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Accelerating Energy Efficiency in Small and Medium-sized Enterprises

Powering SMEs to catalyse economic growth

Policy Pathway

INTERNATIONAL ENERGY AGENCY

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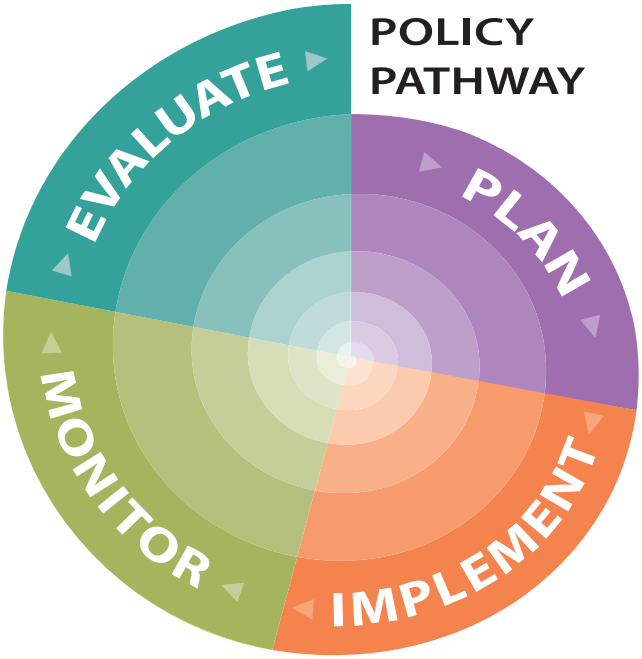

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Executive summary

Small and medium-sized enterprises (SMEs) are a central part of economies worldwide, comprising 99% of enterprises and providing about 60% of employment. They contribute around 50% of global gross value added and from 16% to around 80% of gross domestic product (GDP), depending on the country's economic structure. Increasing their energy efficiency offers considerable value for economies, societies and SMEs themselves. Implementation of energy efficiency improvements in SMEs is lagging, however, because of a lack of information, technical expertise and funding. This Policy Pathway describes how well-designed energy efficiency programmes can address these barriers, unlocking a wide range of benefits.

SMEs are important drivers of economies around the world. In the European Union, SMEs employ almost 90 million people, generate about 1.1 million new jobs per year and contribute almost 30% of GDP, worth USD 5.5 trillion. In China, SMEs account for nearly 60% of GDP, amounting to around USD 6.6 trillion, and account for 60% of manufacturing output. In India, SMEs produce 45% of manufacturing output.

SMEs also drive innovation. They carry out nearly 20% of research and development (R&D) in the United States and the European Union, and account for more than half of R&D in some OECD countries. In the United States, more than 35% of transnational patents are filed by SMEs. In China, SMEs account for more than 60% of domestic patent applications and 82% of new product output. In Australia, almost 90% of the businesses engaging in innovative activity are SMEs.

Individually SMEs consume modest amounts of energy, but collectively their energy demand is considerable. According to IEA estimates, SMEs consume more than 13% of total global energy demand, around 74 exajoules (EJ). Cost-effective energy efficiency measures could shave off as much as 30% of their consumption, namely 22 EJ, which is more energy than Japan and Korea combined consume per year.

Improving SMEs' energy efficiency is a key way to increase their profitability and competitiveness. As well as reducing SMEs' energy costs, greater energy efficiency can improve SMEs' product quality and output, reduce risks and liabilities, enhance resilience and enable new business opportunities. Even where fuel prices are low, energy price volatility and uncertainties hamper SME growth; energy efficiency can reduce exposure.

Improving energy efficiency in SMEs also contributes to wider policy objectives, such as boosting employment opportunities, expanding the market for energy-efficient goods and services, improving energy security, reducing greenhouse gas (GHG) emissions and local air pollution, and enabling investments in additional power generation to be deferred.

SMEs face various barriers that deter them from adopting energy efficiency measures. SMEs seldom have enough time and resources to explore energy efficiency options, and lack information about where and how energy is used in their companies. SMEs usually do not have internal capacity to develop and implement energy efficiency projects, and rarely view efficiency as a priority, especially during the early SME development phase. In many cases, their access to financing for energy efficiency measures is constrained by insufficient capacity to develop bankable projects with financial institutions, which often remain reluctant to provide financial products due to perceived risks and a lack of suitable financial products.

Countries can help SMEs to overcome these barriers by providing energy efficiency programmes. Large industrial energy users are increasingly benefiting from such programmes, but industrial and commercial SMEs are receiving little support, as their energy use and potential for energy efficiency goes largely unnoticed.

Some programmes are under way around the world to help SMEs realise their energy efficiency potential, but they are still small in scope and typically have a short duration. Their results are

generally positive, but they are rarely replicated and scaled up to assist larger numbers of SMEs. Governments and other stakeholders grapple with the challenge of developing effective programmes that can reach the large number of very diverse SMEs operating within vastly differing sectors.

This Policy Pathway sets out how governments and other stakeholders can design and implement energy efficiency programmes that deliver cost-effective savings to SMEs. The Pathway is presented in ten steps, divided into four phases (Table 1). These steps have proven effective in a variety of energy efficiency programmes developed specifically for SMEs.

Table 1 IEA Policy Pathway: Energy efficiency programmes for SMEs

PHASES	*STEPS*	
PLAN	1	Develop programme rationale
	2	Consult with stakeholders
	3	Design the programme
	4	Engage partners and secure funding, staffing and other resources
IMPLEMENT	5	Pilot the programme
	6	Launch the programme
	7	Manage the implementation process
MONITOR	8	Collect, review and disseminate data
EVALUATE	9	Evaluate programme impacts
	10	Adapt the programme and plan next steps

The **planning** phase involves tailoring each programme to meet the specific needs and circumstances of a sub-section of the SME sector. A successful planning process considers barriers between SMEs and improved efficiency, and seeks benefits from engaging with stakeholders and coordinating with existing programmes. Successful programmes include three core components:

- **Information:** SMEs often focus on the day-to-day tasks of the core business, leaving limited time and resources to investigate energy efficiency opportunities. To learn about the benefits of energy efficiency, SMEs need information tailored to their specific needs and delivered in a convenient form from a trusted source.
- **Expertise and capacity building:** Unlike larger businesses, SMEs can rarely nurture in-house expertise on energy efficiency; they are more likely to rely on external advice and support for implementation. Energy efficiency programmes should therefore aim to build the capacity of energy consultants and financial

institutions as well as that of SMEs themselves. Successful programmes incorporate training, the development of professional networks and practical guidance material such as handbooks.

- **Financing:** SMEs face particular difficulties in accessing the financial resources required to purchase, install and operate more efficient equipment or to implement more efficient operating practices, so access to finance tailored to their needs is vital. Successful programmes support the development and promotion of alternative financing measures that are more accessible to SMEs than commercial loans, such as grants, dedicated credit lines and creative approaches such as leasing options for more energy-efficient equipment.

The **implementation** phase focuses on promoting the programme, engaging stakeholders and managing the programme. It is crucial to ensure that the programme meets SME needs and constraints, and that the components are effectively linked. Key success strategies include:

- **Identify your SME target group**. To maximise benefits, a programme should consider company size, ownership structure, industry sector, energy intensity, energy supply issues and geographic location.
- **Identify benefits beyond energy and cost savings**. Energy efficiency investments are more compelling for SMEs (and their financiers) when they deliver multiple returns, such as enhanced productivity, product quality and safety.
- **Build stakeholder partnerships**. The reach and effectiveness of an SME programme is greatest when it unites governments, industry associations, financial institutions, and service and equipment suppliers.
- **Combine measures to provide information, expertise and financing**. An integrated approach to programme design and implementation makes for a more efficient and effective process.
- **Take advantage of existing policies and programmes**. Where another successful SME programme is already in place, efforts should be made to form partnerships and build on existing efforts and resources.
- **Make it easy for SMEs to access assistance**. SMEs' limited resources and their focus on day-to-day operations mean that a successful programme must be easy to access and implement.

The **monitoring** phase involves collecting, reviewing and sharing data so that programme effectiveness can be assessed on a regular basis and the programme adjusted to ensure maximum results. It is important to decide what indicators will be used in consultation with partners and stakeholders and to convey this to participants at the outset of the programme. Attention should be placed on indicators beyond just energy savings. Care should be taken not to overburden SMEs with reporting requirements and to focus on data that is relevant to SMEs. This phase can help ensure that the programme meets SME needs, and can identify possibilities to improve participation and access to programme support.

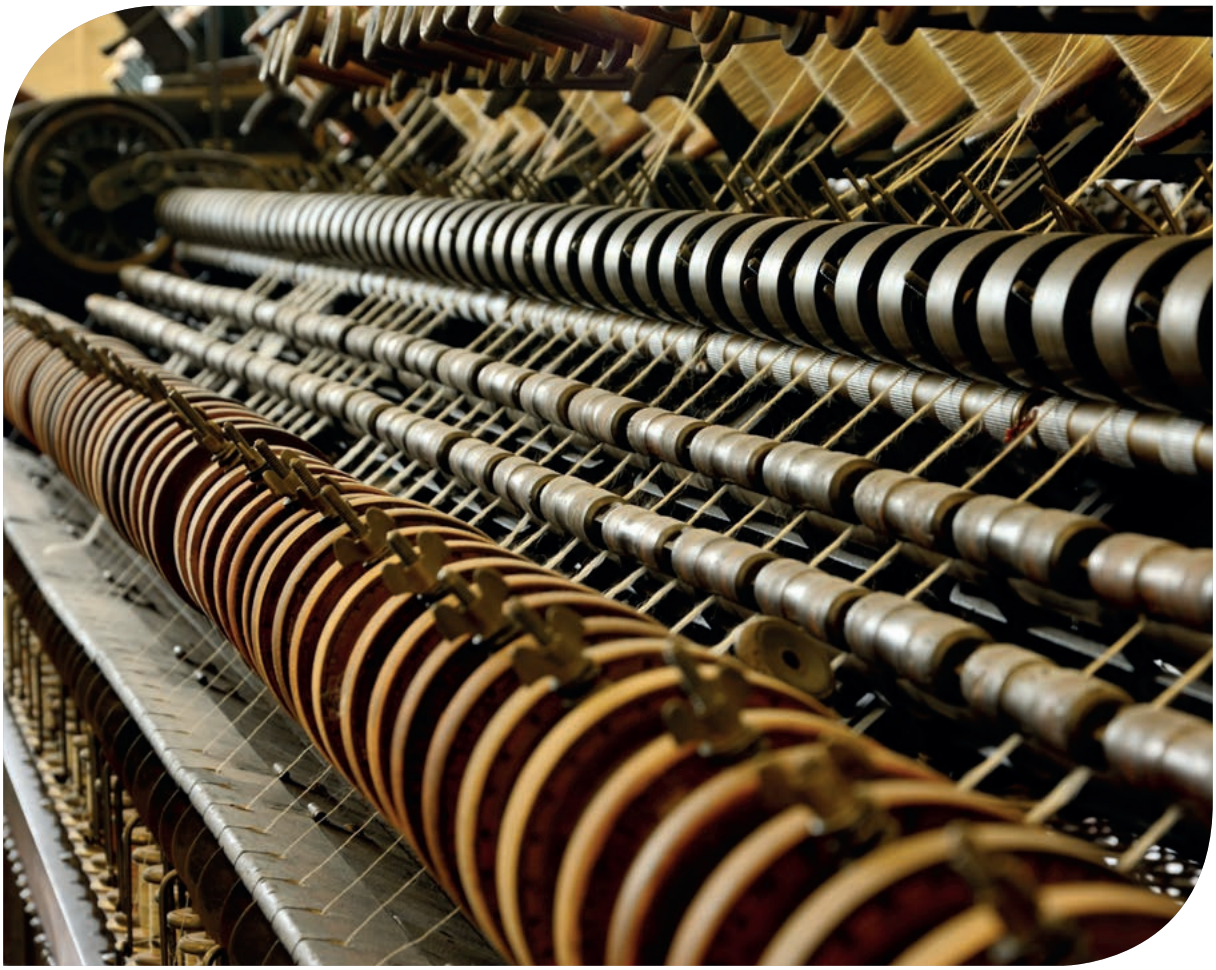
The **evaluation** phase seeks to determine programme results, impacts and success factors, assess cost-effectiveness and the effectiveness of instruments used. A plan for collecting data and information needed for the evaluation should be devised at the outset of the programme. Opportunities to build data collection into the programme should be utilised; for example, audits can provide information on the baseline and results. This phase can provide valuable contributions to future efforts to expand and scale up SME energy efficiency programmes.

The key messages in this Policy Pathway are elucidated by case studies that show how to effectively combine information, capacity building and access to finance; how to utilise existing networks and communication channels to target

SMEs; and how to take advantage of existing business relationships to ensure mutual benefits. These case studies are:

- The European Bank for Reconstruction and Development's Sustainable Energy Financing Facility, which combines information and capacity building (both for SMEs and local banks) and access to finance.
- The Australian Energy Efficiency Information Grants, which leveraged existing networks and information channels by providing funding to business associations and other intermediaries that enabled them to provide energy efficiency information and services to SMEs.
- A selection of programmes aimed to improve energy efficiency in supply chains, including a US Department of Energy pilot programme, that show the value of business-to-business energy efficiency measures and how governments and other stakeholders can provide incentives to stimulate such initiatives.

SME energy efficiency programmes can provide important benefits in mature economies, emerging economies and developing countries. This Policy Pathway provides guidance that can be of use when developing and improving existing programmes, as well as when starting to explore the possibility of setting up new programmes.



Realising the potential

Introduction

There are compelling arguments for an increased focus on energy efficiency in small and medium-sized enterprises (SMEs). SMEs play a vital role in the economy (Box 1). They provide the majority of employment opportunities, contribute significantly to GDP and export income, and play a key role in driving innovation. Energy efficiency can strengthen SMEs by helping them to cut costs, freeing up resources that can be invested in more productive activities, and can make them more resilient and more competitive. Even though SMEs individually consume moderate amounts of energy, collectively they account for a significant portion of global energy demand.

Box 1 ***What are SMEs?***

SMEs are defined by the OECD as non-subsidiary, independent companies that employ less than a given number of employees. This number varies across countries. Many countries break down SMEs into micro, small and medium-sized enterprises. The most frequently used upper limit is 250 employees, such as in the European Union. However, caps vary from 20 employees in New Zealand to 1 000 employees in China. The United States considers SMEs to include companies with fewer than 500 employees. Annual sales, revenue, assets, capital or investment may also be used to differentiate between SMEs and large organisations. In India, for example, the definition of SMEs is based on investment in machinery.

As well as cost savings, energy efficiency can deliver a wide range of other benefits that can help SMEs grow and develop, for example by improving productivity and product quality. Energy efficiency in SMEs can also contribute to broader benefits for societies and economies, reducing reliance on energy imports and the need for investments in additional generation capacity, and lowering environmental impacts, such as GHG emissions and local air pollution.

Despite these many benefits, implementation of energy efficiency measures in SMEs is lagging because of pervasive barriers such as insufficient information, resources and technical expertise, and difficulty in accessing the necessary funding. Energy efficiency programmes can be instrumental in addressing these barriers. Such programmes can be an integral part of efforts to support SME profitability, competitiveness and growth as well as achieving other benefits for society and the economy.

The first section of this publication describes the importance of SMEs to the economy, SME energy demand and energy efficiency potential, benefits beyond energy savings, barriers to the uptake of energy efficiency measures, and some of the challenges facing programme designers and managers. The second section provides guidance on how the barriers and challenges can be addressed. SME energy efficiency programmes encompass a wide range of initiatives ranging from awareness campaigns to audit schemes and energy efficiency networks. Instead of describing different types of initiatives, the publication focuses on core elements, success factors and key considerations that are relevant irrespective of the type of programme. These are illustrated by examples from

implemented SME energy efficiency programmes. Successful and promising approaches are further illustrated and explained in three case studies.

The target audiences of this publication are central government departments, ministries or agencies tasked with promoting energy efficiency, and other stakeholders involved in energy efficiency programmes aimed at SMEs.

SMEs play a central role in economies around the world

SMEs play a major part in the economic landscape in many ways: they are numerous, create many jobs, produce a large part of GDP, generate exports and are major drivers of innovation.

Globally, SMEs constitute around 99% of all enterprises. SMEs employ approximately 60% of private sector workers (Edinburgh Group, 2013). SMEs in the formal sector[1] in the Emerging Asia countries account for 50% to 80% of total employment (OECD, 2013). In the European Union, where SMEs employ almost 90 million people, they generate about 1.1 million new jobs per year (European Commission, 2014a). Globally, 85% of total employment growth was attributable to SMEs on average between 2002 and 2010 (de Kok et al. 2011). To take an example from the southern Mediterranean region, Egypt's business landscape is dominated by SMEs (90% of active enterprises) and they play a key role in the country's economy, accounting for 75% of total employment.

SMEs contribute about 50% of global gross value added[2] and 16% to around 80% of GDP, depending on the country's economic structure.[3] In 2013, SMEs generated USD 4 023 trillion in value added in the European Union, equivalent to almost 30% of GDP (EC, 20214a). In China, SMEs account for nearly 60% of GDP, amounting to around USD 6.6 trillion[4] (OECD, 2013). In Egypt, SMEs account for nearly 80% of total economy-wide GDP. SMEs' contribution to GDP is growing in emerging economies. In Malaysia, for instance, SME contribution to GDP grew at an average compound annual growth rate (CAGR)[5] of more than 6% between 2005 and 2013, higher than the CAGR of the overall economy (SME Corporation Malaysia, 2015).

