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Fiscal And Other Financial Innovative Green Policy Instruments In Promoting And Enhancing Energy-Efficiencies Among SME's Across Asia And Latin America



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Abbreviations

AAU	Assigned Amount Units
ADB	Asian Development Bank
ADFIAP	Association of Development Financing Institutions in Asia and the Pacific
AED	Entrepreneurial Association for Development
BAU	Business as usual
CEEF	Commercializing Energy Efficiency Finance
CHEEF	China Energy Efficiency Financing Programme
CHUEE SME	China Utility-based Energy Efficiency Finance Program for Small and Medium Enterprises
CII	Confederation of Indian Industry
COP	Conference of the Parties
SPICE3	Sectoral Platform in Chemicals for Energy Efficiency Excellence
CTF	Clean Technology Fund
DFI	Development Finance Institutions
DOE	Department of Energy
EBRD	European Bank for Reconstruction and Development
EEN	Energy Efficiency Networks
EERF	Thailand Energy Efficiency Revolving Fund
EIB	European Investment Bank
ESCO	Energy Services Company
EST	Energy Saving Trust
FINTECC	EBRD's Finance and Technology Transfer Centre for Climate Change
GEF	Global Environment Facility
GGF	Green for Growth Fund
GHG	Greenhouse gas
GIZ	Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH
IEA	International Energy Agency
IIP	Institute for Industrial Productivity of China
IRR	Internal Rate of Return
JI	Joint Implementation
KfW	German Development Bank
ktoe	kilotons of oil equivalent
KyrSEFF	Kyrgyz Sustainable Energy Financing Facility
LEEN	Learning Energy Efficiency Networks
PDCI	Practitioners` Dialogue on Climate Investments
SME	Small and Medium Enterprise
tCO₂	tons of carbon dioxide
USD	United States Dollar

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Executive Summary

Small and medium enterprises (SMEs) have long been recognized as one of the engines of global economic growth and employment. Having recognized the critical importance of meeting head on the challenges of global climate change, the promotion and enhancement of energy-efficiencies among SMEs is seen as a key climate mitigation option in many developed and emerging countries.

This Policy Brief examines how fiscal and other innovative green financial policy instruments have promoted the development of energy efficiency (EE) among SMEs. Policy recommendations to tackle the constraints met by SMEs are discussed in the succeeding sections of the policy brief.

Several studies have concluded that industrial sectors are major consumers of global energy. This applies especially to key basic industries such as those in the chemicals and petrochemicals sectors, pulp and paper industries and the steel industry, which are responsible for about 45% of all greenhouse gas emissions. Promoting industrial efficiencies in these key sectors including the whole supporting value-chain ecosystems of each of these industries will greatly contribute to achieving the overarching goal of a less than 2 degree Celsius global temperature rise by 2020. The following key lessons resulting from the study and analysis of various financial and fiscal policies supportive of energy-efficiency among SMEs in selected countries are highlighted by the policy brief:

1. The provision of information and awareness raising among SMEs are critical to help them improve energy efficiencies;
2. SMEs are empowered through engagements within industry associations and networks. The introduction of EE measures will be limited if changes are introduced piecemeal through individual efforts of enterprises;
3. Capacity building measures are key to develop EE skills and knowledge of SMEs;
4. Access to financial support mechanisms both for users and providers of financing are critical to the success of EE projects or programs;

Further business development support measures that can play an important role are the creation of peer-to-peer learning networks for sharing information and experiences to build capacity; the promotion of energy management systems that ensure a framework for continuous improvements; and the implementation of equipment replacement programs that motivate enterprises to invest in efficient technologies.

1. Introduction

Small and medium enterprises (SMEs) have long been recognized as one of the engines of global economic growth and employment. Having recognized the critical importance of meeting head on the challenges of global climate change, the promotion and enhancement of energy-efficiencies among SMEs is seen as a key climate mitigation option in many developed and emerging countries.

This Policy Brief will examine how fiscal and other innovative green financial policy instruments can promote energy efficiency measures among SMEs. Policy recommendations to tackle these constraints will also be provided and discussed.

The year 2015 was considered very significant in the global development history as two major international agreements were reached that would shape the future of energy development patterns in all sectors, including the industrial sector. Firstly, the 17 Sustainable Development Goals “to mobilize efforts to end all forms of poverty, fight inequalities and tackle climate change by 2030” the Paris Climate Agreement were adopted by the member-countries of the United Nations. Secondly, the Conference of the Parties (COP21) to the UN Framework Convention on Climate Change adopted to address the urgent challenges of global climate change. These two major developments are the ultimate “game changers” as the agreements represent the global commitment “to present concrete plans and targets for climate change mitigation and adaptation actions by 2030.”

Energy efficiency plays a crucial role in the achievement of global climate and sustainable development goals. At the same time, the implementation of energy efficiency measures represents new economic opportunities for SMEs. Massive energy efficiency potential exists in the building sector, but also in the commercial, the industrial and the transportation sector.

An International Energy Agency (IEA) study report in 2015 (Accelerating Energy Efficiency in SMEs) mentioned that the industrial sector consumes 25% of the total global energy consumption. Given this situation, it becomes a priority concern for policy makers to engage SMEs from the industrial sector to improve their energy performance. Improved industrial energy efficiency can deliver large energy savings, improved productivity, and reduced environmental pollution. However, in many cases information, financial, and regulatory barriers are continuing to prevent enterprises from fully realizing the potential opportunities offered by an improved energy efficient industrial setting. A wide range of policies and programs can be adopted to help overcome these barriers.

The Importance of EE Actions in SMEs

The definition of what & who is an SME varies across countries and is usually based on total assets or capitalization, employment, annual sales and investment. For this policy brief, we define SMEs as enterprises with 10-100 employees, and with total assets of more than \$50,000 up to about \$2.17Million.

