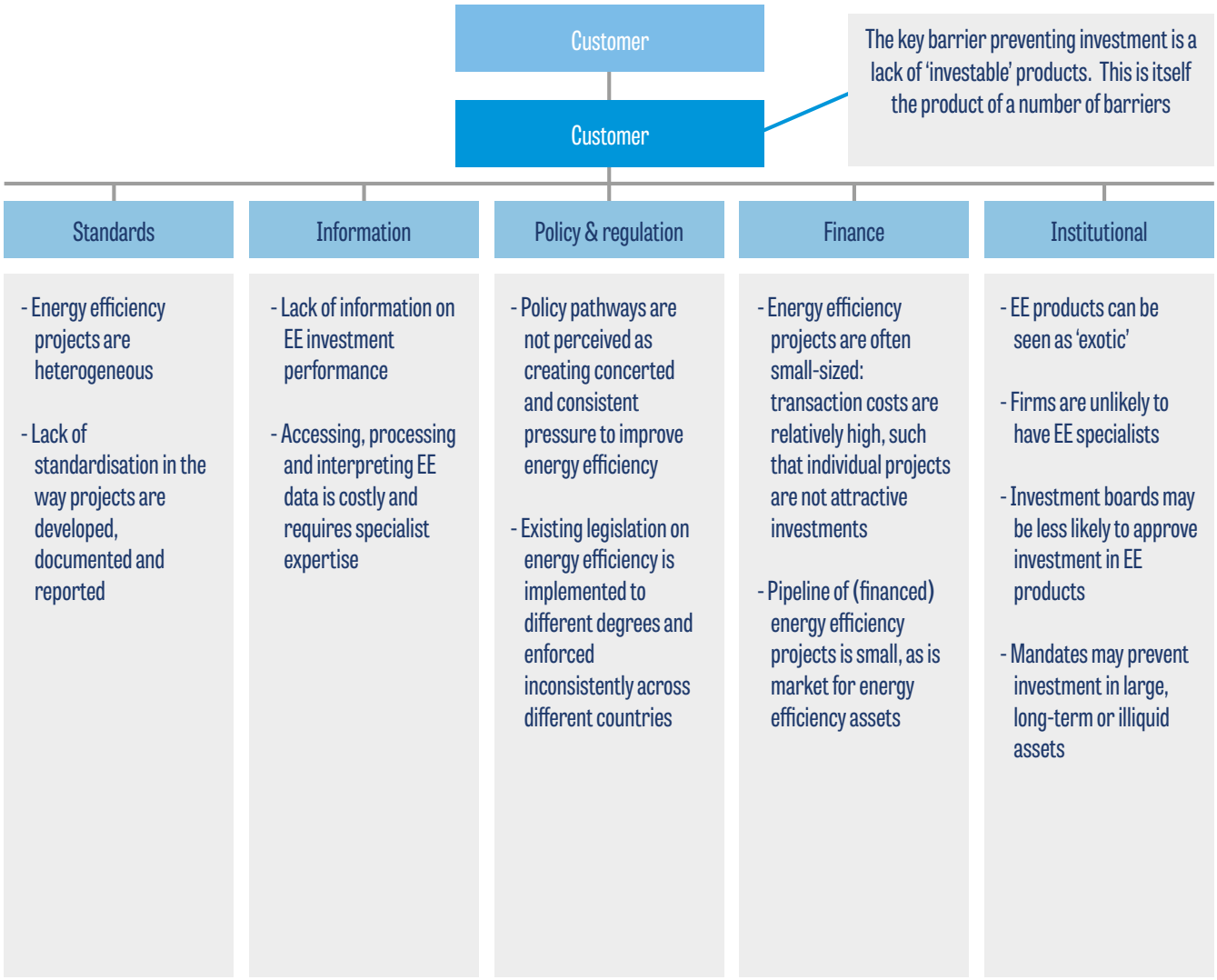
53 N.B. OECD recognise that figures do not sum to 100%. OECD 2015, Corporate bonds, bondholders and corporate governance.

Figure 19: Capital lifecycle and financial instruments



*according to OECD figures, ~20% of all bond proceeds are used for investment, ~90% for refinancing (~10% for acquisitions of existing assets, ~35% for refinancing, ~45% for reducing debt). N.B. OECD recognise that figures do not sum to 100%. OECD 2015, Corporate bonds, bondholders and corporate governance.