SMEs produce significant shares of countries' manufacturing output: 45% in India, for example, and 60% in China (Zhu et al., 2012). SMEs account for a large share of exports in many countries: 68% in China and 40% in India (Zhu et al., 2012; SME Chamber of Commerce of India, 2015).

Despite limited resources, SMEs drive innovation. They carry out nearly 20% of R&D in the United States and the European Union, and far more than half of R&D in some OECD countries, such as Iceland, Norway, Poland and Portugal (OECD, 2013). In the United States, more than 35% of transnational patents are filed by SMEs. In the United Kingdom, SMEs obtain 50% of all patents. In China, SMEs account for more than 60% of domestic patent applications and 82% of new product output (Zhu et al., 2012). In Australia, almost 90% of the businesses engaging in innovative activity are small enterprises (Connolly et al., 2012).

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.

1. The formal sector consists of enterprises that are registered, organised and regulated. The informal sector is characterised by units engaged in the production of goods or services operating at a low level of organisation, with little or no division between labour and capital as factors of production. Labour relations are based mostly on casual employment or social relations rather than contractual arrangements with formal guarantees.

2. Gross value added provides a dollar value for the amount of goods and services that have been produced less the cost of inputs and raw materials that are directly attributable to that production.

3. Countries use different methodologies to calculate the contribution of SMEs to GDP.

4. Corresponding to USD 11 trillion purchasing power parity (PPP) GDP.

5. Based on constant 2005 prices.

SME energy consumption and savings potential

SMEs represent a large but often overlooked part of the energy consumption landscape. Their share of energy demand differs from country to country, but the IEA estimates that SMEs account for at least 13% of global final energy consumption annually (74 EJ).[6] Although there are data and methodological challenges in calculating these figures with precision, it is clear that SMEs are important energy consumers, particularly in urban areas – which are anticipated to grow – and in the service sectors, which countries like China and others are looking to stimulate.

In the United Kingdom, SMEs account for around 45% of total business energy use (Middlesex University, 2009). In the United States, the energy demand of manufacturing SMEs is about 5.4 EJ or half of total final industrial energy demand (Trombley, 2014). Australian SMEs make up about 50% of total business electricity demand.[7] In some countries, the share of SME energy use is even higher: in Italy, manufacturing SMEs' energy demand is 70% of the total industrial sector energy demand (Trianni and Cagno, 2011). In China, manufacturing SMEs consume 2.5 times the energy of large manufacturing enterprises (IFC, 2012).[8]

At all scales of the commercial and industrial sectors, improved energy efficiency holds significant and profitable potential (Box 2). Numerous studies have indicated that the cost-effective savings potential of SMEs is in the range of 10% to 30% of their energy demand. The global energy demand of SMEs could be reduced by 7-22 EJ with existing best available technologies and practices.[9]

6. Globally, SMEs are estimated to account for at least one third of total industrial energy demand and a third of service energy demand. The estimate does not include informal sector energy usage.

7. Australian Bureau of Statistics (2013), www.abs.gov.au.

8. The definition of SMEs in China includes companies of up to 1 000 employees.

9. Savings potentials vary across different sub-segments and regions. Box 2 and the following paragraphs provide further illustrations of savings potentials.

Box 2

Modest enterprises, large potential

Whereas large enterprises around the world have made significant progress in implementing operational and technical changes to realise their energy efficiency potential, in SMEs such potential remains largely untapped. In many SMEs, simple operational changes – such as turning off equipment and appliances when not needed – and better maintenance and settings can save about 5 % to 20% of energy demand at little or no cost. Further relatively low-cost improvements – such as investing in sensors, automation, variable speed drives and other auxiliary technology can enable further savings. Larger investments in new energy efficiency technology can further bring down SME energy demand. Experience with energy management systems in large enterprises shows that energy savings of about 30% are possible within a short time, with additional annual savings of about 2% to 5% (IEA, 2012). SMEs could achieve similar savings by implementing energy management systems.

Evidence shows that the potential for energy efficiency in SMEs is typically more cost-effective than in other sectors as relatively few of them have implemented energy efficiency improvements. In China, for example, SMEs are on average almost 40% less energy-efficient than large industrial enterprises in their respective industrial sectors. The SME energy efficiency potential in China has been assessed at 25% of SME energy demand (IFC, 2012).

Eurochambres (the Association of European Chambers of Commerce and Industry) estimates that the short-term energy reduction potential among its 20 million EU members is 10% to 20% (Eurochambres, 2014). Another estimate puts the energy efficiency potential of industrial SMEs in the European Union at more than 25% of consumption (Thollander and Palm, 2013). SMEs in Spain could save 26% or 307 petajoules (PJ) by implementing efficiency measures. This would equate to an economic saving of over USD 5.9 billion (GasNatural Fenosa, 2015).

In the United Kingdom, it is estimated that potential energy expenditure savings for SMEs range from USD 2 billion to USD 4.1 billion. It is estimated that 40% of these savings are achievable with no capital investments but involve no-cost and low-cost measures such as eliminating energy waste by turning equipment off when not in use and fixing sources of energy losses such as leaks (DECC, 2014).

Benefits of improved energy efficiency for SMEs

Cost-effective investments in energy efficiency generate energy savings that have a direct impact on the profitability of SMEs and provide net positive earnings in the long run. Energy cost reductions can free up resources that can be directed at more productive activities, such as expansion or developing new product lines or services.

As well as cost savings, greater energy efficiency offers SMEs a wide range of other benefits (Box 3). It can improve competitiveness, product quality, materials efficiency, staff commitment and relations with the wider community, and can enhance a company's public profile. Studies indicate that the value of the productivity and operational benefits derived can be up to 2.5 times the value of the energy savings (IEA, 2014b).

Energy efficiency can also help mitigate risks for SMEs. While risk is inherent in all business functions

and activities, SMEs are more vulnerable than large companies to changing conditions in credit markets, given their limited financial base. SMEs often face more severe credit conditions than large enterprises. Banks may not be as motivated to engage with SMEs, as the transaction costs of smaller loans are proportionately higher. Many banks are uneasy about the risks involved or fail to see quality or resilience in the small business segment. At the same time, most SMEs do not have enough collateral to provide a strong alternative repayment source. SMEs in many countries also pay more per unit of energy than larger companies and are hence more vulnerable to price increases. Despite a dip in energy prices across many countries, energy costs are increasingly restricting SME profitability. SMEs are also more sensitive to energy supply disruptions as they may not have back-up systems or on-site generation. Greater energy efficiency can reduce all these risks and enable access to lower insurance premiums and lower finance rates.

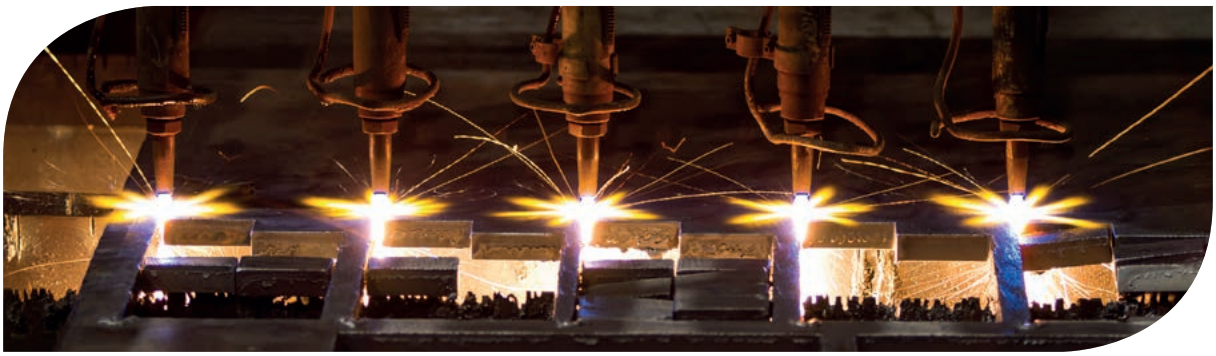
Box 3

Energy efficiency programmes enable benefits beyond energy savings

The EBRD's Ukraine Energy Efficiency Programme (UKEEP) helps SMEs to improve energy efficiency by linking local financiers, advisors and private companies. The programme assists SMEs to overcome information, capacity and financing barriers to energy efficiency by combining targeted financing with technical expertise (e.g. energy audit and training) for local financial institutions. Some examples of projects include:

- A large cheese factory installed nanofiltration to replace an old vacuum evaporation system. The new system eliminates natural gas consumption and reduces electricity use by more than 25%. The initial investment under UKEEP of USD 1 million also produced immediate energy savings of USD 1.5 million per year.
- A cucumber and tomato grower invested USD 1.2 million in new boilers, irrigation systems and control systems for a large greenhouse complex. The monetary savings alone for gas and electricity amounted to a return on investment of 25% per year (EBRD, 2014d).

These multiple benefits are substantial, and they are typical of the rewards reaped from energy efficiency projects. More information can be found on the website (www.ukeep.org).



Broader policy objectives for governments

As well as benefiting SMEs themselves, energy efficiency programmes for SMEs can help countries meet a variety of important policy goals, benefiting energy systems, economies and the environment.

Energy system benefits

Reducing SME energy demand is cheaper than investing in new generation and transmission. Energy efficiency can provide long-term benefits by lowering base load and peak demand, reducing the need for additional generation and transmission assets. Lower energy demand can also help reduce supply disruptions.

Benefits to the economy

Greater energy efficiency improves the stability and performance of SMEs, helping to build a strong and resilient SME segment that can drive economic growth and development. Energy efficiency programmes also stimulate the growth of national and global markets for energy-efficient goods and services, providing significant business opportunities for SMEs themselves as suppliers (Table 2).

Increased investment by SMEs in energy efficiency could also boost energy service company (ESCO) markets and markets for financial products; nearly 83% of the global energy services industry is made up of small or regional players. Growing opportunities exist in the services associated with more energy-efficient manufacturing (OECD, 2015).

Table 2 Types of energy-efficient equipment, controls, software and services

Equipment	*Controls and software*	*Services*
Insulation	Automated monitoring and targeting systems	Energy auditing
Efficient lighting	Boiler controls	Energy checks (energy walk-throughs)
Smart meters and monitoring systems	Building energy management systems	Energy management
Waste heat recovery systems	Heating, ventilation and air conditioning controls	Energy management system implementation support
Efficient windows and glazing	Energy management software	Energy performance contracting
Variable speed drives	Lighting and daylight phasing control and occupancy control	Process optimisation support
Efficient office and industrial equipment	Process energy management systems	Energy efficiency consultancy
Voltage power optimisation equipment	Energy use analytics	Maintenance for energy efficiency

Environmental and climate benefits

Reducing the environmental impact of SMEs by achieving and going beyond environmental compliance in both manufacturing and services is a key success factor in promoting green growth – economic growth that is environmentally sustainable (OECD, 2015).

Energy efficiency can also play a major role in reducing local air pollution, particularly outdoor concentrations of pollutants such as sulphur dioxide, particulate matter, unburned hydrocarbons and nitrogen oxides. In doing so, it can lead to a range of associated economic, environmental and health benefits (IEA, 2014b). Increasing energy efficiency also plays a crucial role in mitigating climate change. Lowered energy demand can optimise resource management and alleviate pressure on natural resources. Reducing energy consumption and emissions through energy efficiency also plays a role in reducing waste and associated pollution (IEA, 2014b).

SMEs are important for green growth as drivers of eco-innovation and key players in emerging green industries. New and young companies are particularly important for radical green innovations, as they often exploit technological or commercial opportunities that have been neglected by more established enterprises or even challenge the business models of existing companies.

Benefits for utilities and other stakeholders

By providing information and support on energy efficiency, **industry and business associations** can deliver added value to their SME constituents. **Energy utilities and other energy providers** can use energy efficiency programmes to build customer relationships, establish value-added services, address energy supply constraints such as peak demand, and meet legislative obligations. In some countries, energy utilities are tasked with the development and delivery of energy efficiency programmes and have set energy savings targets.

SME energy efficiency can open up new opportunities for **financial institutions** for additional services to existing customers or create new markets for financial services, such as specialised loans or funding mechanisms. **Corporations** can use energy efficiency programmes to improve relationships, reduce risk along their supply chains, reduce costs, and meet environmental and social commitments. Increased work on energy efficiency in SMEs can create new markets or expand existing markets for **energy-efficient equipment and service providers**.

Barriers to energy efficiency improvement in SMEs

Some persistent barriers are preventing SMEs from realising their tremendous potential for efficiency improvements. SMEs are typically more vulnerable to market shifts and more reliant on key contracts and customers than large organisations. The need to maintain profitability and competitiveness with limited resources can make it more difficult for SMEs to pay attention to energy efficiency and other environmental and business improvement initiatives.

A focus on day-to-day cash flow and limitations in accessing capital create challenges in justifying non-core business investments. Small companies are less likely than larger ones to monitor performance, for example, and tend to have a more informal structure with less rigorously defined roles (EFILWC, 2013). It is vital to understand constraints and incentives in different parts of the SME sector rather than adopt a one-size-fits-all approach.

The most prominent barriers to energy efficiency in SMEs are:

Limited information on energy efficiency improvement opportunities: SMEs are often unaware of their options for raising efficiency, and the costs and benefits of those options. Where information may be available, it may not be readily accessible, and SME managers may lack the time and motivation to obtain, process and act on it. A recent survey suggests that 52% of the United Kingdom's 2.5 million small businesses have no grasp of how much of their overheads gas, electricity and water account for, while a third of SME owners are unable to access data showing how much energy they use (Utilitywise, 2014).

Limited in-house skills and expertise to identify and implement projects: SMEs typically focus their resources on their daily business, leaving little time to develop expertise beyond the essentials, so they often bypass profitable efficiency opportunities. The Observatory of European SMEs found that fewer than 30% of SMEs in Europe had implemented any measures for conserving energy and resources, and only 4% had a comprehensive approach to energy efficiency (European Commission, 2014b). Lack of experience with energy efficiency also gives rise to concerns that energy efficiency measures may disrupt the production process and lead to revenue losses or affect product quality. Such concerns can act as a strong deterrent. When SMEs do decide to pursue energy efficiency projects, they may have to rely on external parties for financial and technical guidance. Where appropriate skills are not offered in the wider marketplace – by consultants, or equipment suppliers, for example – this barrier is further reinforced.

Difficulty accessing the capital to finance energy efficiency improvements: While significant energy efficiency potential can be realised by measures with little or no cost, SMEs need capital to implement more far-reaching efficiency improvements. SMEs typically face higher hurdles to acquiring capital than do large enterprises. Financiers may point to an SME's lack of collateral and less rigorous record-keeping, and may consider smaller enterprises more vulnerable to market changes. The resulting lack of finance can thwart energy efficiency projects, including those that offer a strong financial return and a range of other business benefits. Banks may also lack financial products or capacity to deal with SME energy efficiency.

Challenges that programme designers and managers may face .....

Most energy efficiency policies and programmes have so far targeted large enterprises rather than SMEs. One reason for this is that developing and implementing such programmes for SMEs is more difficult. The SME segment is very heterogeneous. SMEs vary widely in size and are present in every business sector.[10] Similar-sized companies in the same sector, but in different stages of maturity, can also need different services and different types of support.

The SME segment is dynamic: new companies are established every year, while others close down, grow or shrink, change focus or move operations into new sectors. The number of SMEs per country is high and they are widely dispersed geographically, so centralised approaches that work for large organisations may be ineffective.

Reaching a greater number of small entities costs more than targeting fewer large enterprises. Energy savings opportunities are smaller per entity and distributed more widely, typically leading to higher programme administration costs. This makes it harder for practitioners to argue for programme funding. Public administrations lack staffing needed to engage with thousands or even millions of SMEs.

10. A further complication arises in countries where a large share of SMEs operate in the informal sector.

Ways of improving energy efficiency in SMEs vary considerably across sectors so it is difficult to provide tailor-made approaches given the very large number of SMEs – and standardised solutions (as used in residential energy efficiency programmes, for example) may not work. For financial institutions, the business case for providing a large number of small loans may not be evident and the technical complexity of energy efficiency, particularly in manufacturing businesses, may act as a deterrent.

Programme designers may find SMEs unreceptive because they lack time and resources, capacity, trust and information. As with large enterprises, the lack of standardised methodology to calculate and verify energy savings can create difficulties both in assessing results and in developing financing solutions.

While the costs of energy efficiency programmes may be higher for SMEs than for large enterprises, the SME segment typically offers more untapped energy efficiency potential.

Key elements of an effective programme

There are three main pillars to designing an SME programme that overcomes the barriers above: improving information flow, strengthening capacity and providing financing.

- **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** that develop the 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.
- **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.

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 programmes that motivate enterprises to invest in efficient technologies.

Strategies for success

The significant barriers to the adoption of energy efficiency measures in SMEs call for particularly thoughtful programme design and implementation (Figure 1). Key success strategies include:

- **Identify your SME target group**. To produce maximum benefit, a programme should consider company size, ownership structure, industry sector, energy intensity, energy supply issues and geographical location.
- **Identify benefits beyond energy savings**. Energy efficiency investments are more compelling for SMEs (and their financiers) when they deliver multiple returns, such as enhanced productivity, product quality and safety. Including productivity outcomes in financial cost assessment frameworks can substantially reduce the payback period for energy efficiency investment.

- **Build stakeholder partnerships**. The reach and effectiveness of an SME programme is greatest when it unites governments, industry associations, financial institutions, service and equipment suppliers, and other relevant stakeholders.
- **Combine measures to provide information, expertise and financing**. An integrated approach makes programme design and implementation more efficient and effective.
- **Take advantage of existing policies and programmes**. Where a successful SME programme is already in place, efforts should be made to form partnerships and build on existing efforts and resources.
- **Make it easy for SMEs to access assistance**. SMEs' limited resources and their focus on day-to-day operations mean that a successful programme must be easy to access.