Table 1 below summarizes the important socio-economic roles SMEs play in many of the world economies. Among others, SMEs are the world's primary employer, where 60% of private sector employment is accounted for by SMEs.

They contribute 50% of the total gross global value added in the world economy; and the sector is a major source of product innovations and new technologies.

TABLE 1: Key World Statistics for SME's
(Source: IEA. Accelerating Energy Efficiency in SME's. 2015)

Global Employment Statistics	<ul style="list-style-type: none"> • 99% of the world's enterprises are SMEs • 60% of the world's private sector employment is accounted for by SMEs <ul style="list-style-type: none"> ✓ SMEs in the formal sector in Emerging Asian Countries accounts for 50%-80% of total employment ✓ In the EU, 90million people are employed by SMEs and around 1.1 million jobs are generated by the sector annually
Gross Value Added Contributions	<ul style="list-style-type: none"> • SMEs contribute 50% of the total gross global value added and 16%-80% of GDP depending on the country's economic structure
Source of Business and Technological Innovations	<ul style="list-style-type: none"> • 20% of R&D in the US are from SMEs • 35% of patent applications are filed by SMEs in the US • In Australia, 90% of SMEs are engaged in innovative activities.
Growth Trends	<ul style="list-style-type: none"> • The SME segment is growing in many countries, particularly in countries that are reorienting their economies towards services. The number of SMEs is projected to grow annually by 8% in China and by 10% in Thailand.

2. The current landscape for climate financing vis-à-vis energy-efficiency initiatives or policy impacts on SME industrial sectors

Energy efficiency offers a strategic approach to improving productivity in the business sector as an efficient use of energy reduces corporates' spending and the exposure to volatility in energy prices. While this may be obvious for larger energy intensive industries, it is also important for SMEs where energy costs are less obvious but may be more manageable as they are defined by improved business practices rather than process plant thermodynamics. Productivity improvements include: better product quality, lower operating and maintenance costs, lower production costs, improved working conditions and environmental emissions.

Governments generally prefer a light-handed approach to working with the industrial sector, (particularly with export industries exposed to global market pressures) so effective voluntary measures (or at least measures where the obligation is around cooperation and information) are important policies. The importance of motivating managerial focus on energy efficiency cannot be underestimated. The significant over-performance of energy intensive firms against assigned energy-conservation goals in China's 11th Five-Year plan (2006–2010) is analyzed by Wu et al. and concludes that: Goals can "overcome such behavioral constraints to accelerate the commercialization of energy-efficiency technologies, reduce uncertainty and hesitancy of relevant investment, facilitate the enrichment of information, and concentrate the attention of firms on energy conservation".

SME energy consumption and savings potentials

Given the importance of SMEs in many of the world's economies, they are major users of the world's energy production. If we are able to introduce energy efficiency in their business operations and in the way they do their business, we can achieve energy efficiency in this key economic sector.

Based on a recent study, SMEs account for at least 13% of the world's final energy consumption. For example, in the UK, SMEs account for around 45% of total business energy use (Middlesex University, 2009) while in the United States, the energy demand of manufacturing SMEs is half of the total final industrial energy demand (Trombley, 2014). In Australia, the sector accounts for 50% of total business electricity demand and in China, they consume 2.5 times the energy of large manufacturing enterprises (International Finance Corporation, 2012). Energy efficiency in industrial processes is relevant across all production processes involving both electricity and heat. For utilities in developing countries, massive EE potential exists in transmission and distribution grids as well as in inefficient coal and diesel plants.

Given the high percentage share of SMEs in the world's energy demand, studies have shown that the global energy demand of SMEs could be reduced by 7-22 EJ utilizing best available technologies and practices. Similarly, the cost-effective savings potential of SMEs ranges between 10% - 30% of their energy demand.



3. Barriers of SME's in achieving Energy-Efficiency

Energy efficiency actions in SMEs face multiple barriers with financing being one but often not the most important challenge:

Market Barrier:

There are perceived distortions in the market framework for energy efficiency such as pricing which prevents customers from appraising the true value of energy efficiency. This is brought about by the lack of information to users of energy efficient equipment and technologies, as well as the high project development costs involved in making energy efficiency technologies versus its perceived savings.

For energy efficiency, the most obvious information barrier is knowledge about the performance of different equipment, technologies, buildings, and other systems. As we all know, energy efficiency is very conceptual and cannot be easily seen. Information related to energy consumption is also imperfect; for instance, energy savings are difficult to measure, future energy prices are unknown, and the energy use of individual devices is often hard to separate, since most customers get all their residential or commercial energy use information rolled into monthly utility bills.

A common problem in energy efficiency is the so-called "Principal-Agent Problem" wherein the agent making decisions on efficiency investments or actions does not pay the energy bills, and thus has little incentive to reduce them. The landlord-tenant relationship, in which the property owner purchases equipment but the tenant generally pays the utility bills, is the most commonly cited split incentive for energy efficiency. Another example is how homebuyers pay energy bills, providing limited incentive to builders to improve the efficiency of new homes.

There are also external factors which would affect any decision on the costs or benefits of a transaction being realized by people outside the immediate participants in the transaction. Energy efficiency reduces large negative externalities due to energy supply and consumption: impacts on the environment, risks to energy security, and other societal costs not built into the price of energy.

Low electricity prices reduce incentives for EE measures: Electricity prices are a major driver of the profitability and payback period of EE projects. Low or subsidized energy prices may limit the attractiveness of EE measures.