Figure 20: Barriers that contribute to a lack of investable energy efficiency products for institutional investors



6.3 Energy efficiency and institutional investors

Institutional investors do not appear to be investing in energy efficiency at scale. The future financing requirements for energy efficiency are enormous: over a trillion dollars will be needed annually by 2035. Institutional investors can play a key role in providing this finance. However, while data on institutional investment in energy efficiency are scarce, available information suggests that institutional investment in energy efficiency is limited and well short of potential levels. For example, only 6% of outstanding bonds as of 2016 focused on energy efficiency assets.[54]

The reason is that a number of barriers exist preventing institutional investors from moving into the energy efficiency space. These include **standards**, **information**, **policy and regulation**, **finance** and **institutional** barriers.

The relevance of the aforementioned barriers can be mapped across the three investment products that are more familiar to institutional investors and more amenable to being used as vehicles for energy efficiency assets (Table 3).

It is important to clarify three key concepts:

1. **Energy efficiency assets** can be physical energy efficiency equipment and associated future revenues.

54 IEA (2014), *World Energy Investment Outlook;* EC H2020 call for submission, "Topic: making the EE market investable"; CBI State of the market 2016; 6% of $130bn outstanding.

Table 3: Relevance of barriers to financial instruments

Barrier	Bonds	Funds	ABS
Standards	Accepted standards are needed to build credibility	Accepted standards are needed to build credibility	Enable standardisation of underlying EE assets
Information	Market remains small and so performance data limited, but it is growing	Market remains small but specialist expertise processing and interpreting energy efficiency data would facilitate information sharing	Market remains small; in the long-term, products may provide performance data to enable risk assessment
Policy and regulation	Likely to be consistent with most investment mandates; most likely to impact policy environment if scale achieved	Consistency with investment mandates dependent on type of institutional investor; less likely to impact policy environment	Higher perceived risk may make it inconsistent with mandates; less likely to impact policy environment
Finance	Aggregation may lower transaction costs	Aggregation may lower transaction costs but fund fees may be high	Aggregation may lower transaction costs and may lower financing costs for energy efficiency loans
Institutional	A highly familiar asset class that investors are often comfortable dealing with	Circumvents the need for in-house energy efficiency specialists	May be perceived to be an 'exotic' product

For example, an energy savings company (ESCO) might install an energy efficient refrigerator system (physical asset) that provides future receivables (payments from the energy user to the ESCO, as defined in contract). Here there is some value in the asset, with most value in the receivables.

2. **Energy efficiency investment products** are the (group of) asset(s) that an institutional investor purchases. To illustrate, a bond that could be issued to fund energy efficiency projects is an energy efficiency investment product; or a fund that invests in energy efficiency projects is an energy efficiency investment product
3. **Financial engineering** is the process through which energy efficiency assets are transformed into energy efficiency investment products, for example the process of securitising energy efficiency mortgages is financial engineering

Figure 20 shows how these three elements link together. In order to channel institutional investment into energy efficiency, MDBs and other relevant actors need to support the transformation of energy efficiency assets and associated revenue streams into familiar, investable products, via financial engineering. Several pathways are illustrated below.

It is important to note that specific enabling conditions are required for each product type.

For **energy efficiency bonds**, the key enabling conditions are:

- Creditworthy issuer (on balance sheet) or SPV assets (off balance sheet);

- Information / awareness around bonds;
- Project pipeline - sufficient number of bankable projects;
- Financial engineering capabilities to structure bonds; and
- Accepted green bond standards.

For **energy efficiency funds:**

- Investor confidence that fund managers will deliver returns is central - funds manage investors' capital for them and investors must trust in managers' capabilities to generate returns from this capital;
- Sufficient information regarding and awareness of the performance of energy efficiency assets;
- A pipeline of bankable energy efficiency projects and investment products that can be matched to the predictable, long-term liabilities of institutional investors;
- Personnel with the skills and capabilities required to develop a pipeline of bankable energy efficiency assets, invest in these assets and manage these investments;
- Standards that show assets held are energy efficient, to enable transparency regarding investments; and
- Creditworthiness of the energy efficiency revenues.