Figure 1 Strategies for developing energy efficiency programmes for SMEs

The policy pathway to developing and implementing energy efficiency programmes for SMEs

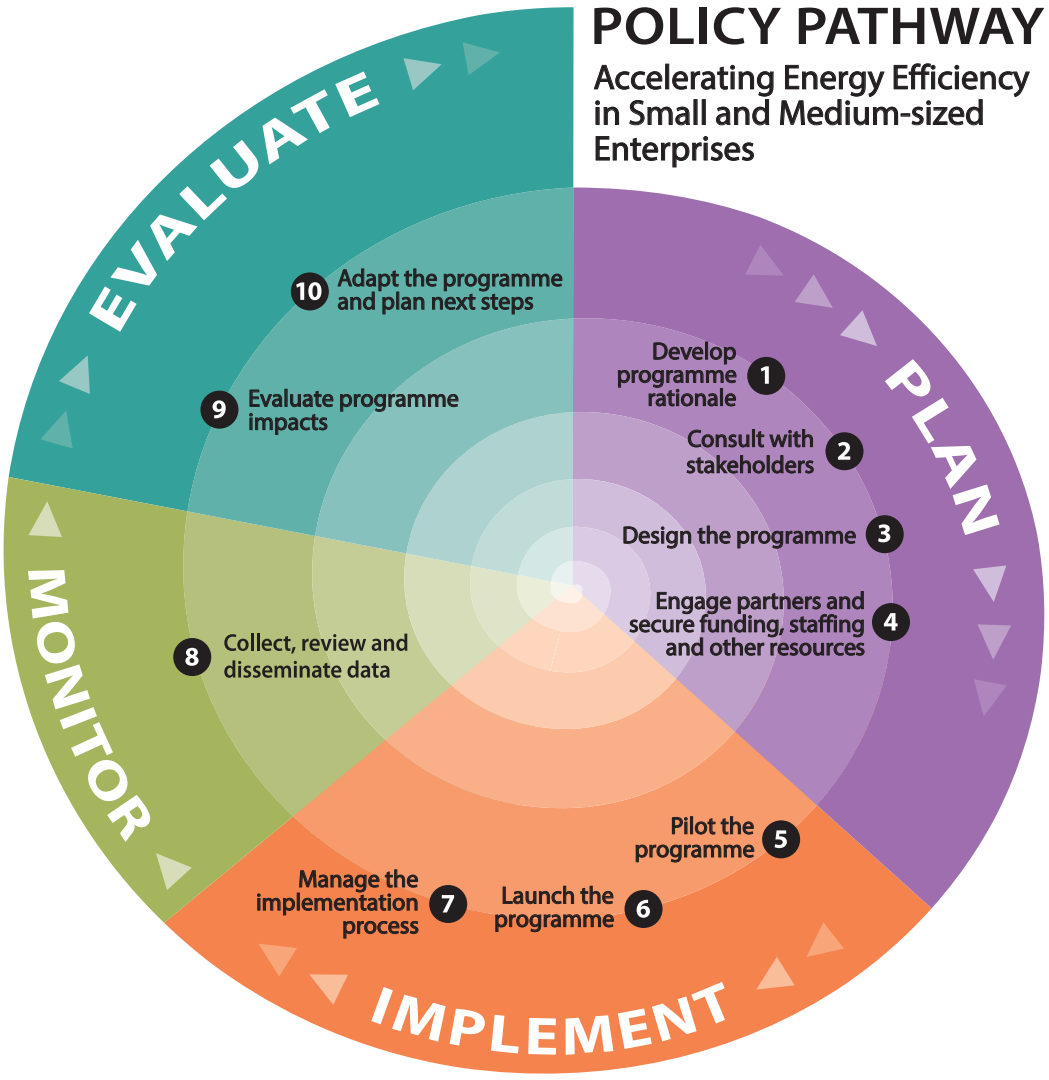
The pathway to developing and implementing energy efficiency programmes for SMEs is presented in ten steps, divided into four phases. These steps have proven effective in a variety of programmes (Table 3).

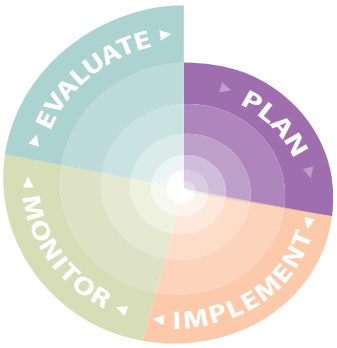
The **planning** phase involves tailoring each programme to meet the specific needs and circumstances of sub-section of the SME sector. A successful planning process considers barriers between SMEs and improved efficiency, and seeks benefits from engaging with stakeholders and coordinating with existing programmes.

The **implementation** phase focuses on promoting the programme, motivating stakeholders and managing the implementation process.

The **monitoring** phase involves collecting, reviewing and sharing data so that programme effectiveness can be assessed on a regular basis and the programme adjusted to ensure maximum results.

The **evaluation** phase seeks to determine programme results, impacts and success factors, assess cost-effectiveness and the effectiveness of instruments used, and will guide future efforts.





PLAN

1 *Develop programme rationale*

The programme rationale is a blueprint that guides further design and implementation, as well as being a useful tool in communicating the value and expected results of the programme. A rationale can also help raise resources and engage programme partners. The programme will be more attractive to potential funders, partners and participants if the rationale describes benefits beyond just energy savings. To develop a rationale, programme managers need to obtain and analyse information and consult with stakeholders.

A rationale should:

- identify the problem or issue that will be addressed
- discuss the problem or issue in relation to the target subset of SMEs
- explain why the programme is needed
- propose solutions based on the needs and constraints of the target market
- give an overview of the programme
- describe the value and benefits of the programme
- explain why the programme will be successful
- describe how the programme links to other related initiatives
- outline clear objectives, including desired changes, target market, how much change is to be achieved, and the period over which this change is to take place.

Define the target market

Programme developers can elect to focus on different subsets of SMEs depending on the objectives of the programme. These subsets can be based on company size, region, business sector or the supply chain to which they belong. Basic market research can help to identify where to focus and the benefits of targeting that subset, including broader economic and social benefits. Useful data includes:

- the number and size of SMEs by type of activity
- the number and size of SMEs by region
- the contribution of these SMEs to regional and national economies (e.g. economic growth, employment, turnover, export income)
- energy intensity
- estimated energy savings potentials.

In terms of area of activity, it is possible to make a broad division in terms of manufacturing, agriculture or services or a more specific division, for example targeting only SMEs in the hospitality business or in brick manufacturing. Different stakeholders may tend to naturally select different groups of SMEs: utilities or energy providers tend to focus on SMEs within their customer base, or a subset of these, based on enterprise size or sector. Industry or business associations focus on their members. Local governments focus on SMEs in their region or city, again possibly targeting SMEs within a certain sector or of a certain size.

It is easier to tailor to specific needs and capacity and to develop standardised methods or tools if the selected target market is more homogenous. An energy efficiency handbook for hotels run by SMEs will be more useful than a more generic guide. An overview of typical energy efficiency opportunities in the brick-manufacturing sector will be more relevant to SMEs in this sector than case studies from other manufacturing sectors. Small enterprises

may have less time and resources to engage in energy efficiency than medium-sized enterprises, so programmes for them could include additional support mechanisms and more streamlined processes.

The diversity of SMEs demands careful consideration of factors that may influence their access to and interest in efficiency improvements. These include:

- number of employees
- sector
- energy intensity of operations
- proportion of energy costs relative to other production costs
- past experience with energy efficiency
- geographical location
- energy supply context (e.g. changing cost of energy, supply disruptions)
- ownership structures (e.g. family-owned, private shareholders, publicly listed)
- position in the supply chain (e.g. intermediate or customer-facing).

Identify the target market's energy use trends and energy efficiency barriers

When the target market has been identified, data need to be collected that are specific to that market's energy use patterns and consumption, such as energy consumption and costs by SMEs overall, and by sector; potential energy efficiency improvements by sector; and estimated energy cost savings.

Data sources are rarely complete. The planning process may highlight the need for improved data on energy use among SMEs. Pilot audits can help address data gaps and stakeholder consultations can provide estimates to use as a basis for further calculations.

Box 4

Using assessments to understand scale and scope

The US Department of Energy's Industrial Assessment Centres, housed in 24 universities across the United States, assess industrial plant energy efficiency improvements, waste minimisation, pollution prevention and productivity improvement. A university-based team conducts the initial survey of the plant, performing a detailed analysis and follow-up regarding implementation. SME manufacturers can receive a no-cost assessment. The programme has been operating for 35 years and now has a database of over 16 000 assessments and over 100 000 recommendations.

The database can provide insights into energy efficiency potential and benefits in many sectors. Each assessment collects a wide range of data, including an establishment's physical size, number of employees, annual sales and production hours. The assessments also report on energy consumption in physical units and US dollars. For each recommendation, detailed information has been compiled, including the type of technology addressed by the recommendation, the rate of implementation, the cost and potential savings, and the actual savings made.

Source: http://energy.gov/eere/amo/industrial-assessment-centers-iacs.

It is essential to assess the particular barriers facing each target market, taking into consideration factors such as company size, type of activity (manufacturing, services or agriculture), sector, energy intensity, energy supply issues and ownership structures. Identifying specific challenges

will help to frame the rationale for the programme and will help to develop targeted and effective approaches (Box 4).

Taking advantage of existing policies and programmes

Programme designers need to gather information on existing policies and programmes and analyse them for opportunities to cross-promote and co-operate, as well as redundant goals or conflicting goals. Relevant policies and programmes could include other energy efficiency programmes targeting businesses, energy efficiency policies and programmes targeting commercial or industrial buildings, environmental reporting requirements, policies or programmes aimed at reducing greenhouse gases, equipment replacement programmes, tax rebates for investments in energy-efficient technologies, standards and labelling programmes for commercial and industrial equipment, green credit lines, revolving funds for energy efficiency, and grants for SME business development and innovation (Box 5).

In some countries, several energy efficiency programmes targeting SMEs operate simultaneously. Ensuring co-ordination and the exchange of information and experiences can save resources, help optimise processes, maximise impacts and avoid confusion for the SME sector.

Past energy efficiency programmes can give valuable insights and help identify success factors or pitfalls to be avoided.

Consider the following questions:

- What government policies and programmes target or could be relevant for energy efficiency in SMEs?
- To what extent are SMEs accessing these programmes?
- What unique contribution can a new programme make?
- Which geographical areas and sectors do other programmes serve?
- What approaches do they use?
- What support do they provide?
- What are the energy efficiency outcomes?
- Do all sectors and geographical regions have access to these interventions?
- Which design and implementation features have proven effective or ineffective among these programmes?

Answering the questions above may reveal whether high-level policy issues are preventing SMEs from adopting energy efficiency projects. If such barriers exist, then programmes can aim to work with and provide advice to relevant governments or agencies on how to reduce constraints presented by legal and regulatory environments.

Existing programmes that promote SME competitiveness or innovation should be examined to assess whether or not they are exploiting opportunities to improve energy efficiency. There could be opportunities to add an energy efficiency component that could deliver a broader package of benefits to the target market. If an existing programme aims at businesses of all sizes, it is worth investigating whether SMEs are aware of the programme and are participating. Use of existing grants, financing or market-based mechanisms could strengthen the impact of planned programme and establishing links with these could save resources.

Building on the networks of existing programmes or developing joint initiatives could also be a way to save resources. Reviewing existing and past programmes can help to identify gaps and niches as well as successful aspects that can be replicated.

Box 5 *Surveying existing policies and programmes in India*

Plotting the location of target industries, and the reach of existing energy efficiency programmes, can reveal where the greatest potential lies. In India, international donors and national, regional and local governments have launched a variety of interventions to improve the energy efficiency of SMEs. This table illustrates the clustering of energy-intensive industries, and notes which agencies are currently engaged with those industries. This survey work guided the Indian government's selection of industrial SME sectors and geographical areas for future energy efficiency interventions. It has also been useful in discussions with other agencies seeking to maximise their interventions. The research was conducted for the World Bank by a team at the Institute for Industrial Productivity in India with the support of Winrock International.

Region	Type of cluster
Andhra	●●●●●●●●●✚◆◆◆
Assam	●●●■
Bihar	●●★
Goa	✚
Gujarat	●●●✚✚✚✚◆◆◆◆◆◆◆◆◆★
Haryana	✚●●●●●◆
Himachal	●
Jharkhand	●●
Karnataka	●●◆◆◆★■
Kerala	●●▲◆▲
Madhya	●✚✚✚◆
Maharashtra	●●●●●●●●✚◆◆◆◆
Odisha	●●●
Punjab	●◆
Rajasthan	◆◆●■
Tamil Nadu	✚✚●●●◆◆◆◆◆★■
Uttar Pradesh	●◆◆◆◆◆■■
Uttarakhand	●●
West Bengal	●✚◆

Legend	
● Auto component	NSIC, SIDO, SBI Uptech, UNIDO
● Food processing	AP Govt/UNIDO, SIDBI, NSIC, NABARD
● Rice mill	SBI Uptech, SIDO, UNIDO, BEE
● Oil mill	BEE, SIDBI
● Brass	SIDO, NABARD, SBI Uptech, NSIC/BEE/Gujarat Govt/UNIDO
● Steel utensils	SIDO, SIDBI
● Steel re-rolling	Gujarat Govt
● Foundry	BEE, SIDO/SBI Uptech, WB-GEF, NSIC, AP Govt/UNIDO, SIDBI
● Forging	WB-GEF
▲ Rubber	SIDO/UNIDO
▲ Coir	SBI/UNIDO/BEE
◆ Glass and ceramics	NABARD, SIDO, NSIC/ BEE, Gujarat Govt/UNIDO
✚ Engineering	DST/UNIDO, NSIC, Gujarat Govt, WB-GEF
✚ Pharma and chemicals	BEE, NSIC, WB-GEF, SIDO
★ Leather	UNIDO, NABARD
◆ Textile	Textiles Committee, Gujarat Govt, BEE, UNIDO, SIDBI, SIDO
■ Tea	BEE
■ Paper	BEE
■ Brick	BEE
◆ Dairy	BEE
■ Machine tools	BEE
■ Limekiln	BEE, WB-GEF

Source: Institute for Industrial Productivity in India (2014).

The initial mapping process should be supplemented during the implementation phase as part of ongoing monitoring, as new policies and programmes may be launched during the course of programme implementation. These changes may provide new opportunities for synergies and partnerships, or they may create additional barriers or complexities that need to be addressed.

❷ *Consult with stakeholders*

As well as consulting with SMEs themselves and their energy providers, programme designers should consult with stakeholders such as business associations, corporations, energy service companies, finance institutions, and suppliers of energy-efficient technology and equipment. A systematic approach to identifying stakeholders is essential to establish a broad base of support and obtain information about SME needs and constraints. Once all of the key stakeholders have been identified, programme designers should consider the best way of soliciting their input: meetings, surveys, workshops or focus groups. Initial consultations might range widely to identify:

- challenges and barriers
- programme components most likely to be effective
- examples of successful energy efficiency practice in SMEs, and the reasons for success
- opportunities for stakeholders to co-operate
- existing resources that could be leveraged.

While surveys are efficient, the interactive nature of focus groups and workshops can produce valuable insights. By sharing their perspectives, SMEs and other stakeholders may identify barriers and design solutions (Box 6). Stakeholders should be consulted regularly as part of the implementation and monitoring process.

Box 6 ***Engaging with stakeholders***

Cost-effective consultation process in Mongolia

Consulting with stakeholders does not necessarily require huge effort and resources. For example, the Mongolian Ministry of Energy, supported by German aid agency GIZ, avoided the difficulties that travel posed both for themselves and targeted stakeholders by using a telephone survey to solicit input from SMEs. A high response rate was ensured by collaborating with electric utilities, taking advantage of their existing relationships with SMEs. Utilities promoted the survey and joined forces with local universities to conduct telephone interviews (Crittenden, 2013; Ernedal and Gombosuren, 2011).

❸ *Design the programme*

The success of an energy efficiency programme relies on selecting and deploying the right components to help SMEs overcome barriers to efficiency. Successful programmes typically deliver three kinds of components:

- **Information components** introduce SMEs to available technologies, and the costs and benefits associated with their implementation.
- **Expertise-building components** are necessary because SMEs may lack internal expertise to identify, select, and implement energy efficiency projects. These skills must be taught or provided by external parties, such as consultants, equipment providers and financial institutions).
- **Financing components** improve SMEs' access to the capital required to purchase more energy-efficient equipment or to implement energy efficiency projects.

As a minimum, a programme should aim to provide information and build expertise. Access to financing should be included if that is a significant barrier for the target group. Alternatively, one or all of the components may be added to an existing policy or programme.

Information components

Many SMEs do not have a clear idea of how much energy they use, which processes are energy intensive and which equipment uses a lot of energy. SMEs often lack time to research energy efficiency opportunities and may lack the expertise to assess which information is useable or reliable. Available efficiency information – for example information targeted at large companies – may not be adapted to the needs of SMEs.

Information for SMEs should be targeted at the right person (Box 7). SME owners or general managers make decisions about what to do and what to invest in; if the owner or general manager is not on board, the company will not be receptive to any further information. After the owner or manager has been engaged, more detailed and technical information may be needed for other staff. Information that is of value includes:

- How much energy the SME is using, preferably in disaggregated form (how much for different processes or how much for heating and lighting, for example).
- How much the SME is paying for energy.
- What are the energy efficiency opportunities (based on an audit or at least on sectoral best practices).
- How much could the SME save (based on an audit or on benchmarks), preferably presented in terms of how much money it is losing on a monthly/annual basis for unnecessary energy use.
- What other benefits energy efficiency measures could deliver. Information on the strategic and operational benefits, in particular, can motivate further investigation.
- How the SME compares with other SMEs in the same sector.