Lastly, imperfect competition occurs when there is not a fully competitive market for a product or service, so prices may be inefficient or availability may be limited. In some energy efficiency markets there is a limited number of producers or sellers, either an oligopoly or monopoly (in some cases a natural monopoly of necessity), and barriers to entry such as high startup costs or patents.

Financial Barrier:

The initial high up-front costs (e.g. for energy audits, consulting services etc.) of energy efficient products including its payback periods of months or years hinder early adoption by the majority of

energy consumers. Similarly, most financial institutions are unfamiliar with energy efficiency investments and are usually risk averse for any start-up projects. The high development costs relative to potential energy savings (due to small project size or there is difficulty in finding and developing bankable projects) create financial barriers to energy efficiency.

Information:

Energy efficiency is an invisible product attribute without energy performance labeling or promotion, and unfamiliarity with energy efficient products, lack of awareness of energy efficiency benefits, and a perceived risk penalty when evaluating potential investments, poses a barrier to opportunities.

Technology:

In most developing countries, there is a lack affordable and available energy efficient technology suitable to local conditions. Additionally, insufficient local capacity to identify, develop, implement, and maintain energy efficiency investments restrict growth, in addition to limited or non-existent distribution or delivery networks to get energy efficient goods to consumers.

Regulatory and Institutional Policy Environment:

Regulatory policy creates a variety of barriers to promote energy efficiency. The following obstacles increase financial risks and costs for project developers through unnecessary expenses and lengthy wrangles for approvals:

- The profitability of energy providers relies on energy sales, thus creating a disincentive to participate in supporting or delivering energy efficiency improvements to customers;
- A lack of capacity to consider, develop, or enforce minimum energy performance standards or codes;
- Prices set below marginal costs of service, uncertainty on recovery of energy efficiency program costs, and lending controls;
- Foreign investment laws;
- Company formation regulations; and even the Clean Development Mechanism (CDM).

4. Overcoming Barriers to Energy Efficiency

Barriers can be overcome using a mix of interventions to encourage uptake of energy-efficiency investment through the market. These instruments may include:

Pricing or market mechanisms:

in which consumers are given stronger price signals and incentives to conserve energy or shift consumption out of peak periods;

Regulation or control mechanisms:

in which governments impose requirements that stimulate more efficient behavior (e.g. minimum energy performance standards for appliances);

Fiscal or tax policies:

in which governments financially support investment in energy conservation or directly procure efficiency goods and services. This can start at the government agency level with recycling programs, investment in low-energy using equipment, and retrofitting outdated equipment over time;

Promotion and market transformation programs:

in which governments or energy providers influence consumer behavior on a voluntary basis (e.g., appliance labeling and customer education);

Technology development:

where the government or energy provider supports development of energy efficient technologies and research geared at local, regional or national energy issues;

Commercial development or industry support mechanisms:

where the government or energy provider partners with the private sector to increase the amount of commercial capacity focused on energy conservation;

Financial remediation: where the government or energy provider creates special channels for end users to access financing needed to invest in energy conservation. Special channels can include energy efficiency upgrade incentives that would allow the government to offer tax breaks on energy efficient upgrades, or utilities working with appliance companies to offer discounted rates on efficient appliances.

5. Prototypes of Fiscal & Financial Policy Instruments currently in place, and examples of prototypes from SEED/PDCI Initiatives in South Africa including challenges and best practices/lessons learned

Addressing climate change is a transformative agenda that requires policy actions. More countries are curbing emissions through the implementation of core climate policies: carbon pricing and market-based instruments, regulatory intervention and targeted support to innovation in low-carbon sustainable technologies. But global greenhouse gas emissions have risen rapidly and remain higher than required to avoid severe and irreversible climate change impacts.

Across Europe, Asia and the Pacific, several policy measures and energy efficiency financing programs are being implemented with the following examples:

Multilateral/Bilateral Development Funds/Credit Lines on Energy-Efficiency:

Multilateral and bilateral development funds or credit lines for energy efficiency projects are made available to the financial sector (through development financial institutions or private banks) at preferential rates for re-lending to private businesses through retail banks, developers and ESCOs. Through this kind of policy initiatives, these funds enable market growths for energy efficiency and allow governments to implement other energy efficiency policies.

In 2014, it is estimated that \$391 billion were internationally available for climate finance, which came from both private (62%) and public sectors (38%). Share of energy efficiency projects in this available fund is in the range of USD 100-330 billion. When only counting incremental investments compared to the Business as Usual (BAU) situation, EE investments are estimated to be about USD 130 billion. At the other extreme, when accounting for full and not just incremental investments, EE Investments are estimated to be USD 310-365 billion.

Government & International Financial Institutions (IFI) leveraged loans funding/Dedicated credit lines

Case Examples:

Germany KfW. The German Development Bank (KfW)'s program provides funding from the national government for deep renovation and construction of low energy buildings. In most cases, the owners/investors are given long-term, low-interest loans supported with professional and independent energy advice. Due to its size (about EUR 2 billion per year are spent) and the fact that it is well known, it has succeeded in setting new standards. (Energy Efficiency Watch 2012) (IEA 2013)

<http://www.energy->

[efficiencywatch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf](http://www.energy-efficiencywatch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf)

<http://www.iea.org/publications/freepublications/publication/energy-efficiency-marketreport-2013.html>

The European Bank for Reconstruction and Development's (EBRD) Sustainable Energy Financing Facilities (SEFF) are dedicated credit lines working through over 80 local financial institutions in 20 countries. SEFF includes a robust monitoring and verification (M&V) process



that manages the key uncertainties in turn reducing underlying technical risk and improving project performance. Over EUR 1.5 billion investments have been made in sustainable energy.
http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014

China Energy Efficiency Financing Programme (CHEEF) is a dedicated credit line by the World Bank and Global Environment Fund offering finance to large and medium industry via local banks, which then match these funds. From 2008 to 2010, USD 200 million funds were allocated via two financial institutions. A further USD 200 million was made available in 2010. By 2011, CHEEF had achieved 1:4 leverage. (IEA 2014)
http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014

Thailand Energy Efficiency Revolving Fund (EERF) scheme introduced in 2002 provides public funded credit lines of between USD 2.5-10 million to 11 million Thai banks at zero interest rates. As finance volumes grew, banks increasingly co-founded the loans. The initial EERF allocation was USD 60 million. The EERF was phased out in 2011 after leveraging total energy efficiency investments of USD 521 million from USD 236 million. It was assessed that banks could now continue funding energy efficiency without government support, indicating successful market transformation.