For ABS:

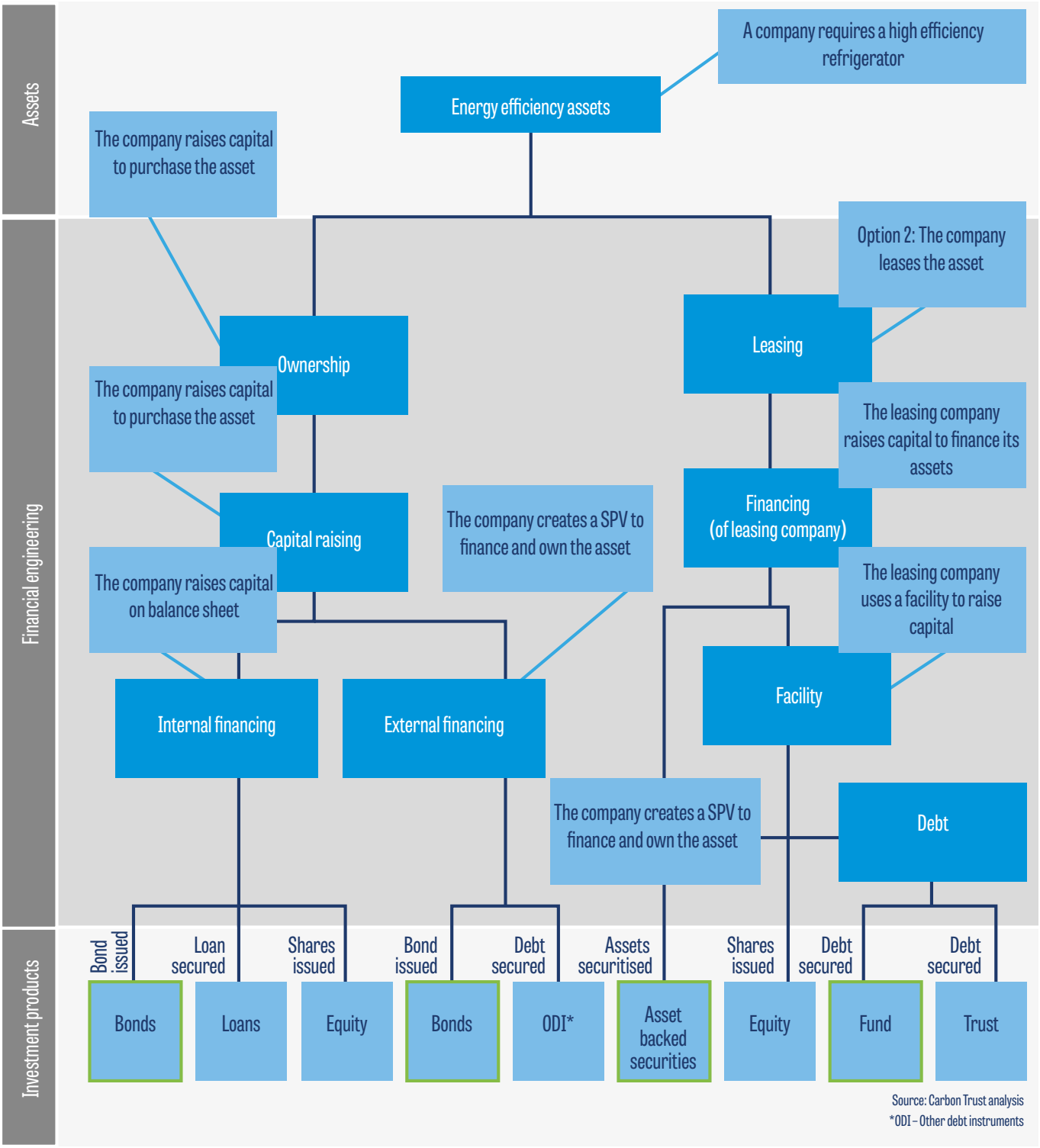
- Standardisation of underlying energy efficiency assets to enable robust underwriting and a rated securitisation – this refers primarily to revenue streams and their ability to pay; terms of payments; homogeneity of terms and conditions; and homogeneity of lease arrangements;
- Information surrounding and trust in the performance of energy efficiency assets in less familiar sectors;
- A functioning energy efficiency finance market, with a pipeline of loans or leases for energy efficiency equipment or upgrades to consumers or companies;
- A robust securitisation landscape and prospective demand for ABS;
- Sufficient capital for finance to warehouse loans prior to securitisation; and
- The financial engineering skills to structure energy efficiency ABS products.