Box 7 *Effective targeting and tailoring*

Delivering tailored energy efficiency information to the SME sector, which is composed of a large number of small heterogeneous units with differing needs and abilities, can be a daunting task. However, there are ways to effectively tailor information to groups of companies.

For several of its programmes, the United Nations Industrial Development Organization (UNIDO) has developed a package of standard tools with options that can be added depending on the programme's geographical scope, cultural and economic background, sector, purpose and aim. UNIDO's Resource Efficiency and Cleaner Production programme, for example, has several standard modules that can be combined for each project depending on the needs. This allows UNIDO to customise the project while ensuring the quality of each intervention by using well established and proven tools, as well as maintaining consistency.

Another option for tailoring information is to target industrial clusters. In India, many SME operations have emerged in natural clusters, based around local resources. A cluster may be defined as a local agglomeration of enterprises producing and selling related or complementary products and services. There are about 350 such clusters in India. The size in terms of the number of units and the quantity of output of these clusters vary significantly. Within each cluster, however, there is a high degree of similarity across units in the level of technology being employed, operating practices and even trade practices. This homogeneity creates opportunities to develop standardised approaches to stimulating energy efficiency; improvements demonstrated in one unit can be easily replicated in other units and mainstreamed within the cluster.

Sources: www.unido.org/cp.html; www.clusterobservatory.in.

After SMEs are informed about the strategic and operational benefits of energy efficiency, they then require more detailed information about the costs and benefits of potential projects in their own facilities. Accessible handbooks and checklists can provide information such as guidance on how to develop project specifications and how to decide between competing solutions (Table 4).

When developing an information component, it is important to determine not only what kind of information but also how it should be delivered; possibilities include programme websites, promotional material, and public events and presentations. Case studies, showing how other companies exploited the benefits of energy efficiency, are an effective form of information. These should be as relevant as possible to the circumstances of the SME target group in order to demonstrate to SME managers that the investment of their time and effort is worthwhile. Given SMEs' time constraints, it may be better to offer shorter, more factual information rather than theoretical texts, and oral information rather than manuals. Shorter meetings might get a better attendance than long workshops. SMEs' schedules should also be considered. Information campaigns for agricultural SMEs during harvesting season, for example, may not draw much notice.

It is vital that information be delivered by trusted sources, as lack of trust prevents the uptake of advice on energy efficiency (Never, 2015). Information from industry associations, for example,

has a bigger impact than information from consultants. Trust in products or vendors can be decisive to the uptake of new goods and services (Never, 2015). People tend to respond best when approached by a peer whom they can trust and comprehend (Fuller et al., 2010).

Table 3 Tailoring information to SME needs

The question:	*The information to deliver:*
Why should an SME participate in an energy efficiency programme?	The strategic and operational business benefits of energy efficiency can be conveyed through case studies and relevant industry data
Where does an individual SME consume energy, and how much does that energy cost?	A quick survey or checklist can outline the amount and location of energy consumption costs in a facility
How can an SME determine which energy efficiency projects would deliver the biggest benefit for the smallest cost?	An energy audit can provide an estimate of the potential savings and prioritise the projects that are likely to deliver the most benefit
How can an SME determine the costs, benefits and risks associated with a specific efficiency project?	Specialist investigations can reveal the options available, and the costs, benefits and risks associated with each
How can an SME pay for an efficiency improvement project?	SMEs often need an introduction to the innovative financing options that may be available to them
How can an SME tell if the project is successful?	Once implemented, a project should be monitored to document the benefits, and to fine-tune for maximum benefits

One of the most common types of detailed information offered by efficiency programmes is a formal energy audit. Typically conducted by a consultant, the audit produces a detailed picture of one facility's potential for energy savings. It may also estimate the costs and benefits of specific interventions. In an energy audit component, it is important to consider:

- the extent to which the energy audit cost will be subsidised for SMEs
- the depth of investigation to be provided through an energy audit
- whether or not accredited energy auditors should be used.

Capacity building measures

Internal capacity building

SMEs often have limited internal expertise on energy efficiency and limited staff resources, so it is essential to help them build expertise – and to help external advisors acquire and supply expertise. The skills needed to launch an energy efficiency project are extensive. Each phase requires distinct skills: conceiving and identifying a project;

selecting and designing a solution; and installation and monitoring. And all phases require active management: project planning and management; communication planning and implementation; understanding energy use across a facility; identifying potential opportunities; establishing costs, benefits and risks for specific projects; assessing business case proposals; identifying and obtaining finance; and monitoring and verifying project outcomes (Lund et al., 2010).

Measures that can be used to build internal expertise include written materials, workshops, education courses and training, on-site training, online training, and capacity building by doing, such as participation in energy audits (Box 8).

Specific skills-building components of an energy efficiency programme will vary according to stakeholders' needs. For example, SMEs are unlikely to be able to justify attending at a lengthy training course. Short, focused training sessions are more likely to be effective. Nevertheless, a training course where managers meet to share experiences and learn from each another is valuable. Similarly, components that cross-train participants in other areas of business, such as financial literacy or improved operational understanding, deliver extra value to SMEs.

Box 8 ***Building a network of support***

Networks in Switzerland and Germany

In 1987 Switzerland founded an Energy Efficiency Network (EEN), which enables 10-15 regionally based large companies and SMEs from different sectors to share their experiences in moderated meetings. After a company survey, participants decided on a joint energy efficiency and CO_2 reduction target over three to four years. There are currently 70 energy efficiency networks involving 2 000 companies. In 2002, the concept was exported to Germany. After a pilot phase in one region, a programme to set up 30 networks was established, funded by the German Federal Foundation, two federal states and three private companies. Participating companies reduced their energy demand by twice the national average rate. There are plans to expand the number of networks to 600-700 by 2020 (Koewener et al., 2014).

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 programme 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 neighbourhood 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 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 programme. The programme is offered in 30 countries and there are currently 4 000 energy managers in the network. Trainers deliver standardised 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.

Source: http://eurem.net.

External capacity building

Few SMEs can muster from within their own walls all the expertise they require for increasing energy efficiency. Similarly, few SMEs can support a dedicated manager or department to oversee energy-related initiatives; they typically rely on outside stakeholders, such as specialist consultants, equipment providers and financial institutions. So energy efficiency programmes need to ensure that these external stakeholders have the necessary expertise.

Equipment and service providers, for example, may have insufficient knowledge of energy efficiency issues, so the design of a training component should address both SMEs and their providers. The quality of an equipment installation can significantly affect energy savings, so it makes sense to train equipment providers and installers to optimise energy efficiency.

The quality of audits or other types of energy services is an important success factor. Poorly performed audits can damage the reputation of a programme and discourage enterprises from engaging in energy efficiency. If there is a lack of auditors or auditors require further training, programmes could include capacity building for auditors or consultants.

Financial stakeholders may require new expertise for dealing with SME energy efficiency (Box 9). Energy efficiency projects differ from mainstream investment projects in that they are cost savings projects not revenue generating projects. Banks are still relatively unfamiliar with cost savings projects. Energy efficiency projects also often consist of a range of smaller investments rather than a big investment in one piece of machinery. It can be difficult to find collateral for loans for energy efficiency projects and to calculate and verify energy savings. Financial institutions often perceive

SMEs as less transparent and more likely to default than larger companies. SMEs are typically too small to absorb the fixed costs associated with debt issuance in the financial market.

For all these reasons, capacity building for local financial institutions is increasingly seen as a pre-requisite to ensure the availability of appropriate financial products for SME energy efficiency projects. For example, the EBRD Sustainable Energy Financing Facility (SEFF) provides dedicated training and capacity building for staff in local financial institutions (EBRD, 2014a). This includes:

- how to promote new sustainable energy products
- how to recognise eligible projects
- marketing the benefits of the finance programme
- creating standards for environmental and social due diligence
- encouraging clients to originate investment opportunities.

Programmes can facilitate access to external expertise by providing grants or partial cost-coverage to engage experts to help develop energy efficiency projects and applications for financing.

Box 9

Building finance sector skills in China

Building on a programme 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 programme 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 programme 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 tonnes annually. In the first year of operation, the programme 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).

Financing components

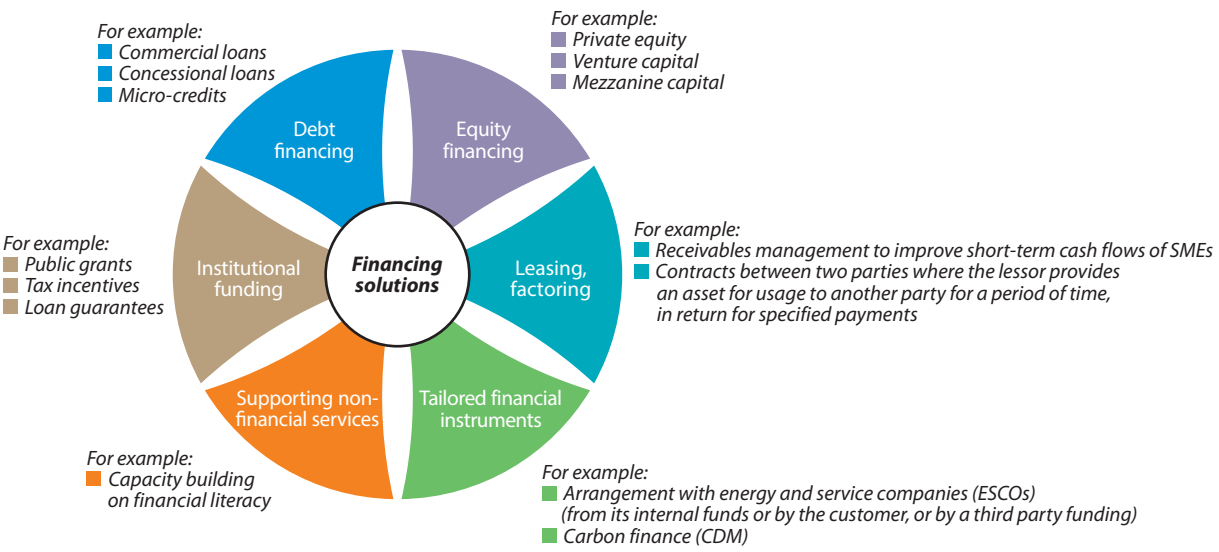
Unless SMEs have access to the financial resources they need to purchase, install and operate new equipment, effective and profitable efficiency opportunities will go unexploited. The finance landscape is complex and diverse (IEA, 2014a), and a number of interrelated barriers confront SMEs.

Within the walls of SMEs themselves, working capital is dedicated to daily administration and production costs such as payroll, rent, water and energy. With many short-term needs, SMEs are less likely to invest in projects with a medium-term return (more than two years). What is more, they may view the added expense of a loan repayment with caution. And the debt an SME incurs for energy efficiency may reduce its ability to acquire future loans that it might need to support its core business.

From the perspective of financial institutions, energy efficiency investments typically do not generate additional revenue for the SME applicant. Although they do yield operational savings, financiers may struggle to demonstrate how future savings can justify a loan. This can lead to a higher interest rate or outright rejection of a loan application. These challenges have led both governments and financial institutions to develop a spectrum of alternative financing options (see Figure 2, Table 5 and Box 10).

In some cases, it can make sense to combine different financial instruments or to use different instruments for different sub-segments, for example, grants for small enterprises and preferential loans for medium-sized enterprises.

Figure 2 The spectrum of financing solutions for SMEs



Source: Mueller and Tuncer (2013).

Table 4 Financing options for SME energy efficiency

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 underperformance risk (Global Innovation Lab for Climate Finance, 2015).
Grants	Grants may offer capital for projects that SMEs could not otherwise finance. 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 schemes	Like emissions trading systems, these are market-based systems 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	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).

Box 10 *Examples 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 programme 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 programme. The latest evaluation (2010-11) found that the programme had delivered lifetime benefits to customers of over 40 000 tonnes of carbon dioxide (tCO_2) 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 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).

❹ *Engage partners and source funding, staffing and other resources*

Building effective partnerships

Given the large number and diversity of SMEs, successful energy efficiency programmes typically feature several organisations working together throughout the process from programme design through implementation. For example, industry associations can use their existing relationships and activities with SMEs to deliver information and skills. Governments can bring stakeholders together and manage programme development. Other stakeholders, such as financial institutions, can provide expert perspectives and develop strategies to overcome specific barriers that may limit SME participation in energy efficiency opportunities.

Potential programme partners

Government ministries, departments or agencies tasked with energy efficiency are key stakeholders. They have expertise in the area of energy efficiency and typically play a key role in engaging other stakeholders and initiating and administrating programmes.

Other government entities or agencies with interests in an energy efficiency programme vary based on their policy objectives. For example, an environment department may focus on environmental outcomes, while an industry department may prioritise industrial growth. Government entities tasked with SME growth and development may have a better insight into SME needs and better contact networks and communication channels. A clear case for how energy efficiency can help support business sector development or economic growth may be needed to effectively engage them in energy efficiency programmes.

Local governments are interested in stimulating business development in their regions or cities, reducing environmental impacts and reaching energy savings targets. They often have closer

ties to SMEs than central governments and can be better placed to engage SMEs or other stakeholders in their regions.

Industry and business associations include sectoral organisations – for example, associations of tourism companies – and general associations, such as chambers of commerce and SME associations. They have an interest in supporting their members and offer valuable networks and knowledge of SME needs. They are typically considered a source of trusted information.

Energy utilities and other energy providers may use efficiency programmes to build customer relationships, establish value-added services, address energy supply constraints such as peak demand, or meet legislative obligations. In some countries, energy utilities are tasked with the development and delivery of energy efficiency programmes and have set energy savings targets.

Financial institutions may wish to offer additional services to existing customers or create new markets for financial services, such as specialised loans. Financial institutions can be instrumental in developing and delivering a programme's financing components.

Corporations can use energy efficiency programmes to improve relationships, reduce risk along their supply chains, reduce costs and meet environmental commitments. They have existing relationships and contact channels with the SMEs

in their supply chains. As large organisations are increasingly engaging in energy efficiency, they can also provide expertise and valuable experience.

International initiatives, such as the Global Superior Energy Performance Partnership (GSEP) and the Energy Management Action Network (EMAK), can leverage international networks of experts to enhance the design and implementation of SME energy efficiency programmes.

Development organisations and development banks can use their existing networks and expertise to promote energy efficiency programmes that ultimately help to advance other economic, social and environmental goals.

Equipment and service providers are motivated to promote and participate in SME programmes when they see the potential for increased sales of equipment or other benefits for their own business objectives. When these providers are themselves SMEs, their involvement can further stimulate SME segment growth and development.

Education and research institutions can make skilled professionals available to SMEs, which may lack the skills and knowledge required to improve energy efficiency.

Obtaining the necessary funding, staffing and other resources

Launching and implementing an energy efficiency programme can require significant time, funds and expertise. Even after implementation, a programme demands regular review and reporting to monitor progress and guide future work. The process of estimating programme costs will often lead to adjustments in the programme components as the cost of subsidies and other supports becomes clear; these adjustments to balance a programme's mission and its fiscal prudence can be challenging.

There are three broad types of resources to consider: institutional, financial and technical.

1. Institutional resources

These are the resources required to administer and promote the programme, including liaison between the stakeholders and regular reporting on progress to the funding bodies. A clear governance model will ensure that institutional resources are used efficiently. It is important to consider:

- who will make final decisions
- how key programme stakeholders will contribute to the programme design
- what processes will ensure that effective decisions are made.

A programme framework can be a useful tool in assessing the need for institutional resources and managing them throughout the duration of the programme. The framework establishes governance and decision-making processes. This is particularly important when a number of stakeholders are involved. Therefore the framework should outline:

- roles and responsibilities of each partner organisation and its staff
- the process by which decisions will be made
- who will participate in those decisions
- communication protocols through which partners will be informed of issues and developments.

The framework should also include an action plan detailing:

- time-frames for the delivery of each programme component
- accountability for the delivery of each component
- the timing and method of monitoring and evaluation.

2. Financial resources

Several costs need to be considered when

developing a programme. As well as subsidies or grants the programme might provide to SMEs, these costs typically include costs for staff, external experts, information and training materials, workshops and information dissemination.

In terms of the larger cost item – subsidies or grants – options include:

- partial subsidisation of an SME's cost
- full subsidisation from a single organisation such as a government department
- shared support from a range of stakeholders with an interest in programme outcomes.

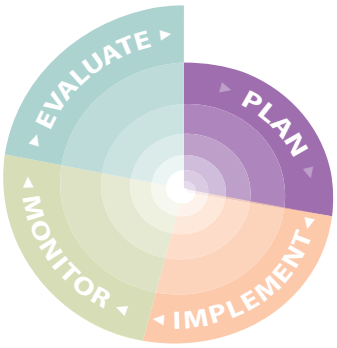
User-based charging, where SMEs pay a participation fee, is are an interesting option. Such charges can be a barrier to SME participation, but if the fees are reasonable and are considered good value, they can create buy-in from the SMEs and inspire completion of a project.

Because SME energy efficiency programmes deliver results over the medium-term, it is ideal to secure funding for a number of years. A well-developed programme rationale can help source funding and engage partners.

3. Technical resources

Technical resources encompass technical experts – energy efficiency consultants, auditors, educators and trainers – as well as equipment and technology. From a programme perspective, it is important to make sure that sufficient technical experts are available and can deliver services of high quality, and to consider how technical experts will be selected. Technical experts may need additional training.