Green for Growth Fund (GGF). The EBRD, European Investment Bank (EIB) and KfW funded GGF to provide funds to local financial institutions for on-lending to private households, small and medium-sized enterprises as well as direct financing to large companies and municipalities for investments in energy efficiency via partnerships with financing institutions and direct financing in the Southeast Europe and European Neighborhood Region. The GGF Technical Assistance Facility provides capacity building and training to GGF's partner institutions (both financial institutions and non-financial institutions), awareness raising and market enabling activities, validation and monitoring.
<http://www.ggf.lu/>

Public-Private Finance:

A financed implementation package with guaranteed returns overcomes key barriers to implementation and scale. By integrating technical and financial risks, discontinuities between consumers, service providers and financiers are removed. The ability to leverage private funds is a key to maintaining low public budgets while enabling sound energy efficiency investments. ESCOs often face unfamiliarity from clients about the nature of the contracts used to guarantee returns, manage assets and risks.

Public-Private Financing

Case Examples:

United States. Utility and public sector programs for educational, health and government facilities have driven the ESCO market. In 2011, United States Federal facilities were directed to enter in USD 2 billion of energy performance contracts by the end of 2013. (IEA 2013)
<http://www.iea.org/publications/freepublications/publication/energy-efficiency-marketreport2013.html>; <http://energy.gov/eere/femp/federal-energy-management-program>

In the Czech Republic, energy performance contracting is becoming more popular: good projects have multiplied and now more than 150 projects have been realized. The growing number

of projects has increased confidence in this instrument. The ESCOs have also taken a very active role in promoting the instrument and have recently formed an association. (Energy Efficiency Watch 2012)

http://www.energy-efficiencywatch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf

Fund Guarantees and risk sharing for energy efficiency

Financiers offer underwriting for perceived risks in energy efficiency investments at a wholesale level to mitigate commercial bank risks to scale up energy efficiency. By supporting risk mitigation with local banks, IFIs complement local financial service providers rather than compete with them. Governments can support and enable existing service providers and avoid competing or distorting financial service operators while still offering leveraged financial support. Banks receive strong signal of support as well as financial risk mitigation solutions, enabling them to fund energy efficiency more easily.

Fund Guarantees and Risk Sharing Schemes for Energy Efficiency

Case Examples:

Commercializing Energy Efficiency Finance (CEEF). A joint International Finance Corporation (IFC) and the Global Environment Facility (GEF) initiative, CEEF provides guarantees of up to 50% of the loss from loan defaults to energy efficiency investments in Eastern Europe. (IEA 2014)

http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014

Capital Market Development: Green Bond Market in Asia

Green Bonds: This is a generally new asset class which was started in 2007. Green Bonds' proceeds are directed to projects supporting environmental and climate benefits. These include a broad range of projects, from renewables, energy efficiency, sustainable water, waste management to clean transportation. To date, most green bonds have been issued in a senior unsecured format, referencing the general credit of the issuer, rather than specific project cash flows. Hence green bonds achieve the same financing rate as conventional or senior bonds.

Today, around \$47 billion worth of green bonds have been issued worldwide. However, of late, there has been a noticeable shift of activity to Asia, with China and India making significant strides off the back of regulatory developments.

In India, the government has identified 8 Development Finance Institutions (DFIs) to play a proactive role in green financing in order to help meet the government's ambitious targets in renewable energy space. In August 2016, NTPC, India's largest power generation company, became the first issuer ever of a green MASALA bond, tapping into the growing offshore rupee funding route for Indian corporates.

In the Philippines, AP Renewables raised \$225 million green (project) bond – the first from ASEAN, supported by the Asian Development Bank (ADB).

Source: Henrik Raber. "Green shoots in the bond market." Business World On-line. (Philippines) Sept. 29, 2016.

Fiscal Policies (Tax Incentives and Rebates)

It is difficult to discern direct impacts of tax incentives from other policy instruments and free rider effects, particularly where multiple fiscal instruments exist. Good design of fiscal incentives can ensure synergies between different policy priorities in a particular country. This can be a reliable way of motivating change where governments have a preference for centrally motivating desired actions by fiscal incentives. Market players receive tangible monetary tax and incentive signals.

Fiscal Policies (Tax Incentives and Rebates)

Case Examples:

Italy: Between 2007 and 2013, a 55% tax deduction offered in the Energy Efficiency Tax Rebate Program scaled-up investment in new appliances and equipment by EUR23 billion in 1.8 million applications. The cost of the scheme was EUR 13 billion. (IEA 2014)

http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014

Fiscal Policies (For Passenger & Freights)

Case Examples:

France: 'bonus-malus' scheme. By offering an incentive to purchases efficient vehicles and a disincentive for inefficient vehicles, the government is skewing purchases to high efficiency vehicles.

Also known as 'fee bate' (fee/rebate) schemes, these policies can be designed to be fiscally neutral, balancing the discounted life cycle costs to consumers of inefficient vehicles against the benefits of efficient vehicles, with little or no costs to government.