6.4 Case studies

Although the CIF is has limited involvement with programs aimed at involving institutional investors – with the nascent IDB/GCF bond the exception - there are several examples of programs implementing some of the activities described before around the world, however they are mostly focused on developed countries. One possibility is that developing countries' energy efficiency markets are still too immature to move into the refinancing stage for which institutional investors are best suited. As such, intervention by MDBs would be even more crucial to kick-start this market.

The case study summaries below outline some of key approaches and mechanisms that contemporary initiatives have taken. They are addressed from a different perspective to the energy efficiency programs evaluated above due to the fact that: i) incentivizing institutional investors sits at an additional stage of our framework, after a market has been created in the first place; and ii) they are, more often than not, at a relatively early stage of development with limited results to evaluate.

Figure 21: Financial mechanisms to create energy efficiency assets



6.4.1 Information/standards

Tackling the barriers associated with information and standards, two relevant initiatives are the De-risking Energy Efficiency Platform (DEEP) and the Investor Confidence Project (ICP).

DEEP is "an open source initiative to up-scale energy efficiency investments in Europe through the improved sharing and transparent analysis of existing projects in buildings and industry." It provides an open source database for energy efficiency investments performance monitoring and benchmarking; interpretation of gathered data and development of a standardised risk/performance modelling methodology for investments; and a common, accepted and standardised underwriting and investment framework for energy efficiency investing.

The **ICP** is "a marketplace for building owners, project developers, utilities, public programs and investors to trade in standardized energy efficiency projects." It provides Energy Performance Protocols that define a standardised roadmap of best practice for originating energy retrofits. It also supports project development specifications by providing a standardised approach to requirements, tools, expectations and quality management. Finally, the program supports certification to increase confidence in energy efficiency as a demand-side resource and quality assurance by certified providers to increase confidence.

6.4.2 Financial instruments

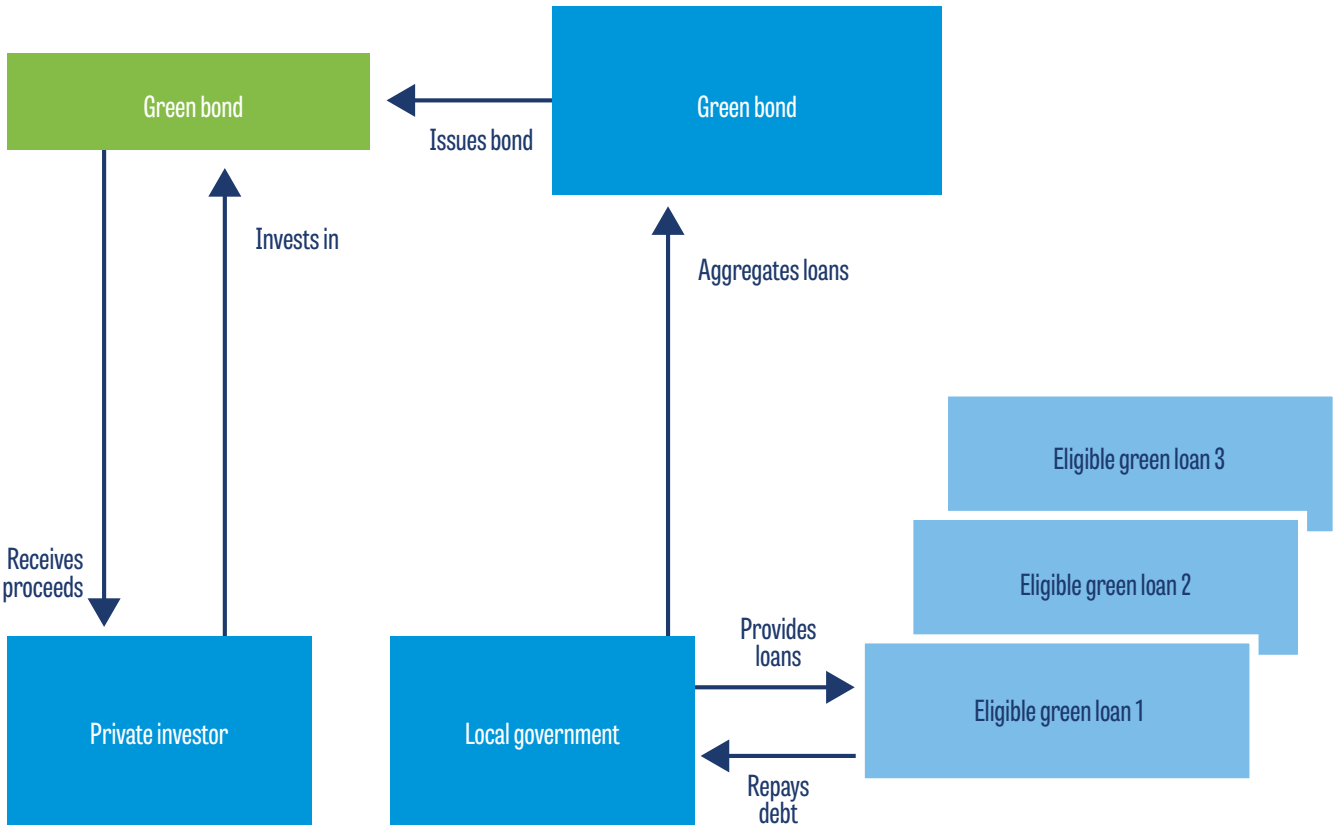
Financial instruments can aggregate energy efficiency assets through financial engineering to draw investment from institutional investors. They tackle finance and institutional barriers. Two examples presented below are the Kommuninvest Green Bond and the IDB/GCF Mexico Energy Efficiency Bond.