While it is not possible to assess the availability of all types of technologies and equipment that might be needed, programme designers should check whether there are any barriers to accessing necessary technologies. In some cases, programmes are linked to technology transfer projects.



IMPLEMENT

5 *Pilot the programme*

Implementing a small-scale version before the rollout of a full programme is a key step. Whether this involves a subset of the target SMEs, or a subset of programme components, it will highlight shortcomings and allow for adjustments. Piloting also enables the development of tools and approaches that can be used in subsequent implementation (Box 11). Case studies and testimonials from pilot participants can also help attract new participants and partners.

If the resources and timeframe do not allow for a piloting phase, stakeholder consultation can be used to get insights on how to combine programme components and help identify tools and mechanisms that would contribute to programme success.

Box 11 *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 programme 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 to 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 finalised 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 kilotonnes of oil equivalent (ktoe) per year in primary energy savings
- 100 $ktCO_2$/year reduction in GHG emissions.

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

6 *Launch the programme*

SMEs' diversity and geographic dispersion can make it difficult first to identify all of the candidates for a programme, and then to maintain communication with them. Therefore, it is vital to communicate with SMEs and other stakeholders in a systematic way.

Start by learning how the target group currently receives information:

- Where do they access information?
- Whom do they trust in relation to technical and business issues?
- Which communication channels are likely to be the most effective?

Consider the timing of communication. Industries with a seasonal rhythm can devote more time to communication that arrives during a quiet period. Consider language barriers as well, which may occur in a small organisation. For example, when the Community Migrant Resource Centre in Western Sydney, Australia, promoted its 3E Project of energy efficiency and free energy audits, it published its fact sheets in seven languages.

A public programme launch is an opportunity to raise awareness of the programme and its goals. The style of a launch will vary with the size and scope of the programme and its partners (Box 12). It may include a suite of communication activities such as:

- official announcements from senior government or business leaders
- presentations by SMEs that have already benefited from energy efficiency improvements
- presentations of positive news stories for mainstream and social media.

Consider filming the launch as a live webinar or recording it for future promotional use. Encourage SMEs to participate in the launch.

Ensure that SMEs can easily access the programme and quickly reap benefits. SMEs and other stakeholders need easy access to information about a programme, including:

- why the programme has been initiated and its objectives
- what it offers SMEs
- SME eligibility criteria
- how SMEs and other stakeholders can participate.

Linking energy efficiency to concrete business benefits, such as improved product quality or productivity, will attract more interest and participation, both from SMEs and from their financiers. This approach is particularly effective when the activities also deliver core business improvements.

Benefits might include: lower energy costs; less vulnerability to energy supply disruptions, resulting in higher product quality and productivity; compliance with government regulations regarding energy efficiency or environmental requirements; more attractive status as a supplier in a supply chain where larger corporations prefer suppliers that can help them reduce costs, and meet their corporate sustainability commitments.

A comprehensive website is a key, because it makes information available whenever an SME's schedule permits. Other communication initiatives might include information seminars, webinars, and promotion through industry associations and other organisations with established communication channels.

Box 12 ***Raising programme awareness***

Using a variety of tools to reach their audience in South Africa

In 2013, South Africa's National Business Initiative (NBI) launched the Private Sector Energy Efficiency (PSEE) programme with USD 13.5 million in support from the UK government. Small companies are offered free practical advice on no-cost measures, and medium-sized companies are offered free four-day on-site surveys and audits. Large companies can receive in-depth energy consultancy services subsidised by 60% (NBI, 2013). The programme has worked with 3 000 small businesses, and savings of about 20% of energy costs have been identified (NBI, 2015). NBI raises awareness of the programme via a website, regular workshops, case studies, programme marketing materials (including advertisements), and a regular newsletter that reports on progress.

Source: www.psee.org.za/.

Promoting existing programmes in Europe

Euratex, the European Apparel and Textile Confederation, launched the Energy Made to Measure communications campaign in 2014. The campaign does not create programmes but instead researches and presents existing energy efficiency resources to its membership. This improves the reach of existing programmes and simplifies SMEs' access to the support they need.

Energy Made to Measure organised 21 public events in seven countries in 2014. These events cross-promoted existing programmes, including the Sustainable Energy Saving for the European Clothing Industry platform, and the projects ARTISAN and Save Energy in Textile SMEs.

Source: www.euratex.eu/em2m.

❼ *Manage the implementation process*

Continuously ensure that the programme meets the needs of SMEs

Even when support and resources are readily available, it can be difficult to engage SMEs in energy efficiency programmes. SMEs have limited resources, they need to focus on keeping the enterprise running on a day-to-day basis and they do not typically have the advantage of being able to assign responsibility for energy efficiency issues to anyone as a full or even part-time responsibility. Successful programmes build awareness among SMEs over time, ensuring sufficient and easy to access information about how to participate, criteria and what is expected of participating enterprises. They also make it as easy as possible for SMEs to access the assistance they need, from selection of a project through financing and implementation. Use networks to promote the programme, and encourage peer-to-peer learning (Box 13). One of the most credible sources of information for SMEs can be other SMEs: peer-to-peer networks permit SMEs to learn from one another.

It may be tempting to try to get as much data and information from SMEs as possible to better understand opportunities, provide support and report on results. This can backfire, however, deterring SMEs from participating, if sufficient efforts are not made to build trust and engage partners that already have the trust of SMEs. Efforts to make application processes as comprehensive

as possible can also backfire, as SMEs have limited time and resources to spend on filling out bureaucratic forms.

While for larger enterprises it may be sufficient to provide information, tools and incentives for them to start managing their energy, SMEs need more support throughout the process. There is a high risk that SMEs will opt out if any of the programme steps requires too much effort, time or other resources. Support should be adjusted to the situation of SMEs. Mechanisms that can be helpful are site visits, information or technical guidance hotlines, online guidance (easy to navigate), online reporting forms (easy to use) and access to technical support whenever needed.

Box 13

Streamlining reporting requirements and working with vendors

The Energy Trust of Oregon (ETO)'s Small Industrial Energy Users Programme, established in 2008, sought to avoid an overly bureaucratic application process and burdensome reporting requirements. ETO developed a new class of "calculated savings" incentives, which fall between prescriptive incentives that offer a set amount based on installing certain equipment, and custom incentives that require detailed engineering calculations to identify technical solutions, costs and projected energy savings. ETO staff identified typical energy efficiency measures (such as variable speed drives or air compressors) and developed templates of the analyses that could be applied to many future projects by using site-specific data. This method improved the confidence of savings estimates over prescriptive measures with deemed savings. At the same time, it avoided the detailed analysis and one-on-one assistance that is required for custom measures.

ETO served so many SME customers that programme staff could not reach out to them directly. They decided to make use of a network of trade allies made up of equipment vendors. Vendors already have expertise in the equipment they sell and install, and in many cases they have existing relationships with customers. Furthermore, when equipment at a plant breaks, plant managers often call those same vendors to get an immediate solution and vendors involved in the programme can promote energy-efficient solutions that may otherwise not have been considered. ETO estimates that the programme has been responsible for over 16 million kWh in savings (Trombley, 2014).

Ensure that programme components reinforce each other

Information, expertise-building and financing components alone do not suffice to build an efficiency programme. A package of all three components is critical, as they reinforce each other. Information is needed on where to find external expertise and where to access appropriate finance. While energy audits provide information, they also build in-house expertise. Interpreting audit reports may require additional capacity building and training. Capacity building may also be needed to develop bankable projects. Financial institutions may need information about SMEs and energy efficiency and capacity building to work with SMEs on energy efficiency.

There are large variations among SMEs and their needs for information and expertise vary. There are also large variations in the size of investments needed and the ability to source internal and

external finance. SMEs' experience with energy efficiency projects also varies: some may have implemented no measures, while others may have already started implementing measures. Depending on the composition of the selected target market, there may be a need to differentiate offerings to better cater to these differing needs.

Just providing information to SMEs rarely results in the implementation of energy efficiency. For instance, audits can help motivate SMEs to engage in energy efficiency, especially if they also provide information on other benefits, but without sufficient internal expertise or access to external expertise, they will most likely not progress far. Information coupled with expertise building improves the likelihood of project implementation, particularly if the programme ensures access to external expertise (Box 14). However, if the identified options require investment, it is unlikely that they will be implemented without access to suitable financial products.

Box 14 *Energy audits and access to funding*

Sweden

In Sweden, several municipalities joined forces in 2006 in Project Highland to offer energy audits for SMEs. This resulted in 340 two-day energy audits in six municipalities. The measures focused primarily on support functions, such as lighting and space heating, rather than on core production processes.

The implementation rate of recommendations was about 40%. Energy savings were around 75 725 MWh per year. In addition, the energy audits from the evaluated companies resulted in energy conversions to district heating (22 GWh) and on-site biofuel boilers (3 GWh). Energy savings per private capital were 7.5 kWh/EUR.

Companies surveyed after the programme said it was easier to receive funding when having an audit report to rely on. Presenting the identified opportunities in economic terms (saved EUR per year) and including investment assessments were key factors for increasing the adoption rate (Price and Lu, 2011; Karlsson, 2012).

Germany

In Germany, the Special Fund for Energy Efficiency, first implemented in 2008 through the government-owned development bank KfW, provides grants for SMEs to obtain advice and consultation. Audits are split into "initial" and "in-depth"; 80% of the initial audit fee and 60% of the in-depth audit fee can be covered by a grant (up to an upper limit). The programme is administered by the Federal Office for Economic Affairs and Export Control (BAFA).

There was a high implementation rate of audit recommendations and 5 000 audits were conducted each year. Energy savings were around 1.4 terawatt hours (TWh) per year, equating to around EUR 80 million in energy cost savings. CO_2 savings were 470 000 tCO_2 from a total programme investment of EUR 480 million. Programme costs were EUR 0.5-0.7/MWh energy saved and EUR 0.03-0.06 per euro of investment induced.

The key success factors were the availability of sufficiently high subsidies to encourage SMEs to participate and the SMEs' own low expenses. Furthermore, delegating responsibilities to regional partners was important, particularly in terms of personal communication between the regional partners and SMEs. The high quality of the energy audits was also cited as a success factor (Gruber et al., 2011).

Sustain results

Successful energy efficiency programmes motivate SMEs to continue to manage their energy, explore energy efficiency opportunities and invest in energy efficiency. Energy management systems, often seen as more relevant for large enterprises, can be a useful tool for sustaining continuous energy efficiency improvements in SMEs (Box 15). The US Department of Energy (DoE) provides additional support to SMEs to enable them to participate in the Superior Energy Performance (SEP) programme, which aims to stimulate the uptake of the ISO 50001 standard for energy management. A new handbook, *ISO 50001 – A practical guide for SMEs*, a joint initiative of the International Organization for Standardization (ISO), the International Trade Centre (ITC) and UNIDO, shows how SMEs can use energy management systems to achieve continuous energy savings.

Other ways of sustaining continuous energy efficiency improvements are to plan for follow-up audits or to provide incentives such as energy efficiency awards or recognition.

Regular communication of programme progress to participants can also help motivate SMEs to continue to be engaged in the implementation of energy efficiency. Highlighting the achievements of participating companies can be a strong motivator.

Box 15 ***Energy management systems are relevant for SMEs***

Building skills in Hong Kong

The Hong Kong Electronic Industries Association and Hong Kong Productivity Council, with funding from the Singapore government's SME Development Fund, has developed a programme to show that energy management systems are relevant for SMEs. The programme has adapted training designed for large organisations so that SMEs can use the ISO 50001 standard for energy management. The support programme introduces the benefits of energy management and the skills needed for successful implementation. The programme includes a telephone hotline and a subsidised energy review of SME operations. Short seminars explain the main requirements of the ISO 50001 standard. For SMEs that want to go further, a reference guide and training sessions are provided to support companies through the implementation process.

Source: HKEIA (2014).

Energy management in the retail sector in the Netherlands

In the Netherlands, the company Lidl has ISO 50001 certified almost 400 of its branch stores, with about 28 employees per store. The most important motivations were cost reduction and energy awareness within the organisation. A key aim was to enhance the company's reputation. The investments required were moderate: EUR 12 000 for certification and EUR 4 000 for staff training. The training focused on understanding where and how energy is used, and on quickly finding and addressing problems or equipment malfunctions. The process took three months (four days a week of staff time). This was possible because many processes and procedures were already in place and needed only minor modification to make it applicable for ISO 50001.

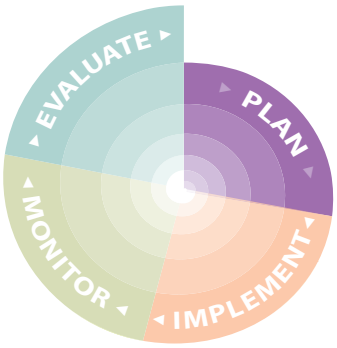
A key success factor was providing training tailored to the skills and needs of non-technical staff. Energy savings have been 5% to 10% on average (with savings on store level up to 30%), largely due to continual attention to the functioning of the system and rapid response to problems. In the future, energy management-related activities could be expanded to the supply chain.

Verify progress and make improvements

Ensuring that all parties are meeting their commitments is an important part of the implementation process. SMEs' obligations, which should be clearly outlined when they join the programme, might include providing access to:

- the facility or site where energy audits and other activities are to be conducted
- data on energy consumption and business operations
- personnel familiar with business operations and potential improvement opportunities
- decision-making personnel for energy efficiency projects.

Another key aspect of the implementation process is making improvements on the basis of monitoring results. A good monitoring system (see next phase) will alert programme managers to problems that need to be dealt with. If the monitoring indicates, for instance, that there is limited participation, programme managers should consult with SMEs to find root causes and re-initiate an adapted and improved recruitment process that pays consideration to the deterrents identified. Monitoring will also help highlight aspects of the programme that are successful and that could be expanded.



MONITOR

Monitoring should be considered as early as the planning stage. It allows results, processes and experiences to be documented and used to steer decision-making and learning processes. An essential part of the monitoring process involves collecting and reviewing data, which provide a quantitative means to measure and verify progress towards meeting programme objectives. The data and information acquired through monitoring can be further used in the evaluation stage of the programme. Monitoring processes need to be realistic relative to the costs involved. SMEs will rarely be interested in putting resources into monitoring and verification beyond their needs. Ensuring that the type of data collected is useful and relevant for participating companies, not just for the programme, will help data acquisition. The costs of obtaining measured, accurate and verified data need to be included in the programme budget. To save time and effort, existing systems for data collection should be reviewed and possibilities for building on these should be explored.

8 *Collect and disseminate data*

Regular monitoring and reporting of results and issues keeps stakeholders informed, allows early detection of problems, and guide adjustments in programme delivery.

What data to gather

Programme objectives will determine how best to measure progress. Establishing what to measure and monitor, and how to do this at an early stage, will help avoid challenges later. Agreeing on the metrics up front is essential, as confusion is common between absolute measures and measures related to output. It is also important to establish clear terms early in the programme development since definitions may vary from one constituency to another. All performance indicators used should be "SMART" (Specific, Measurable, Achievable, Relevant and Time-bound) (IEE, 2013). Indicators will be both quantitative, to understand the energy efficiency opportunities and energy savings made, as well as qualitative, to understand organisation change and the effectiveness of the programme. When considering data required, it is important to consult with participating SMEs and, if needed, establish confidentiality agreements that outline how gathered information can be used and publicised (Table 6). The frequency of data collection should also be considered and efforts should be made not to overburden participating companies with reporting requirements. Reporting requirements should be streamlined and, if possible, existing reporting systems should be used or built on, for example, environmental impact reporting.

Table 5 Energy saving data

Energy project	*Data*
For each potential energy efficiency project	• Fuel source • Estimated energy savings • Estimated investment required to implement • A measure to assess the profitability of the project (such as payback period, net present value, internal rate of return)
For each potential project not implemented	• As above, but with reason for not implementing the project
For each potential project implemented	• As above, but with information on the degree of monitoring, and with verification post-implementation

Information on benefits other than energy savings and costs should also be sought. This will help communicate the value of the programme and its contributions to other policy targets, such as greenhouse gas emission reductions. Data on the effectiveness of different components should also be collected (e.g. number of SMEs participating in workshops, number of downloads of guidance documents on the website). Surveys can be used to get SME feedback on application processes, quality of materials, quality of training and audits, and to gather suggestions for improvements. Project partners should also be queried regarding their experiences and suggestions for improvements.

The collected information should be analysed and discussed with project partners. Indicators can be analysed at different scales: regional and national level, within companies, at the company level, and at the sector or industry-wide level.

The analysis of data and information will reveal both progress and opportunities for improvement. This information can then be used to refine relevant aspects of the programme. The data from the monitoring should be kept, to be utilised for the evaluation phase.