In **Ireland**, a change in car taxation in 2008 is deemed to be a success. The new system moved away from assessing vehicles based on engine size to one that is based solely on CO2 emissions per/km. This provided a strong encouragement to buy smaller and more efficient cars: between 2007

and 2011, CO2 emissions dropped from 164 g/km to 133 g/km. (Energy Efficiency Watch 2012)

<http://www.energy->

[efficiencywatch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf](http://www.energy-efficiencywatch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf)

Government Grant Funds

Typically grants are best applied to demonstrate, leverage funds, or initiate market transformation programs. Ideally, grants will have a defined exit strategy so they do not displace private funds, or they are designed to crowd-in loan funding over time. Good design of grants can ensure synergies between different policy priorities in a country. Grants can be tailored to needs and phased in and out to balance and synergize with other policy priorities. Grants are perceived by consumers as a tangible signal and are usually a welcome offer from the government. Consumers and market players receive tangible monetary tax and incentive signals.

Government Grant Funds

Case Example:

UK Warm Front. From 2002 to 2013, the United Kingdom government offered grants for thermal insulation to tackle energy poverty under its Warm Front Scheme. 1.7 million United Kingdom households took up grants resulting in a reduction of heating energy intensity of 35% from

63GJ/m2 in 2001 to 0.41GJ/m2 in 2011.(IEA 2014a)
http://www.iea.org/W/bookshop/475-Capturing_the_Multiple_Benefits_of_Energy_Efficiency

International Climate Finance and Carbon Finance

Given the large role for energy efficiency in minimizing greenhouse gas (GHG) emissions, it should be expected that large climate fund initiatives would be keen to fund energy efficiency. Linking carbon funds and energy efficiency financing makes sense as energy efficiency makes the single largest contribution to GHG mitigation. Governments may see this as an effective way to recycle carbon revenues, and gain extra GHG reductions. Uncertainty over global carbon prices means that markets cannot expect durable flow of carbon finance.

International Climate Finance and Carbon Finance

Case Examples:

Climate Investment Funds have been one of the world's largest climate finance mechanisms since their establishment in 2008. With USD 7.5 billion total funds, USD 5.2 billion is in the Clean Technology Fund (CTF) that focuses on country-initiated projects in energy efficiency and related clean technology areas. 17% of CTF funds went to energy efficiency as of March 2014.(IEA 2014)

http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014

Estonia has "earmarked" revenues of the sales of "unspent" Joint Implementation (JI) quotas of Assigned Amount Units (AAUs) for energy efficiency. Amounts in the order of several EUR100M are invested in building programs, in the residential and in the public sector. This also included significant amounts from the Austrian government. (Energy Efficiency Watch 2012)

http://www.energy-efficiencywatch.org/fileadmin/eew_documents/EEW2/EEW_Survey_Report.pdf

SMEs & Industry Networks

SMEs-support is an important policy area as SMEs make a key contribution to the net creation of jobs and have the potential to significantly contribute to GDP growth. It is potentially a useful economic development policy and valuable market stimulus for productivity gains and the development of new skills and services industries.

SME Development Funds with Energy Efficiency Focus

Case Examples:

Germany. Learning Energy Efficiency Networks (LEEN) support innovative companies to increase energy efficiency and improve their competitive position. By learning from each other, a multitude of companies cooperate in order to save energy in the most cost-effective way. The main starting points of the cooperation in the networks are efficiency improvements with respect to cross-cutting technologies (e.g. compressed air systems, combined heat and power systems, electrical drives). Evaluation of 30 networks in Germany showed 4,000 profitable measures with an average internal rate of return (IRR) of 35%. Companies cooperating in LEEN networks increase their efficiency twice as fast as the German industrial average.

<http://leen.de/en/leen-netzwerke/>

Ireland. Over 2007-2011, the Irish Sustainable Energy Authority SME program has supported

1,470 SMEs with 130,000 employees. In 2012, 200 SMEs with 2,000 employees were supported, achieving cost reductions of EUR 2 million from a total EUR 19.7 million energy bill. (IEA 2014)
http://www.iea.org/W/bookshop/463-Energy_Efficiency_Market_Report_2014

Switzerland / Germany. Energy Efficiency Networks (EEN). The first EEN was founded in Switzerland in 1987 and transferred to Germany in 2002. In EENs, 10 to 15 regionally based companies from different sectors share their experiences in efficiency activities in moderated meetings. Results from 70 networks in Switzerland and 20 in Germany show that the efficiency improvements of participating companies are accelerated by 100% compared to the autonomous progress. Almost every company has a profitable (internal rate >12%) efficiency potential between 5 and 20% of its present energy demand. Learning tools include: contract templates, checklists, technical manuals, and software-based techno-economic calculation tools under a unified user interface. EENs are financed and operated mainly by industry itself and represent an innovative approach for companies worldwide.
<http://proceedings.eceee.org/visabstrakt.php?event=1&doc=3-325-11>

China. The Institute for Industrial Productivity (IIP) Supply Chain Initiatives Database is an interactive and user-friendly database of case studies that describe supply chain initiatives for energy savings and GHG mitigation in industry.
<http://www.iipnetwork.org/databases/supply-chain#sthash.Bz5m82EP.dpuf>

SME network in Sweden

Established in 2009, ENIG is a Swedish energy efficiency network targeting SMEs in the manufacturing sector. ENIG is run by the Swedish Research Institute for Industrial Renewal and Sustainable Growth (Swerea); the Swedish Energy Agency is a partner and funder. ENIG creates, collects and disseminates information on energy efficiency technologies, practices and methods. The network enables cross-industry collaboration in areas of common interest, such as ventilation, compressed air and lighting. The objective of the network is to save 30% of energy consumption in participating companies by 2015. The evaluation of the initial stage (2009-12) indicates energy savings of 23 600 megawatt hours (MWh) in 93 of the participating companies, which had an initial consumption of 341 000 MWh, corresponding to a 7% reduction. The program has been continued for a second stage (IVL, 2012).