The **Kommuninvest Green Bond** acts as an aggregator and conduit issuer for cost-efficient public investments. Kommuninvest combines single green loans into an aggregated portfolio, against which it issues a bond. Local government entities select and verify green projects that require loans. Kommuninvest then reviews loan applications for eligibility and creates a portfolio of eligible green loans. It then issues a green bond with a commitment to allocate bond proceeds to the portfolio of eligible loans. The amounts raised by green bonds are less than or equal to 75% of the volume of committed green loans, and loan repayments are used to fund debt payments to bond investors. Investors receive debt payments directly from Kommuninvest.

Kommuninvest has been highly successful in leveraging institutional investment to fund green building energy efficiency improvements, with $768 million committed to energy efficiency and green buildings as of 31 December 2016.[55] Only $26 million of these were for energy efficiency improvements that were not for buildings. This program is very replicable, subject to certain conditions. There could be potential for an MDB to use Kommuninvest model to aggregate private sector projects. It requires the capability to identify and create business case for energy efficiency projects, and a creditworthy bond issuer.

55 Kommunivest (2016), *Green Bonds Impact Report, December 2016*. Available at: http://kommuninvest.se/wp-content/uploads/2017/03/Kommuninvest_Green-Bonds-Impact-Report_dec2016-1.pdf.