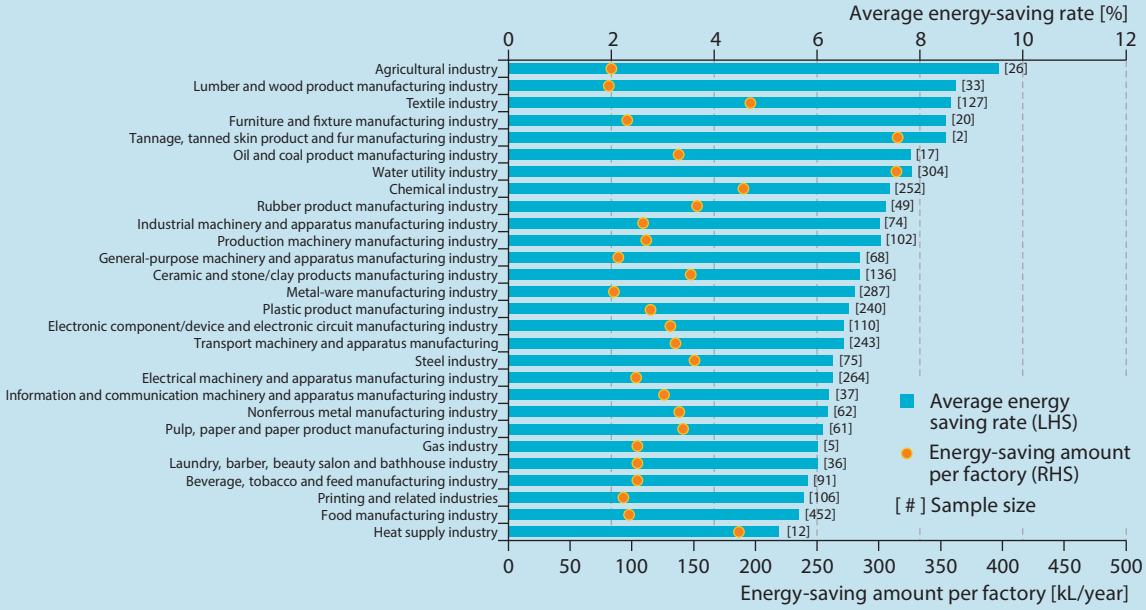
What and how to disseminate

In consultation with stakeholders and partners, the project manager should develop reports in a suitable format for dissemination depending on the target audience. Funding bodies may need a formal mid-term progress report, while information for SMEs could be presented on the website or in a newsletter. Both weaknesses and strengths of the programme should be openly communicated so as to build trust between partners and the programme administrators and SMEs. If participation in the programme is still open, initial results could be used to attract new participants (Box 16). Potential participants are interested in what the benefits have been for companies. Case studies based on participating companies' own accounts of experiences with the programme can be an effective tool in communicating the value of the programme.

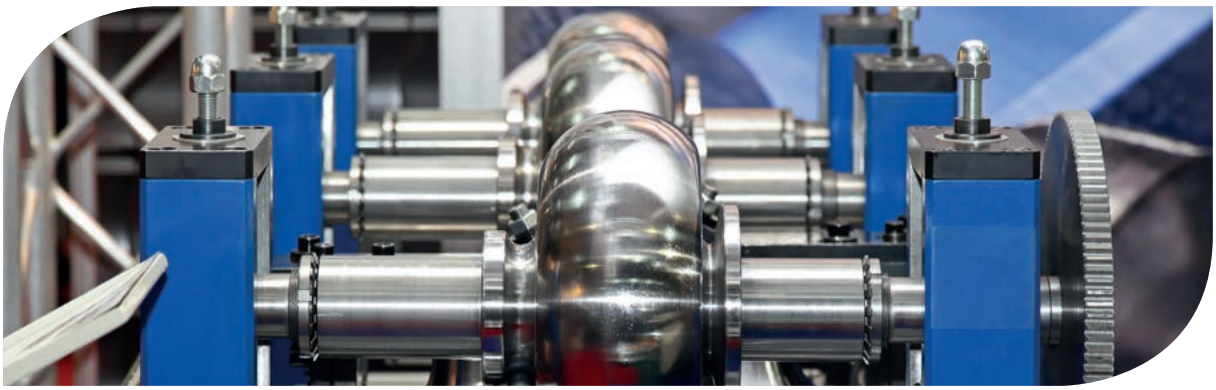
Box 16 *Communicating results in Japan*

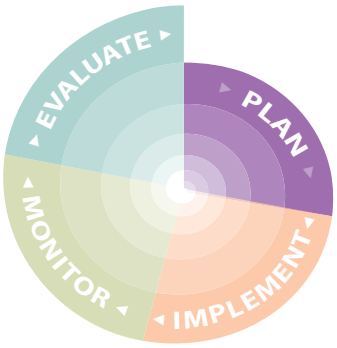
The Japanese Ministry of Economy, Trade and Industry (METI) subsidises energy audits for businesses with an annual energy use exceeding 1 500 kilolitres in crude oil equivalent. The audits are carried out by the non-profit Energy Conservation Centre of Japan (ECCJ), which has no links to equipment or service providers.

ECCJ's impartial role allows it to accumulate data on the results of individual energy-saving projects, which is then published in aggregated form. ECCJ identified an average of 8% energy savings in each business. Follow-up assessments found that around one-third of the potential projects identified have been implemented. This information effectively conveys the value of energy efficiency measures to other businesses across different sectors.



Source: ECCJ.





EVALUATE

Evaluation is the systematic and objective assessment of a completed programme or a phase of an ongoing programme. Evaluations entail collecting and analysing information to inform strategic decisions regarding the direction of the programme or other initiatives.

9 *Evaluate programme impacts*

A programme evaluation provides information that can be used to:

- assess programme impacts
- assess effectiveness of programme measures and instruments
- identify opportunities to improve programme design and delivery
- establish the extent to which a programme's influence is driving future energy efficiency improvements through long-term changes in the marketplace
- establish the cost-effectiveness of the programme.

The evaluation can be used to answer some of the following questions:

- Is the programme achieving its objectives? If so, how and why?
- What changes would improve the programme?
- How does the cost-effectiveness and impact of the programme compare with other programmes?
- Should the programme be replicated, adjusted or cancelled?
- What lessons from the programme could help others to improve the planning and implementation of SME energy efficiency programmes?
- What lessons from the programme could be shared with government policy makers to inform the development of future policies?

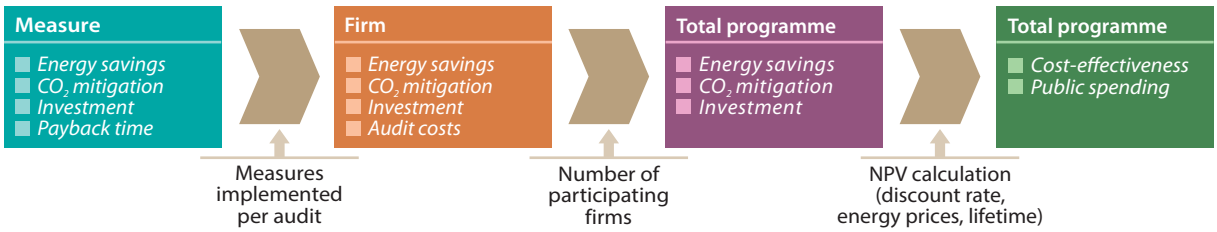
Determine cost-effectiveness

Assessing the cost-effectiveness of a programme is an important part of the evaluation. In its simplest form, energy efficiency cost-effectiveness is measured by comparing the benefits of an investment with the costs (Figure 3). Cost-benefit analysis requires comparing the up-front investment needs with the monetised flows of costs and benefits over a period of time. To make a meaningful comparison of the initial investment with the flow of costs and benefits taking place in the future, these costs and benefits should be discounted using an appropriate discount rate. For a more comprehensive assessment, cost-benefit analysis should be considered together with qualitative analysis of other costs and benefits not monetised in the calculations (Box 17).

Numerous methods can be used to assess cost-effectiveness; frequently a combination of methods will provide the type of information needed. Key considerations include:

- Whose benefits are being considered –the programme participant's or society's?
- What should be included in costs and benefits (avoided energy use, avoided need for new generation and new transmission and distribution, benefits other than energy savings)?
- How should the baseline (starting point with which subsequent changes are compared) be defined?
- What costs and benefits would have been realised without investment in energy efficiency?

Figure 3 One approach to assessing cost-effectiveness



Source: Fleiter et al. (2012).

Box 17 ***Evaluation can demonstrate net benefits***

The Sustainable Energy Authority of Ireland (SEAI) has been implementing an energy efficiency programme targeted at SMEs since 2007, providing assessment, advice and training. An evaluation shows that more than 1 470 companies participated in the programme and reduced their annual energy consumption by around 10%. The cost of saving one kilowatt hour was estimated at USD 0.020 (to 2020) to USD 0.008 (to 2030) compared with an average electricity cost of USD 0.090/kWh, assuming an average lifetime of 12 years for the energy savings measures. The total programme budget in 2010 was USD 1.3 million. The present value of CO_2 and other emissions abated was calculated at USD 44 million in 2020 and over USD 88 million in 2030. It was estimated that almost 1 800 $ktCO_2$ (cumulative) will be abated to 2030, at a net benefit to society of around USD 220 per tonne of CO_2.

After all programme and investment costs were taken in to account, the evaluation estimated the net benefit to society at USD 178 million in 2020, increasing to USD 425 million in 2030, when the lifetime of savings measures is included. Every USD spent by SEAI via the programme delivers a net benefit to society of USD 16.5 to 2020, and USD 36 to 2030 (Scheer and Motherway, 2011).

Define the scope of the evaluation

Although programme managers and other stakeholders might like to evaluate many aspects of a programme, time and resources will impose limits on what is possible. Establishing a clear scope for an evaluation early in the planning process, and allocating the necessary resources, will help. When planning an evaluation, consider:

- What is the most important: programme impacts; programme delivery or changes in the marketplace?
- What evaluation methods will be used?
- Which stakeholders will be included in an evaluation sample and what method of sampling will be used?

A professional evaluation firm can be retained for this task, but the programme must define its needs clearly in order to solicit accurate job quotations.

Gather data to assess programme impact

A framework for gathering data should be established in the planning phase of programme development. This will help to establish a baseline for the programme participants and to encourage them to collect data throughout the implementation process. Data collection can be built into the programme. For example, energy audits establish a baseline that can be updated over time.

Evaluation tools and approaches

Evaluation tools vary in cost and data quality. Typically, using a combination of measures should balance the shortcomings of each, yielding more accurate results (Table 7). While surveys are efficient, the interactive nature of focus groups and workshops can produce unexpected and valuable insights. By sharing their perspectives, SMEs and other stakeholders may identify barriers, craft solutions and improve the participation rate for a particular intervention. Participants may also learn about creative strategies that individual companies have used to improve their energy efficiency. However, with both surveys and focus groups, responses are self-reported, which can introduce biases:

- Participants may focus more strongly on the positives rather than the negatives of their organisation's energy efficiency activities in order to show themselves more positively compared with other organisations.
- Participants may respond based on what they think those conducting the focus groups want to hear.
- Participants may not recall information accurately (memory bias).
- In focus groups, participants may be influenced by the responses of other participants.

Table 6 Evaluation tools

Desktop review, e.g. of energy audit reports or case studies	*Relatively cost-effective.*	*Contribution depends upon the quality and content of reports.*
Survey	An efficient means of obtaining information from a large number of respondents.	Can be difficult to achieve a high response rate (i.e. number of returns relative to number of surveys sent out).
Interview	Provides deeper insights into programme strengths and weaknesses compared to surveys.	Can be resource intensive, and many interviews are required to reduce the risk of bias.
Focus group	The interaction of participants can generate more comprehensive discussion.	Can be resource intensive, and it may be difficult to assemble an appropriate mix of participants.
Case study	Provides an in-depth perspective on the programme from a single SME perspective.	May be biased towards those SMEs where the programme outcomes have been most significant.

When evaluating programmes, energy savings adjustments should be made to account for factors that affect programme performance, such as free riders, rebound effects and ensuring additionality. Free riders are SMEs that would have engaged in energy efficiency activities regardless of whether or not the energy efficiency programmes existed. Rebound effects can occur when financial savings from reduced energy consumption are used to increase energy use overall, either directly (through the same activities) or indirectly (through other energy-consuming activities). Rebound effects are not necessarily negative and can lead to increased productivity in SMEs without increasing their overall costs. Ensuring additionality refers to the necessity for the programme evaluators to demonstrate that the programme(s) achieved energy savings additional to what would have occurred in the absence of the programme. Estimating the energy consumption baseline is crucial in this respect (Warren, 2015).

Communicate results

Evaluation results should be made public whenever possible. This will ensure a degree of transparency and help the programme to improve over time. Where there are positive results, the evaluation may also serve to promote the programme to new stakeholders.

⑩ *Adapt the programme and plan next steps*

Evaluations often reveal opportunities to improve a programme, perhaps through adding new components or tailoring the support delivered to SMEs. Such adjustments can improve both the programme administration and the ease of implementation by SMEs.

Evaluations also provide an opportunity to explore the best way to scale up a programme. Consider the following questions:

- Can the early successes in a programme be exploited to demonstrate the benefits to a wider group of SMEs?
- Can the ongoing programme experience generate checklists and tools that might simplify participation for future SME participants?
- Is it possible to reduce subsidies for components of a programme (e.g. energy audits), once the value and benefits have been illustrated by initial programme participants?
- Has the programme shown that particular technologies or measures are more popular within a particular industrial sector, or in other sectors that use similar technologies?
- Where training has been part of a programme, can a "train-the-trainer" approach be developed to broaden the reach and accessibility to the training?

A programme's expansion and deployment strategy will depend upon its initial successes, as well as the motivation of target SMEs. However, a thorough analysis of the evaluation and all of the expansion options is essential. A workshop setting, with a range of stakeholders, can be particularly productive.

Plan next steps and future actions

Irrespective of the methodology used, evaluations provide a good basis for reporting results to stakeholders and deciding whether or not to continue the programme. Evaluations can indicate opportunities for improvement and possibilities for scaling up the programme by highlighting success factors as well as weaknesses.

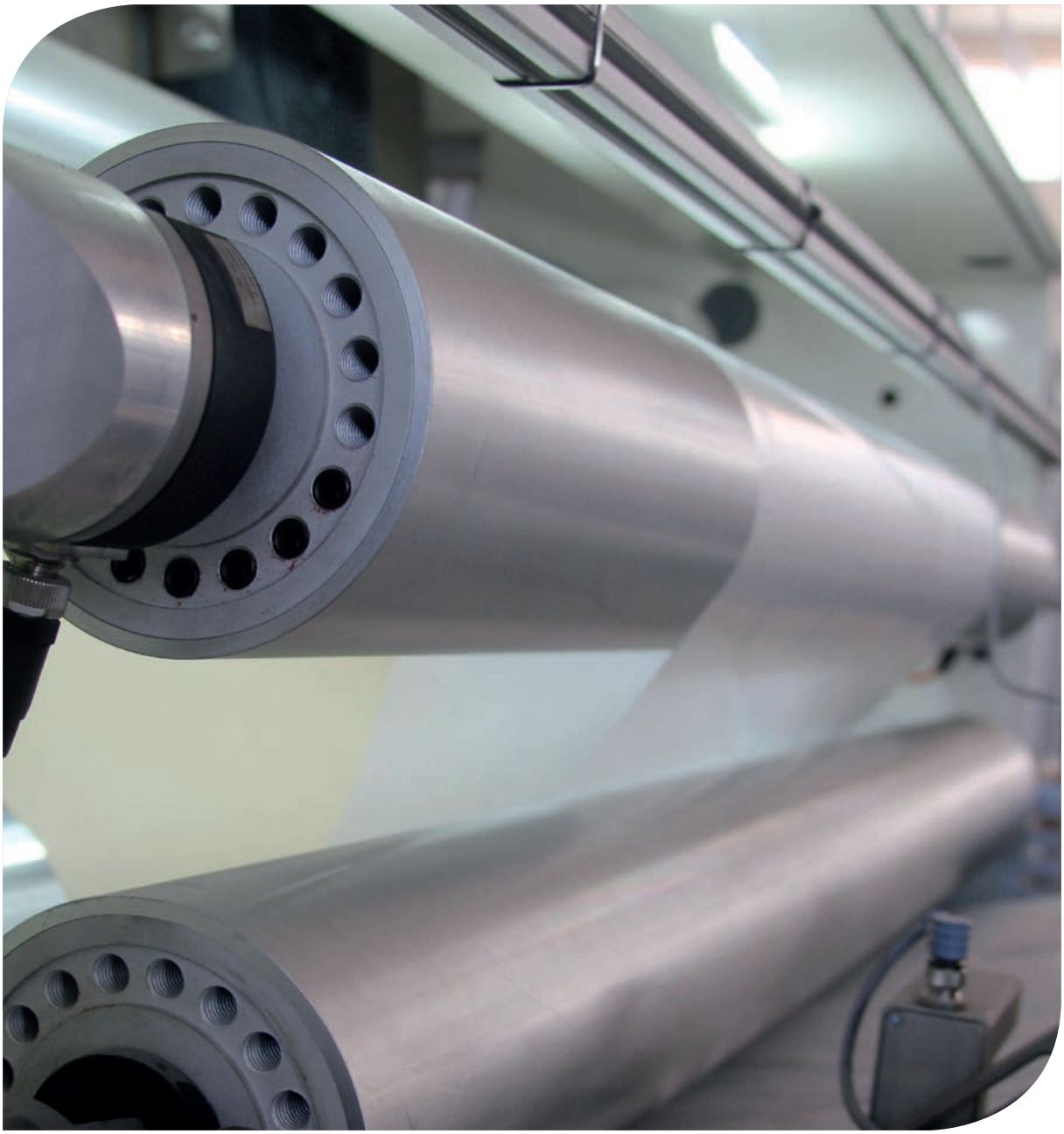
Scaling-up programmes

Scaling-up processes can take many forms, including expanding, replicating, adapting and sustaining successful programmes in a geographical space and over time to reach a greater number.

Planning is an important component of the scaling-up process. It is essential that all stakeholders who will be counted on to move the programme to scale

are involved from the start. Scaling-up opportunities should be considered at the outset of programme design rather than coming as an afterthought. Activities that have been designed as pilot or demonstration projects, but have not considered the requirements of translating activities to a broad scale, may not be suitable for effective scaling up.

When considering scaling up, a long-term timeframe (five to ten years or more) is essential. The more developed the programme design and experience before expansion, the more durable the programme will be as expansion occurs.