Networks in Japan

In Japan, the Hokkaido and Kanto Bureaus of Economy, Trade and Industry have developed an energy conservation neighborhood association model. Energy efficiency is promoted via the establishment of industry groups within the same sector or within the same geographical location to share information and experiences. Meanwhile, in the Suwa region, a private sector initiative was started by Epson in 2000 as part of its corporate social responsibility efforts. Epson established an Energy Saving Patrol Team to provide free advice to help other companies in the area to improve energy efficiency. In 2005, the company launched the Shinshu Energy Conservation Patrol Teams, which in co-operation with environmental protection associations, business associations and Nagano Prefecture, promote audits in companies in Nagano. Patrol teams generally consist of 25 volunteers from different companies. In nine years, more than 200 audits were carried out. The concept has been exported to Taiwan, where the first energy saving patrol team was set up in 2010 (Noda, 2013).

Energy Manager Network in Europe

The European Energy Manager Network consists of alumni of a training program. The program is offered in 30 countries and there are currently 4 000 energy managers in the network. Trainers deliver standardized energy manager training to technical experts, company managers and energy service providers. Trainees then receive access to an Internet platform that acts as a social community. Events and awards for energy management excellence help build momentum.

Financing Options for Energy Efficiency Measures in SMEs

Given the characteristics of SMEs and their business operations, various financing schemes for energy efficiency measures in SMEs were reviewed and are presented below:

Loan Type/Program	Definition/Description
Preferential Loans	SMEs may lack the assets (collateral) necessary to secure a traditional commercial loan. And financiers may lack the familiarity and confidence with the small projects they are asked to underwrite. To address this, governments and stakeholders such as development banks can extend special credit lines to local financial institutions, which on-lend the funds to their clients.
Energy Savings Insurance	SMEs and local banks often lack both the technical capacity to assess the potential of more capital-intensive energy efficiency investments and the confidence that they will pay back. Solutions to address these barriers are under way. One promising approach is energy savings insurance, which pays out if the projected value of energy savings is not met. Analysis shows that the instrument can absorb up to 80% of this under performance risk (Global Innovation Lab for Climate Finance, 2015).
Grants	Grants may offer capital for projects that SMEs could not finance otherwise. However, SMEs may be deterred by the administrative costs of applying for a grant or if the chance of winning a grant is low. Streamlining application processes or providing additional information and guidance can help address this.
Equipment Leasing	In leasing arrangements, the financier owns the energy efficiency equipment and the customer obtains the right to use it. The SME needs no capital to participate, and may gain an immediate reward from reduced energy costs.
ESCO Funding Model with Shared Savings	An energy services company (ESCO) designs, constructs, operates and finances energy efficiency equipment. The customer pays for energy savings through an agreed rate (\$ per avoided unit of energy), or pays a fee for a guaranteed level of service. However, ESCOs function best with large projects; and they typically prefer larger companies that are less likely to fail during the funding period (Akman et al., 2013).
Utility on-bill financing	An energy retailer or third-party financier provides initial capital for energy efficiency projects. This is repaid through a debt repayment charge on energy bills. This can provide an efficient mechanism for SMEs to obtain energy efficiency funding.
White Certificate	Like emissions trading systems, these are market-based systems

Schemes	wherein energy utilities earn certificates for their efficiency improvement. The advantage to SMEs is that they may acquire such certificates by implementing an energy efficiency project, which in turn reduces the cost of the project. Administration costs can be reduced when equipment or service providers manage the administration of certificates.
Tax Incentives/Rebates	These provide a financial incentive to undertake an energy efficiency project. In South Africa, for example, the Energy Efficiency Tax Incentive provides registered companies with a USD 0.45 tax reduction for each kilowatt hour (kWh) of energy saved. Projects must establish a 12-month energy usage baseline before claiming the incentive (SANEDI, 2015).

Samples of financing solutions for promoting energy efficiency in SMEs

The Energy Saving Trust SME Business Advice and Loans Scheme

The Energy Saving Trust (EST) Business Advice program in Scotland is funded by the Scottish government. It provides tailored advice on reducing energy use to businesses with annual energy bills of less than USD 55,000. The Energy Saving Trust also manages a 0% fixed rate small business loan of USD 1 100 to USD 110,000 to help businesses install measures that reduce energy consumption. Thousands of businesses have benefited from the program. The latest evaluation (2010-11) found that the program had delivered lifetime benefits to customers of over 40 000 tons of carbon dioxide (tCO₂) in GHG reductions and USD 10.5 million in cost savings.

Source: www.energysavingtrust.org.uk/.

Preferential loans in Korea

The government of the Republic of Korea provides preferential long-term and low-interest rate loans to encourage the installation of energy-efficient equipment in industry.

Thailand supports leasing

The government of Thailand supports leasing through the Energy Conservation Fund. Energy service companies can acquire loans for equipment, which they then lease to SMEs. As a result of reduced energy costs, the SMEs have the funds to meet their lease payments back to the service companies (Jue et al., 2012).