Figure 22: Kommunivest structure



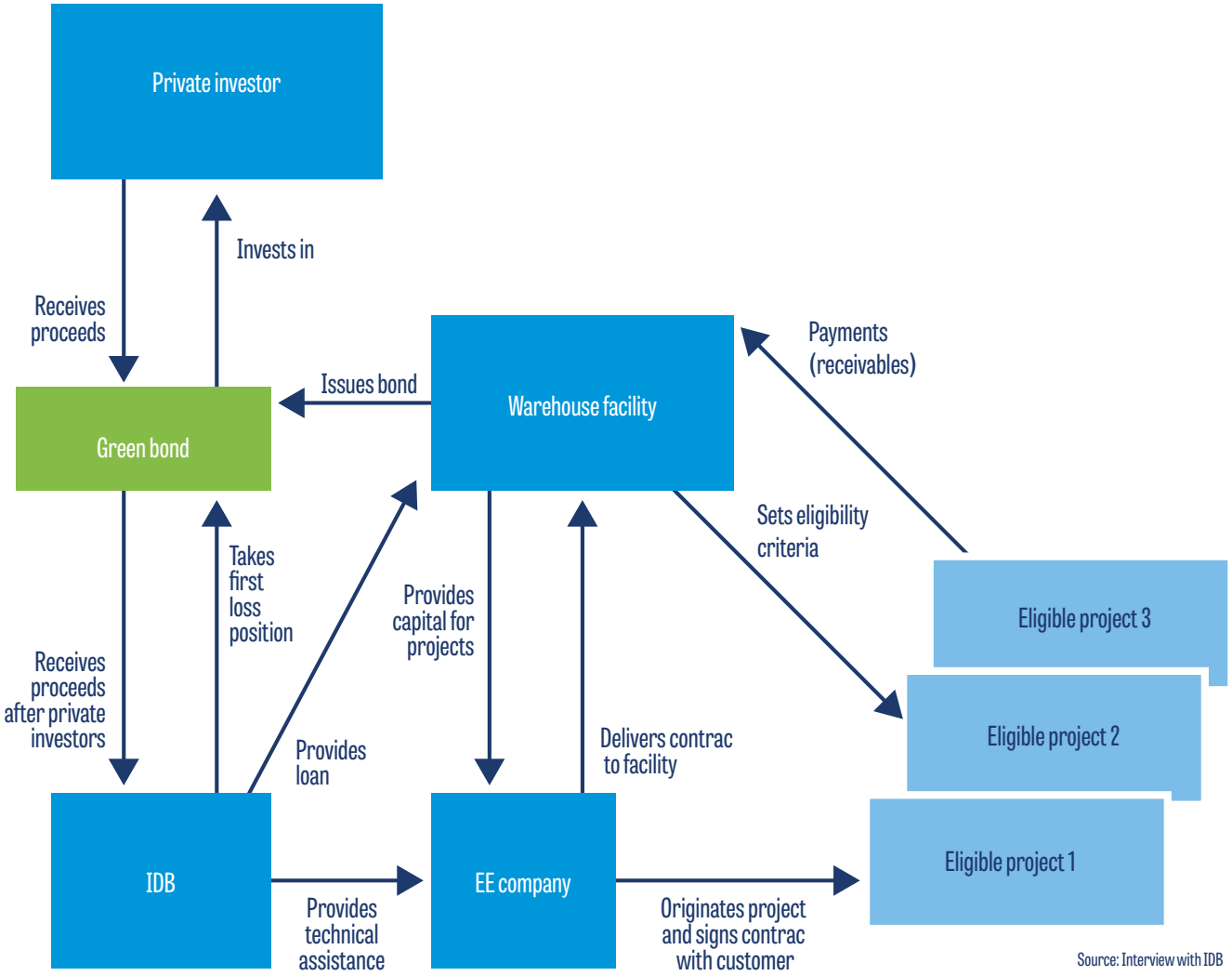
Source: Unep green finance enquiry, Green Bonds: country experiences, barriers and options, Kommuninvest green bonds impact report December 2016

The **IDB/GCF Mexico Energy Efficiency Bond** aggregates projects from multiple eligible energy efficiency companies to issue a bond backed by the receivables from energy efficiency projects. This bond has not yet been issued, but its mechanism is interesting to explore.

Interested energy efficiency companies apply to IDB through competitive process. IDB then selects eligible companies and works with them to identify a pipeline of eligible energy efficiency projects (eligibility criteria are consistent with green bond principles). The energy efficiency company develops a project with an energy user, which the warehouse provides capital for projects to the energy efficiency company for, and the energy efficiency company hands the contract to the warehouse (contracts are standardised by IDB to enable later securitisation). The warehouse then issues a bond to fund selected companies' pipeline of energy efficiency projects, backed by receivables paid by energy users to the warehouse. IDB (potentially) takes a first loss position on the bond to encourage outside investment. Finally, investors receive debt payments from the bond.

While the bond is yet to be issued, there are interesting lessons that can be learned from the initial process of creating a pipeline of projects prior to bond issuance. Independent consultants were needed to draw up (ad hoc) standardised contracts between energy efficiency companies and clients, to enable clear assessment of risk of eventual security. The IDB conducted screening and aggregation in-house – but in the longer-term, capabilities would need to be developed in the market. As such, the program requires the pipeline to be of sufficient scale for bond issuance. In the absence of standardised contracts for receivables, it also requires considerable ad hoc technical assistance to standardise contracts.

Figure 23: IDB/GCF Mexico Energy Efficiency Bond structure



Source: Interview with IDB

6.5 Conclusions

Institutional investment should be seen as an opportunity to replace or scale-up existing capital sources, enabling public finance to be recycled to higher risk areas. Institutional investment is not a magic bullet. Public finance should initially be used to support project preparation and finance, in order to develop functioning energy efficiency markets with a strong pipeline of projects that require refinancing, to enable and incentivize the involvement of institutional investors

There are two high level ways to promote investment in energy efficiency at the institutional level:

1. Creating energy efficiency investment products that are attractive to institutional investors *as they currently operate*; and
2. Changing institutional investors' behaviours and operations such that they 'organically' invest in low carbon, energy efficiency products.