SME programme case studies

Introduction

This Policy Pathway explores three case studies that highlight key success factors of energy efficiency programmes:

- **The European Bank for Reconstruction and Development's Sustainable Energy Financing Facility**. The EBRD's Sustainable Energy Financing Facility, implemented in Central and Eastern Europe, complements funding for on-lending to SMEs with capacity building for SMEs and commercial banks. This combination of information, capacity building and finance enables SMEs to develop bankable projects and banks to provide suitable financial products. EBRD programme implementation highlight the importance of learning from experience and creating programmes that can be adjusted. It also indicates the importance of incentives, management and staff engagement.
- **The Australian Energy Efficiency Information Grants**. The Australian Energy Efficiency Information Grants programme achieved significant results by using business associations' existing networks and communication channels to reach out to SMEs by providing incentives for them to work more actively on energy efficiency. SMEs received targeted information and support from a stakeholder they trust and have an existing relationship with. Delivering a programme through industry associations and community organisations enabled greater reach than would have occurred through the government alone. The Australian programme also provides insights into the value of monitoring and evaluation and how they can help uncover areas for improvements and next steps.
- **Supply chain energy efficiency programmes**. Supply chain energy efficiency programmes are promising new way of effectively engaging SMEs in energy efficiency by using existing relationships and expertise. Experience shows that corporations are well placed to motivate and help SMEs improve their efficiency. The case study looks at programmes initiated by corporations such as IKEA, Walmart and Johnson Controls. The US DoE Better Plants programme's supply chain initiative demonstrates that government support, in the form of technical expertise, recognition or other incentives, can be a powerful driver that could enable the expansion of supply chain energy efficiency initiatives.

Combining access to finance with business information and capacity building: The EBRD's Sustainable Energy Financing Facility (SEFF) model...

Background

The EBRD was established in 1991 to promote private and entrepreneurial initiatives and market-oriented economies. EBRD is now active in more than 35 countries, from Central and Eastern Europe to Central Asia and the Southern and Eastern Mediterranean.

Inefficient use of energy was recognised as one of the most important and enduring challenges in the EBRD region: it undermines the competitiveness of enterprises, threatens energy security and contributes disproportionately to global warming. In 2006 the Bank launched its Sustainable Energy Initiative with the aim of scaling up sustainable energy investments, improving the business environment for sustainable investments and removing key barriers to market development.

The EBRD reaches out to thousands of clients such as SMEs to assess their energy efficiency needs and finance energy efficiency projects. The bank uses its sustainable energy finance facilities (SEFFs) as an

intermediated channel for medium-term finance (Figure 4). The SEFFs combine this access to finance with technical support, expertise building and policy dialogue, and aim to help overcome barriers to market penetration of sustainable energy finance.

Through the SEFFs, the EBRD extends its credit lines to local financial institutions (banks, leasing companies, microfinance institutions) for dedicated sustainable energy projects. These partner institutions then on-lend the funds to their clients, many of which are SMEs. SEFFs have now been rolled out across 22 countries to accelerate energy efficiency improvement in the commercial, residential and municipal sectors. So far, over 100 local financial institutions âriticipate and over EUR 2.4 billion of EBRD financing has been committed SEFFs resulting in over 95 000 projects and saving over 5 $MtCO_2$ per year.

This case study illustrates how financing facilities can help SMEs to overcome the common barriers that discourage energy efficiency initiatives. It describes the model components and lessons learned from SEFFs in Bulgaria, Turkey and the Western Balkans.

Launching the SEFF model in Bulgaria

When the SEFF model was deployed in 2004, Bulgaria was experiencing significant energy challenges. Ageing nuclear power plants that had produced more than 40% of the country's electricity were being decommissioned. As a result, Bulgaria's SMEs faced rising energy prices and increasing risks of a disrupted energy supply. Improving efficiency would address both problems.

But SMEs were unlikely to fund an energy efficiency measure, as opposed to a core business improvement, because their awareness and understanding of the benefits, availability, and diversity of energy efficiency technologies was limited. They also lacked formal business procedures and in-house technical expertise to finance and implement improvements.

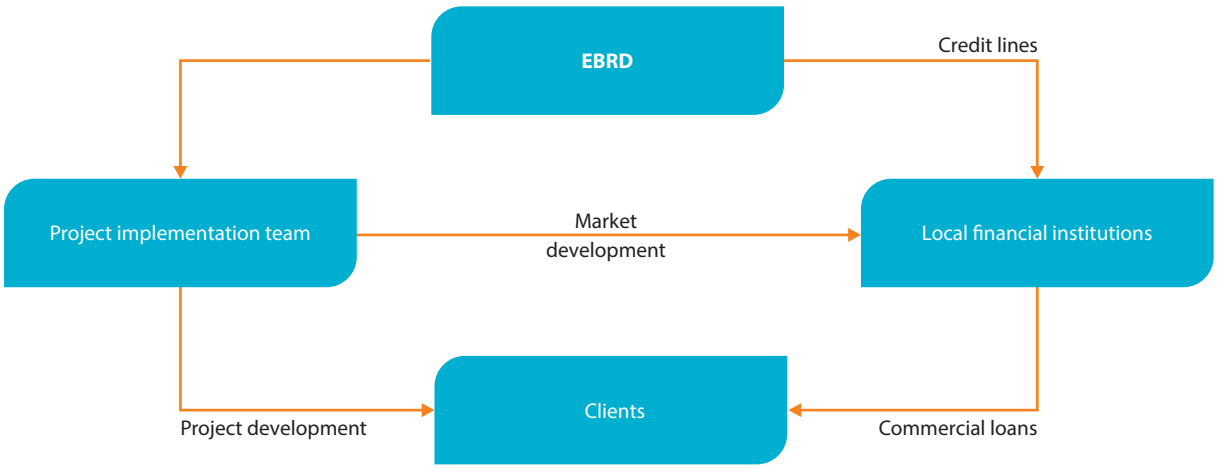
This situation was exacerbated by Bulgarian bankers' lack of technical skills and experience with energy efficiency projects. For example, the banks typically did not have the technical expertise required to appraise projects, and they often had insufficient information about the technical risks and financial benefits of such projects. Thus, investors often believed energy efficiency projects were technically risky or unlikely to deliver financial returns, particularly as compared with greenfield or expansion investments.

The EBRD's research into these complex barriers guided its development of the first SEFF model. Key features include:

- EBRD selects a project implementation team made up of both local and international experts funded by donors to provide support and guidance for the programme's implementation.
- EBRD provides dedicated credit lines to local financiers, enabling them to provide their clients with tailored energy efficiency loans.
- SMEs receive technical support from the implementation team to identify potential projects, and to develop funding applications.
- The implementation team helps local financial institutions to develop this new market, including by establishing procedures, appraising projects and providing support with marketing.

The EBRD worked with nine commercial banks in Bulgaria to deliver financing of more than USD 286 million through SEFF programmes. Thanks to the "one-stop shop" financing model, SEFFs in Bulgaria successfully opened the market for local lending to sustainable energy. A key component of their success was the technical assistance provided (see Table 7) to both SMEs and banks, which was funded by donors.

Figure 4 The SEFF programme model



Source: EBRD (2014a).

Table 7 Technical support provided by a SEFF project implementation team

Financial institutions	*SME clients*
Training staff in promoting new product	Identifying energy efficiency investments and enhancing project design
Supporting staff in recognising technically eligible projects	Promoting the benefits of high performance technologies
Marketing the benefits of the finance programme	Supporting the completion of finance applications
Creating standards for environmental and social due diligence	Providing guidance during and after project implementation
Encouraging clients to originate investment opportunities	

Source: Adapted from EBRD (2014a).

Capacity building with local banks in Turkey

The SEFF programme in Turkey confirmed the critical role of local banks and the necessity of supporting them. The Turkey Sustainable Energy Financing Facility (TurSEFF) also supports local banks with a wide variety of expertise-building opportunities, including:

- *Classroom sessions:* These are typically scheduled early in the deployment process and explore

eligibility criteria for the SEFF, technical aspects of project identification and evaluation, case studies, and sales considerations.

- *On-the-job training*: Project implementation teams work with loan officers and branch staff to screen their portfolios for potential projects. This direct support and mentoring reinforces the classroom training and enhances quality control.
- *Appointment of SEFF ambassadors:* Individuals within the local banks receive additional training in recognising opportunities, actively promoting the SEFF and working more directly with clients to identify energy savings.
- *Developing staff incentive schemes:* One of the partner banks worked with the TurSEFF implementation team to create an incentive scheme that rewarded staff for promoting SEFF loans. After this was introduced in September 2011, the bank's disbursements tripled from USD 12 million in the third quarter of 2011 to USD 36 million in the final quarter of 2011.
- *Encouraging the development of local marketing solutions:* Local marketing solutions and motivated staff are essential. This was illustrated at a partner bank in Turkey where motivated staff quickly recognised the market opportunity in sustainable energy. These staff enthusiastically marketed the programme by organising regional client workshops to introduce the SEFF and promoting it internally through branch visits. However, after a few months this team moved to a competitor bank. Without this enthusiastic team, the first partner bank's lending for sustainable energy projects fell sharply and took a long time to recover. By contrast, the competitor's disbursements in this sector accelerated rapidly (EBRD, 2014c).

Supporting SEFFs with policy shaping and direct financing in the Western Balkans

As SEFFs have extended to new regions, the EBRD has improved their effectiveness by working closely with financial institutions and other stakeholders. SMEs in Croatia, Bosnia and Herzegovina, Serbia, and FYR Macedonia can access loans and technical support for energy efficiency projects through local banks involved in the Western Balkans Sustainable Energy Financing Facility (WeBSEFF). In addition, the EBRD provided a package of policy dialogue assistance, such as legislative support to enable energy efficiency projects, direct funding, technical support and incentives.

For example, in Serbia, the EBRD used policy dialogue to shape legislation that will allow development of energy performance contracts by energy service companies (ESCOs). Under these, an experienced private sector ESCO guarantees a specific level of service performance to its SME client. This ensures that the SME's investments in energy efficiency, and the cost of energy service delivery, are covered by the savings that those improvements generate. EBRD's contribution included drafting an ESCO by-law and creating contract templates that make it easier for ESCOs to develop and implement energy performance contracts.

To complement the existing SEFF in the Western Balkans, a direct lending facility is also in place and makes available loan amounts of USD 1.1 million to USD 6.6 million for medium-sized projects that cannot obtain funding from commercial banks. Technical support includes energy audits and technical advice. Incentive payments made at the successful completion of the eligible projects encourage quick implementation.

Lessons from the SEFF experience

The success of the SEFF model as an innovative financial instrument has generated important lessons that can benefit energy efficiency programmes across the world.

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 the programme's future effectiveness. The main lessons were:

Information and marketing is essential to familiarise SMEs with the general benefits of energy efficiency and with the specific offerings of the programme. Marketing the programme to SMEs, recognised early on as a key factor for the success of the model, demanded specialist marketing skills, along with significant additional financial resources. Technical consultants provided expertise to banks and SMEs, including the creation of dedicated SEFF websites. Marketing has also been channelled via the local financial institutions through a marketing plan and toolbox of activities; these have been increasingly supplemented by local financial institutions' own resources.

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 the 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.

Programme 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.

Applying the SEFF lessons

SEFFs have evolved continuously over the years, incorporating design and implementation lessons from previous iterations. Innovation has been essential to increasing SEFF effectiveness and remaining at the leading edge of sustainable energy financing across many countries. Some of the innovative solutions introduced are:

- **Broadening the range of financial intermediaries** has increased the route to market for the EBRD financing, especially for standardised solutions, and enabled greater influence on end-beneficiaries (including leasing companies, ESCOs, households, and technology vendors and suppliers).
- **Skills transfer** to local experts and financial institutions' staff have ensured local capacity, with international leadership tailing off over time.
- **Project implementation teams**. Blending local and international experts on a project implementation team provides essential local context and continuity for programme deployment.
- **Grants**, when used, have been structured to increase transition impact, for example by requiring even higher energy performance or packaged solutions.
- **Understanding and engaging with local financiers**. EBRD works intensively with local financiers to create a long-term transformation in the lending market. EBRD works particularly hard to demonstrate how energy efficiency financing can be commercially viable and profitable.

- **Providing technical support for SMEs**. By providing energy audits and business advice to SMEs, the EBRD ensures a steady supply of quality projects that will be eligible for SEFF funding.
- **Policy dialogue** opportunities have been explored in parallel to SEFF implementation, and in some cases provided up front, to support the creation of specific markets and enabling environments for sustainable financing (e.g. energy efficiency regulations and energy performance contracts).
- **Combining SEFFs with other mechanisms such as direct lending and policy support**. These initiatives help to address economy-wide barriers that limit the uptake of energy efficiency projects by SMEs.
- **Learning from experience**. The commitment of the participating financial institutions, and their close interaction with SEFF implementation teams, are vital to the success of SEFFs. It is therefore extremely valuable that the people at the forefront of SEFF implementation are able to communicate early and often with banks to thoughtfully shape SEFF products.

Conclusions

The SEFF model has succeeded in accelerating energy efficiency improvement in SMEs by combining dedicated finance with capacity building and technical support. As the EBRD expands the number of countries within which it operates, SEFFs will continue to play an important role in unlocking the many benefits that energy efficiency can deliver. In many of these new countries, such as those in the Southern and Eastern Mediterranean, SMEs make up a large part of the market, delivering 90% of new jobs in the region (IEA, 2014c). Given the success of SEFFs in addressing barriers to energy efficiency in SMEs, they will provide an important mechanism to reach the globally needed goal of reducing GHG emissions while enhancing the competitiveness of local economies. In general, SEFFs are designed to help financial institutions fund energy efficiency as well as resource efficiency (water and material efficiency) in SMEs, corporate, municipal and residential sectors. They have been successfully implemented in 22 countries and attract significant levels of demand.

The EBRD will also continue to play an important role in promoting the importance of energy efficiency finance, collaborating with other banks around the world to do so. For example, in September 2014, together with the world's six multilateral development banks, as well as in September 2015 at the forum on "Building a Global Energy Efficiency Financing Alliance" in Istanbul, the EBRD together with over 70 financial institutions reaffirmed its commitment to lead by example in responding to the challenge of climate change. During COP21 in Paris, the SEFF model is presented as a vehicle demonstrating that financial institstutions are integrrating energy efficiency into their business operations and that continued support for their activities is critical in addressing climate change.

Australia: Using industry associations and non-profit organisations to educate SMEs

Background

The Australian Energy Efficiency Information Grants (EEIG) programme was established to address an identified lack of knowledge about energy efficiency among SMEs and community organisations. This lack of knowledge contributed to SMEs not seeing energy efficiency as a priority.

The programme's objective was to empower both SMEs and community organisations to make informed decisions about energy efficiency and thereby reduce their operational costs. Grants were offered to industry associations and non-profit organisations that could deliver practical, tailored energy efficiency information to SMEs or community organisations. The programme disbursed a total of

USD 24.6 million in merit-based, competitive grants. Some 46 recipients received amounts of USD 81 000 to USD 1 390 000. Two funding rounds were offered, one in February 2012 and another in October 2012. All projects were completed by 30 June 2015. The programme was managed by the Australian government's Department of Industry and Science.

The EEIG programme was part of a package of measures to help SMEs adapt to the changing energy landscape. Funding for the programme originated from general revenue. The programme was successful when a trusted source made it easy for an organisation with little time or money to acquire high-quality information. These successes demonstrated that when businesses are offered tailored, solutions-driven education, they will start to engage in energy efficiency.

Programme implementation

The EEIG programme used a merit-based evaluation of project proposals. Projects were evaluated on the basis of effectiveness, design and management and value for money. While an open, merit-based grant programme does not guarantee equal delivery across all industry sectors, it fosters higher-quality projects. Providing detailed grant funding guidelines, with clearly articulated merit criteria and assessment methodologies, contributed to successful programme outcomes. And by revising the grant funding guidelines between funding rounds, it was possible to make changes on the basis of lessons from the initial programme implementation phase.

The EEIG programme included agriculture and food processing; commercial property; community services; manufacturing; retail; and tourism. That diversity demanded a similar diversity of information products and delivery methods, carefully tailored to each target audience (Box 18).

Information products delivered by successful projects included: face-to-face and online training; fact sheets; how-to guides; case studies; on-site energy audits of businesses and community facilities; online interactive tools, videos and calculators; advice hotlines; site visits; and newsletters.

To extract the maximum value from grants, EEIG promoted the sharing of both information products and project experience. It sent all grant recipients a quarterly newsletter that featured problems encountered, lessons learned, good news stories, and the launching of websites. The newsletter kept recipients apprised of one another's progress and encouraged them to share experiences and advice. This emphasis on communication has resulted in a number of recipients pursuing partnerships among themselves and externally so that their projects could continue beyond the completion of the EEIG programme.

The funding agreement with EEIG grant recipients provided the department with a licence to use any energy efficiency information material produced with grants funds. This enabled the department to reproduce or publish effective material for distribution in other sectors or locations, or on the Internet.

Box 18 ***An EEIG project example***

The Australian supply chain and logistics industry generates 37% of Australia's emissions, a share that has grown by 80% in the last 20 years, but SMEs in this sector are often neglected by efforts to improve energy efficiency. Even when assistance is available, SMEs frequently lack the time, expertise, funding and freedom from immediate business pressures that would allow them to analyse and improve their energy use.

To address this need, the EEIG programme awarded a grant to the Supply Chain and Logistics Association of Australia (SCLAA), which proposed to develop and deliver energy efficiency information to the Australian transportation and warehouse sector. SCLAA identified multiple energy-saving opportunities across the entire industry, including warehousing, distribution and road, rail, sea and air transportation.