Grants and technical support for energy efficiency technology transfer

The EBRD's Finance and Technology Transfer Centre for Climate Change (FINTECC) provides technical assistance and incentive grants to SMEs as well as larger corporates that also involve SMEs as part of the value chain. This support comes as a complement to EBRD financing for eligible energy efficiency technologies that have low market penetration. The grants provided by the Global Environment Facility (GEF) and EBRD help to demonstrate the market potential of these technologies in order to support wider adoption by businesses. FINTECC also includes funded technical assistance activities designed to increase awareness, address information gaps in the market and stimulate technology transfer. In addition, policy support is provided to governments to create regulatory environments that help SMEs deploy energy-efficient technologies (EBRD, 2014b).

Energy efficiency solutions for SMEs in Kyrgyzstan

The SME sector in Kyrgyzstan employs more than 60% of the population and has vast potential for energy efficiency improvements. The EBRD has established the Kyrgyz Sustainable Energy Financing Facility (KyrSEFF) to provide dedicated loans for energy efficiency to local companies through local financial partners. Successful investments are supported by the European Union through grants.

In addition to financing, the EBRD helps small businesses access expert advice. The Bank's Small Business Support teams up with local consultants and international advisors to help SMEs transform their businesses. Experts help companies to identify potential energy-saving measures, clarify which technologies and approaches would be most appropriate and make recommendations on how best to implement them. Each project is tailor-made to the needs of the client and projects are undertaken on a cost-sharing basis.

Source: EBRD (2014e).

Building finance sector skills in China

Building on a program focusing on providing finance to large companies in China, the International Finance Corporation (IFC) established the China Utility-based Energy Efficiency Finance Program for Small and Medium Enterprises (CHUEE SME) in 2013. It is a risk-sharing facility and advisory service that supports energy efficiency and renewable energy projects undertaken by SMEs. The program helps financial institutions to better understand these sectors and provides not only financial support but also technical assistance. Banks therefore become familiar with new technologies and related risks, and can build in-house expertise to take the next steps of independent lending offers.

The CHUEE SME advisory services program is expected to promote loans worth USD 558 million for at least 175 sustainable energy projects, helping to reduce GHG emissions by 3.75 million tons annually. In the first year of operation, the program exceeded its objectives: four CHUEE partner banks received in-depth advisory services and disbursed loans valued at USD 72.4 million. Furthermore, partner financing institutions built green finance portfolios of USD 1.9 billion. Four new financial products were designed and launched, and 350 finance sector professionals were trained in sustainable energy financing.

Source: IFC (2014).

Piloting in the chemicals industry

The CARE+ pilot, co-funded by the European Commission, was set up by the European Chemical Industry Council (Cefic) to help SMEs that lack experience with energy audits to identify energy-saving opportunities. One of the main objectives was to develop and test tools to help SMEs to help themselves to improve their energy efficiency. The program started in 2008 and ended in 2011. The CARE+ pilot project built on experiences of voluntary agreements between the chemicals industry and local authorities in the Netherlands and the United Kingdom.

Activities included:*Gap analysis:*

The partner countries (Bulgaria, Italy and Poland) conducted surveys on energy management performance and provided a gap analysis to help determine the current situation and needs in chemical SMEs.

Tools development:

Based on the survey results and existing expertise, the project evaluated best practices and appropriate delivery mechanisms for improving energy efficiency. The results served to draft the Self Audit Guide and the Best Practice Manual. These can be adapted to individual company needs and combined with existing measures, such as national funding schemes.

National test phase and rollout:

The draft tools were tested with two chemical SMEs in each partner country. The field test enabled further improvements to match companies' needs and expectations. The finalized tools were then promoted through a rollout campaign in the partner countries.

In 2013, Cefic continued its energy efficiency work by launching the Sectoral Platform in Chemicals for Energy Efficiency Excellence (SPICE3), co-funded by the European Commission, which aims to boost energy efficiency across the European chemicals industry, particularly in SMEs. The consortium brings together 14 partners from 11 countries. The project uses a multi-lingual online platform, industry workshops and tailored training to provide companies with guidance, tools and promote the exchange of best practices.

The chemicals sector's strong commitment to the project has prompted SPICE3 to establish an ambitious set of goals after just two years:

- USD 11 million in cumulative investment by European stakeholders in sustainable energy
- 250 kilotons of oil equivalent (ktoe) per year in primary energy savings
- 100 ktCO₂/year reduction in GHG emissions.

Sources: www.cefic.org, www.spice3.eu

CASE PROTOTYPE: Commissioning of Existing Buildings in Antigua & Barbuda

The prototype case project is the Commissioning of Existing Buildings in Antigua & Barbuda by the Department of Energy of the Government of Antigua & Barbuda.

Building commissioning is defined as the process of verifying, in new construction, all (or some, depending on scope) of the subsystems for mechanical (HVAC), plumbing, electrical, fire/life safety, building envelopes, interior systems (example laboratory units), co-generation, utility plants, sustainable systems, lighting, wastewater, controls, and building security to achieve the owner's project requirements as intended by the building owner and as designed by the building architects and engineers. Recommissioning is the methodical process of testing and adjusting the aforementioned systems in existing buildings.

The proposed project aims to launch an energy efficiency program for public buildings in Antigua & Barbuda in order to help existing buildings attain a higher level of effectiveness and efficiency by ensuring all systems operate as intended. It was mentioned in earlier meetings that the Department of Energy (DOE) will start this project with national public buildings such as hospitals, government buildings and related facilities, etc.

In China, a recent national policy-industry dialogue on enhancing capital flows to EE investments in China Building Sector cited the need to provide incentives to building and property developers to improve building performance. These elements included: labelling, certification, and standards for energy-efficient buildings, innovative financial instruments, incentives and subsidies, third party intermediaries as well as objective energy performance data, measurements, reporting and verification. There was also a call for provision of specific technical assistance for project development, risk assessment and relationship management between front and back offices in order correctly identify and process high value projects.)