The recommendations of this study focus upon point 1 as this can deliver short-term impact at scale. However point 2 is also very important, but should be considered a longer term goal. The recommendations cover the key investment products that public finance can support to drive institutional investment in energy efficiency.

The first point is supporting pipeline development and finance. Institutional investors require investment products that are at sufficient scale - e.g. $200m+. Aside from major infrastructure assets (such as railways), the small nature of most energy efficiency assets makes direct investment in energy efficiency unlikely. Institutional investors will not purchase small assets on an individual basis: they require investment products that bundle up and aggregate these assets. This requires an underlying stock of assets (pipeline) at sufficient scale (e.g. $200m worth of individual loans for residential energy efficiency improvements). This scale will not be found if the underlying markets are not functioning well – the health of underlying markets is key.

From a practical interventions, interventions by MDB can be categorised under three broad headings:

1. Risk mitigation – guarantees, insurance products, co-investment and currency protection. These can support pipeline creation by increasing investment at project level and attract investment by protecting institutional investors from underlying asset risks.

2. Transaction enablers – supporting the aggregation of energy efficiency assets and revenue streams into products that can be invested in by institutional investors. These include warehousing facilities for ABS, issuance of bonds, and credit softening for project loans.
3. Overall market support – including policy advice, support for standardisation and sharing of data, and providing technical assistance for financial engineering.

How these instruments are deployed will differ based on which investment product is being targeted – bonds, funds, or ABS; and in turn, the right investment product will depend upon the nature of the underlying energy efficiency assets.

Table 4: Recommended interventions for MDBs to incentivize institutional investors

Intervention	Description
Standardised approaches to risk management, underwriting and investment appraisal	Standardising these approaches will reduce the time and resources that institutional investors or investment management firms need to make an investment decision. This will reduce transaction costs associated with investments.
Supporting the creation of accepted standards for tools assessing impact, and certification, of energy efficiency for investment products and underlying assets	If investors are investing based upon a product's green credentials, then they must have confidence that the green credentials are robust. With regard to energy efficiency, this can be challenging. For example, when is a building energy efficient? Robust protocols and tools are required for investors to understand the energy efficiency of investment products.
Supporting the creation and availability of commercially available data on energy efficiency asset performance	A lack of historic asset performance data (e.g. loan performance data) creates uncertainty for institutional investors. Investors want clarity and certainty over the risks and rewards of products, in particular clarity regarding the probability of loss and the expected value of losses. Clarity enables investors to make a robust and thorough assessment of products in investment decisions, such that they can see how products fit with their [the investors'] risk-reward profiles. Further, publishing these data can encourage more actors to enter project development. If data show energy efficiency investments to be commercially rewarding, then it could be expected that more actors enter the market, to increase the pipeline of projects.
Pipeline development	Pipeline development is a broad term that encompasses activities that support the identification of 'bankable' – that is, investment-ready and financially attractive – energy efficiency projects. Activities will differ by asset type. For example, energy audits to private sector companies to identify and make the business case for energy efficiency opportunities is a form of pipeline development. Equally, working with large real estate firms to identify opportunities for energy efficient retrofits in commercial buildings is a form of pipeline development.
Policy support to develop supportive and stable policy environments	A fundamental driver for energy efficiency is the policy and regulatory framework, including energy prices. A stable and predictable policy environment can inspire investor confidence and enable investment.
Technical assistance to increase financial engineering capabilities	In certain less financialised markets, there may be a lack of financial engineering capability, which can prevent the development of attractive investment products. MDBs can work with the relevant financial service providers to build these capabilities to enable market-led development of energy efficiency investment products.
Training for project developers	Technical assistance to project developers will support the development of a bankable pipeline of projects that will incentivize institutional investor involvement.
Demonstration projects of new instruments / business models	There may be novel and untested instruments or business models that could aggregate multiple (smaller) energy efficiency projects, or enable the aggregation of multiple projects, to achieve the level of scale that institutional investors require. However, market failures can prevent the uptake and use of these instruments or business models. Demonstrating that these novel initiatives can prove the concept and facilitate private sector activity, generating supply for institutional investors.

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