Source: SWITCH Asia Report: National Policy-Industry Dialogue: April 15, 2016, Shenzhen, China

CASE PROTOTYPE: Scaling Up of investments in industrial energy efficiency programs in Tunisia

The prototype solution aims to introduce and implement a nationwide energy efficiency program in Tunisia through scaling up of investments in industrial energy efficiency. It aims to reduce energy intensity by 3% annually during the period 2015-2030.

The prototype calls for a scaling up of its national current energy efficiency program using a special treasury fund created by the Government of Tunisia granting allowances and subsidies for purchase of machineries and equipment used for energy efficiency to a more integrated fiscal and financial programs that would offer an integrated financial/fiscal package of incentives such as equity capital, guarantees, credits and interest rate subsidy to climate and energy efficient investments.

It is worthwhile to note for our Tunisian friends to study how the SEFF in Bulgaria was implemented and the key take outs in this project as presented below. The ultimate goal of the SEFFs is to create a demand-driven, self-sustaining market for sustainable energy financing through local financial institutions. The Bulgarian deployment of SEFFs highlighted a number of improvements that could enhance other similar programs in the future. The main lessons were:

Information and marketing is essential to familiarize SMEs with the general benefits of energy efficiency and with the specific offer of the program.

An integrated communications and marketing program was implemented taking cognizant of the critical role of SMEs to the project. The project organized staff with specialist marketing skills to be able to sell to the general public and stakeholders the benefits of energy efficiency. Human resources were supplemented by additional financial resources, technical consultants and other marketing and communication collaterals and channels such as dedicated websites and availability of specialized toolkits to target clients and beneficiaries.

It takes time to build momentum for the disbursement of loans.

Developing a new financing instrument and building expertise within partner banks is time-consuming. The commercial banks needed to establish a new loan application and new review processes. Then they needed to train internal staff. They also needed to create new marketing channels to promote the loans, and new reporting tools to monitor progress.

Engagement with participating financial institutions is a key success factor.

The motivation of local financial institutions is essential for the ongoing success of SEFFs. This requires a clear demonstration to banks that energy efficiency financing is profitable, improves relations with the bank's industrial and commercial clients, and helps banks to meet regulatory requirements associated with clean energy and climate change.

Program staff play an important role in ensuring that technical co-operation is effective.

The initial experience confirmed that strong technical support to both banks and SMEs was essential. Technical support proved to be complex, and it demanded a long-term commitment. For it to be effective, the EBRD had to build up its in-house expertise so that it could in turn support the technical supporters on local project implementation teams.

Success Story at the National Level: The Story of Costa Rica

The story of Costa Rica as a country powered by 100% renewable energy deserves to be highlighted.

In the early 1940s, Costa Rica's forest cover was at 75%. However, due to logging and disregard to protecting its environment, the country's forest cover (which was mostly tropical rainforests) dropped alarmingly to 21% in 1987.

Through strong political will, strategic thinking and innovative policies and programs, Costa Rica was able to reverse the process and developed a program that focused on clean energy through an incentive program that "paid" land owners to protect their environment and undertake reforestation activities. This produced the positive result that by 2010, the forest cover was back up to 52%. The country also developed other sources of energy principally from hydropower, through its river systems and abundant rainfall, which accounts for 70-75% of its electricity supply, with the rest of its renewables coming from geothermal, biomass, wind, and solar. You don't have to look far to see how Costa Rica is breaking all kinds of renewable energy records. In 2015, the nation achieved 99% renewable energy generation, with its grid powered by only renewable sources for a remarkable 285 days. And it's on a similar track in 2016, powering its grid on 100% renewable energy for 150 days and counting.

Costa Rica also focused on reducing greenhouse gas emissions through major changes in its transportation sector, which makes up 32% of the country's emissions and 67% of its fuel consumption. In 2015, Costa Rica established a buy-back program for older cars and trucks in exchange for new, fuel-efficient vehicles. Reducing emissions from the transportation sector is necessary to meet the country's carbon neutrality goals by 2021. Officials have stated that it has already reached 81% of this goal. If Costa Rica succeeds, it will be one of the few carbon-neutral countries in the world.

Source: <https://www.climaterealityproject.org/blog/video-costa-rica-last-green-mile?>

6. Conclusion

Key Lessons and Elements of a Successful Energy-Efficiency Program for SMEs

In conclusion, we are presenting below some of the key lessons and elements of successful energy-efficiency programs for SMEs which we can draw upon as we chart the next steps in our effort to increase public and private participation in climate investments in medium term.

Information System	<ul style="list-style-type: none"> Information measures that help SMEs to improve energy efficiency include: energy audits, technology demonstration projects, site visits, case studies, “how to” guidance materials, fact sheets, lists of typical energy efficiency projects, list of energy-efficient equipment, workshops, webinars, advice hotlines, energy efficiency standards for equipment, and clear marking of efficiency levels on equipment.
Capacity Building Measures	<ul style="list-style-type: none"> Capacity building measures that develop energy efficiency skills and knowledge of in-house personnel and external stakeholders include energy audits, training, peer-to-peer experience sharing, and seminars and workshops.
Financial Support Mechanism	<ul style="list-style-type: none"> Financing measures that help provide SMEs with access to capital and other financial resources include providing training and support to help SMEs develop bankable projects, and training and capacity building for the financial sector to enable it to develop, provide and promote financial products for energy efficiency projects.
Other support programs	<ul style="list-style-type: none"> Further measures that can play an important role include establishing peer-to-peer learning networks that help share information, experiences and build capacity; promoting energy management systems that ensure a framework for continuous improvements; and implementing equipment replacement programs that motivate enterprises to invest in efficient technologies.

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