Through a project called Energy Efficiency Solutions for Australian Transport and Logistics SMEs, SCLAA developed a suite of information, including:

- A Step Guide to help SMEs identify, evaluate and implement efficiency projects. This included an assessment tool to help SMEs benchmark their energy performance against industry best practice and to help them locate key opportunities within their business.
- Fact sheets on road transport operations; warehousing, refrigerated stores and materials handling; alternative fuels; the importance of procurement in energy savings; and energy efficiency "on a shoestring."
- How-to guides on: data systems and management; identifying opportunities; evaluating opportunities; and implementation.
- Case studies on the achievements of selected SMEs (McGill's Transport; Keysborough; and Xtreme Freight).
- A webinar series.
- A dedicated website that helps SMEs to understand where and how energy is used in their business, and offers strategies to reduce energy use and stabilise operational costs.

For further information on the Energy Efficiency Solutions for Australian Transport and Logistics SMEs project, and to access the tools available, see http://sclaa.com.au/.

Company-level impacts

The programme helped SMEs identify improvements to their energy efficiency. Examples include:

- P&W Marine, Queensland, which casts and machines high-precision components, is expecting to offset approximately 20% of its off-peak energy consumption from the grid by installing solar photovoltaic cells, with further savings of approximately 50% from upgraded lighting. These savings will provide expected total electricity consumption savings of approximately 70%.
- Angelakis Bros, a seafood, poultry and game company with three manufacturing sites around

Adelaide, spent about 85% of its electricity budget on refrigeration. Through an EEIG-funded audit, it learned that it could reduce its annual refrigerant costs by 96% and achieve annual electricity cost savings of USD 56 000 by upgrading and consolidating its refrigeration plants.

- GM Scott, an abattoir in New South Wales, improved the energy efficiency of its existing refrigeration systems by installing smart controls to a newly built ammonia refrigeration plant and R404A refrigeration plant. They expect this measure to deliver 155 MWh of energy savings annually and reduce energy costs at the site by USD 26 000. In addition, the smart controls will enable the refrigeration plant to operate at lower pressure ratios, which will reduce stress on parts and prolong the operating life of the plant.
- Capilano Honey, based in Queensland, uses both electricity and natural gas; its total energy consumption is 18 000 gigajoules at a cost of USD 430 000 per annum. Its EEIG-funded energy assessment identified energy savings in pasteurisation (30%), compressed air (15%) and other thermal systems (10%). In addition, LED lighting and solar PV was recommended to Capilano to reduce its annual energy costs. These savings constituted energy savings of over USD 34 000 per year.
- McLaren Vintners, a wine maker in South Australia, will save USD 37 000, or 22 per cent of its annual energy costs, by insulating its processing tanks (at a cost of USD 166 500 and a return of investment in 4.5 years).

Programme evaluation

The Department of Industry and Science engaged consultants to evaluate the EEIG programme throughout its four-year duration. These consultants developed a new instrument to measure energy efficiency awareness, attitudes and behaviour among the target SMEs and community groups. Designed around the EEIG programme objective, the evaluation measured impact on:

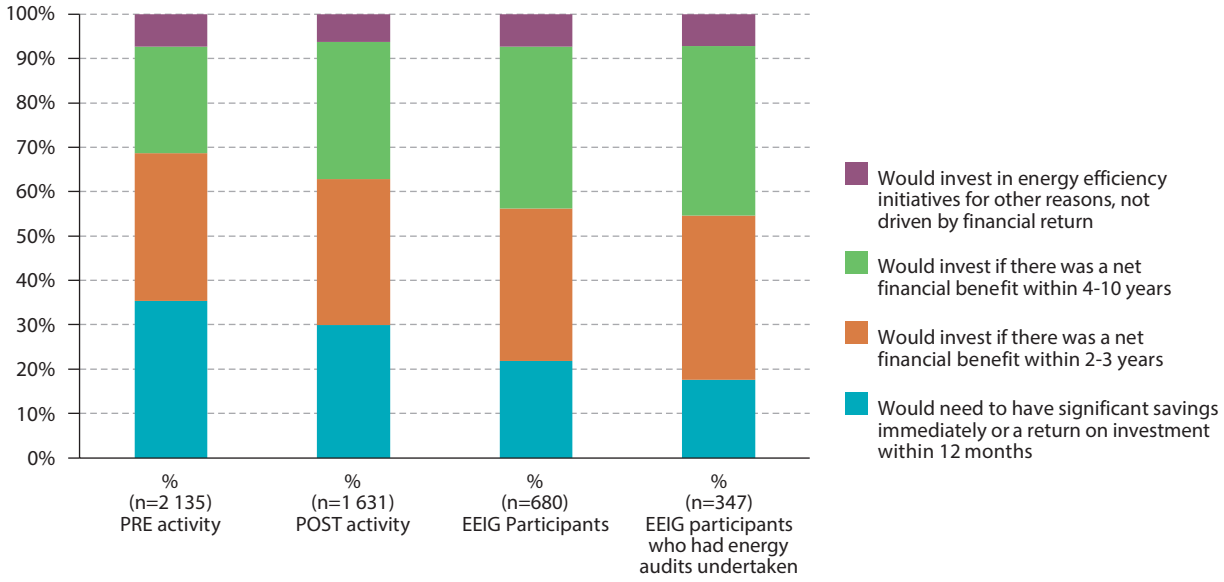
- SME awareness and knowledge of energy efficiency, including opportunities for improvement
- ease of accessing information and advice
- SME attitudes towards energy efficiency, e.g. perceived return on investment/effort and motivations for action/inaction
- key behaviours, including monitoring energy costs
- incidence of energy efficiency assessments and action plans
- key barriers to taking action.

The central component of the EEIG programme evaluation was a pre-post survey of SMEs and community organisations potentially exposed to EEIG-funded activity. The pre-activity survey (March 2014) was based on 2 135 responses within the target audience. The post-activity survey (June 2015) was based on 1631 responses (of which 680 were EEIG participants and 951 were non-participants).

By establishing a pre-activity baseline and then taking a post-activity snapshot, it was possible to measure changes in awareness, attitudes and behaviour over the life of the programme (Figure 5). These analytics showed that initiatives like energy efficiency assessments (with resulting action plans) are most likely to lead to better outcomes in terms of behaviour, attitudes and perceived knowledge.

The surveys showed that those who participated in EEIG-funded activities were less likely to report as barriers a lack of information relevant to their organisation or a lack of advice tailored to their organisation. This suggests that the EEIG programme was able to effectively address information-related barriers.

Figure 5 Impact of the EEIG programme on expectations of return on investment



Source: EBRD (2014a).

The surveys further found that EEIG participants were more likely to have had an energy efficiency audit or assessment and to have developed an energy efficiency action plan than companies not participating in the programme. The proportion of programme participants having taken measures to reduce energy use increased across most sectors. EEIG participants that had undertaken energy audits showed the highest increase in taking practical steps to reduce energy usage. Of these SMEs, nearly half have developed an energy efficiency action plan; 60 per cent were monitoring their energy use on a quarterly basis; they were more prepared to accept a longer return on investment in energy efficiency (i.e. up to ten years) (Figure 5); and were immediately undertaking energy efficiency activities such as upgrading lighting and equipment, and changing staff behaviour.

Lessons from the EEIG programme

The EEIG programme reinforced the importance of ensuring that information comes from a trusted source, targeting the information to the right people, using existing information channels and relationships, and targeting information to SME needs. Programme managers also highlighted the importance of providing support beyond information; capacity building is needed not only for SMEs but also for the people who work with SMEs. It was also found that targeting remote or rural areas requires additional efforts.

In terms of using existing information channels and relationships and targeting the right people, trust is paramount to SMEs. Approaching SMEs through trusted sources that know the sector and have credibility (e.g. local business networks and local government contacts) was a more effective way of capturing the attention of the target audience than large-scale or indirect marketing. It is also important to find a business's key players: the person who recognises efficiency opportunities may not know the person with the decision-making power. Sometimes a link must be forged between energy advocates and senior members of staff.

In terms of messaging and information, a "show me the money" approach was more successful in garnering attention of SMEs. The biggest incentives for efficiency action were concerns about energy prices and the desire to maintain or enhance profit margins. Hence the majority of EEIG recipients found that messaging that was short, sharp and provided a clear illustration of the costs and benefits of energy efficiency (a "what is in it for them" approach) was most effective in attracting this time-poor audience. To ensure the appropriateness of energy efficiency material, focus group sessions with SMEs are particularly valuable. These sessions allow SMEs to identify what information they would most value and the best mechanisms to deliver that information.

A "one-size fits all" approach is not appropriate for SMEs. They need flexible support options to suit a range of different businesses and sectors. Offering a variety of tools in a range of convenient ways ensures that participants can better engage with energy efficiency information. For example, some participants noted that online tools were more useful for small businesses, whereas on-site audits were better suited to medium-size businesses. Businesses that used multiple tools – for example, attending a workshop in addition to undertaking an audit – had greater results than employing one component in isolation.

SME managers placed high value on real world examples. Case studies and the testimony of peers who have implemented energy efficiency initiatives are effective; written information and the testimony of bureaucrats and consultants is less effective. Some SMEs are particularly wary of outside experts if they suspect a hidden agenda. Thus, for workshops, enlisting a speaker who has received an audit and implemented energy efficiency changes is particularly effective. This speaker should address the expenses incurred and the savings that resulted.

In terms of the need for additional support beyond information, the programme managers found that there is a gap between the receipt of information and the implementation of energy efficiency initiatives. Additional support is required by SMEs to take energy efficiency knowledge and turn it into action. This is because many SMEs become overwhelmed when navigating their way through the energy market, the application process for funding and the supplier market. They also lack adequate internal resources to develop good documentation to go to the market for an implementation solution. Several SMEs also reported that they received vastly different quotes for technologies and were unsure which would be best suited for their purposes. Others noted that they did not know what to look for when purchasing items (such as energy efficiency lighting) and that mistakes were made when these items were purchased.

The programme managers also found that energy service providers could benefit from training that develops their skills and knowledge of energy efficiency options for SMEs. Providers have strong technical skills and experience conducting energy audits in large organisations. To meet the needs of SMEs, however, they may require training in more clearly communicating the recommendations from energy audits so that non-technical, time-poor personnel in SMEs are not overwhelmed by the variety of options available to them.

To deliver programmes to rural and remote areas, careful planning is needed. Serving these areas requires extra resources unless recipients and/or their partners already have a presence in the area. Where there is no presence in the area (and therefore no relationship in place with SMEs), the target audience may initially assume that they will receive inferior service and therefore they do not see the value in participating in energy efficiency programmes. Fewer skilled practitioners can provide advice in regional areas, so seeking out industry clusters, or even clusters of diverse SMEs, can be helpful so that support services and distribution networks can be used to reach these areas.

Conclusions

The EEIG programme was successful in reducing SMEs' perceived barriers to taking action on energy efficiency – particularly in terms of overcoming a lack of information and tailored advice – and in raising awareness and enhancing knowledge of the benefits of energy efficiency. However, up-front costs, and lack of time and staff resources, remain key barriers.

The projects that included deeper capacity building, such as energy audits, clearly had a bigger impact than those that were purely information-based.

SMEs need to know what to focus on and how action can easily and quickly be taken. Ideally, they need to be provided with some financial support or demonstration that up-front cost is not an issue where savings are immediate.

The evaluation of the EEIG programme by both the department and outside experts has ensured that results, impacts and lessons have been captured and will be thoroughly analysed to inform future policies and programmes.

Supply chains present major energy efficiency opportunities .....

Background

Large corporations are increasingly focusing on energy efficiency along their supply chains to cut costs and support environmental objectives. The supply chain is the production and distribution network that encompasses the sourcing, manufacturing, transportation, commercialisation, distribution, consumption and disposal of goods.

Providing energy efficiency training, resources and support to companies in supply chains can provide benefits to SMEs in the supply chain and to corporations. Supply chain energy efficiency programmes can lead to cost savings both for suppliers and corporations; they can reduce supply cost inflation; make supply chains more resilient and competitive; reduce risk; and improve relationships between producers and suppliers. Corporations seeking to reduce greenhouse gas emissions often find that their direct emissions are marginal compared with the emissions in their supply chains (Palmbeck, 2012). Studies have found that across industries, corporations' direct greenhouse gas emissions average only 14% of their supply chain emissions (Matthews et al., 2008).

Supply chain initiatives taken by three corporations – IKEA, a home furnishing company; Walmart, a general retailer; and Johnson Controls, an energy efficiency product supplier – illustrate these benefits. A pilot programme initiated by the US Department of Energy as part of its Better Plants programme shows how government initiatives, programmes and support can give corporations incentives to work with their supply chains on energy efficiency.

IKEA achieves a 25% improvement in its supply chains

In October 2008, IKEA started the Supplier Energy Efficiency Program (SEEP) to engage its most energy-intensive suppliers in order to discover potential energy efficiency improvements. IKEA started with around 100 suppliers to determine actual energy use, as well as the potential for improvement. With the support of IKEA, the suppliers have been able to save millions of dollars (PwC, 2012). The return on investment was very high in some cases, at around 750%. Generally, savings of 20% to 40% were identified and have been achieved in many cases (PwC, 2012).

Currently, IKEA works with more than 1 000 home furnishing suppliers to reduce their energy use. These efforts contribute to the company's overall environmental objectives, while saving money for their customers, suppliers and the company

itself. IKEA has developed a sustainable supplier index that covers energy management, energy-efficient production, renewable energy and raw materials efficiency. In 2014, suppliers achieved a 25% improvement compared with 2013 (IKEA, 2014). Working with a glassware company in China led to improvements in product quality of 80% and reductions in product costs of 13% (Willoughby et al., 2011).

Johnson Controls shares experience to cut supply chain energy demand

Johnson Controls has developed a programme that sends energy efficiency experts to supplier plants to train staff on low-cost/no-cost energy efficiency best practices. Their pilot supplier efficiency programme was announced at an annual supplier conference in 2013 and offered to all interested suppliers. As suppliers participated in on-site assessments, Johnson Controls was able to share information on energy management processes and tools with its suppliers, while identifying potential improvement measures for its suppliers and making preliminary estimates of project costs and benefits. By surveying suppliers, Johnson Controls could identify knowledge gaps and provide specific training opportunities tailored to their needs (US DoE, 2015).

The supplier training follows an industry practice known as "energy hunts," which Johnson Controls has used at its own manufacturing plants around the world. Suppliers participating in the programme typically achieve energy savings of 5% to 10%, with a payback period of less than two years (US DoE, 2015). Development of a standard, scalable programme that provides SME suppliers with energy management tools, training and on-site technical assistance enables the company to effectively expand the programme. In 2015, the programme was scaled up to support 60 additional suppliers over the following three years as part of a "Commitment to Action" under the Clinton Global Initiative (US DoE, 2015).

Walmart improves energy performance of its supply chain in China

Building on the success of its US supplier energy efficiency programme, Walmart has since implemented an energy efficiency programme in its supply chain in China, resulting in a 20% energy reduction in more than 200 factories and USD 279 million savings in energy costs (Goldberg et al., 2012). To adapt the programme to the Chinese business environment and the needs of Chinese SMEs, Walmart organised a launch meeting and training sessions, and developed approaches to connect suppliers with energy service companies. Programme experience indicates that SME managers in China typically do not have a strong energy or efficiency background. Providing insight and resources through training, call-in lines and tools can help build capacity.

Under its supplier energy efficiency programme, Walmart covers the cost of energy audits if the energy efficiency opportunities identified through these audits are implemented (Goldberg et al., 2012). After a piloting phase involving 40 factories in China in 2014, Walmart announced that it will strengthen its supply chain energy efficiency work in China, aiming to engage suppliers representing 70% of Walmart's business sourced in China (covering approximately 500 enterprises) in its energy efficiency programme by the end of 2017 (Clancy, 2014).

Government programmes can provide strong incentives

Governments can play an important role in providing initial incentives for corporations to work with energy efficiency in their supply chains. The US Department of Energy's (DoE) Better Plants programme is a partnership consisting of more than 160 companies, which represent over 2 300 facilities and almost 11% of the total US manufacturing energy footprint. Leading manufacturers and industrial-scale energy-using organisations demonstrate their commitment

to improving energy performance by signing a voluntary pledge to reduce their energy intensity by 25% over a ten-year period. To help manufacturers make energy efficiency more visible in their supply chains, the programme is working with a select group of Better Plants partners to extend and promote the benefits of energy efficiency to suppliers.

Better Plants partners who participate in the supply chain pilot receive DoE recognition for their leadership in improving supply chain energy efficiency. The pilot allows partners to engage suppliers in an established, national programme that offers clear goals, technical assistance (such as a DoE technical account manager who is available for individual coaching), and methods for data collection and tracking progress. DoE helps partners and their suppliers to improve energy efficiency through a series of energy management webinars, access to energy-saving tools and calculators, energy audits, and opportunities to network and learn from peers. Legrand North America and United Technologies Corporation have taken a leading role in piloting the programme and reaching out to their suppliers. A key part of the programme is the provision of free energy audits for qualifying suppliers. These are undertaken by Industrial Assessment Centres (IACs). An evaluation of the two initial cohorts in the programme revealed the following results:

- 13 suppliers have set goals to improve energy efficiency by 25% over ten years
- Nine have submitted annual reports
- 11 have conducted IAC assessments
- total savings identified by IACs are close to USD 1.2 million
- average savings per plant are about USD 120 000
- average savings equal about 13% of plant-wide energy use
- average payback period for identified recommendations is less than one year (Defontaine, 2015).

Other stakeholders can also play an important role

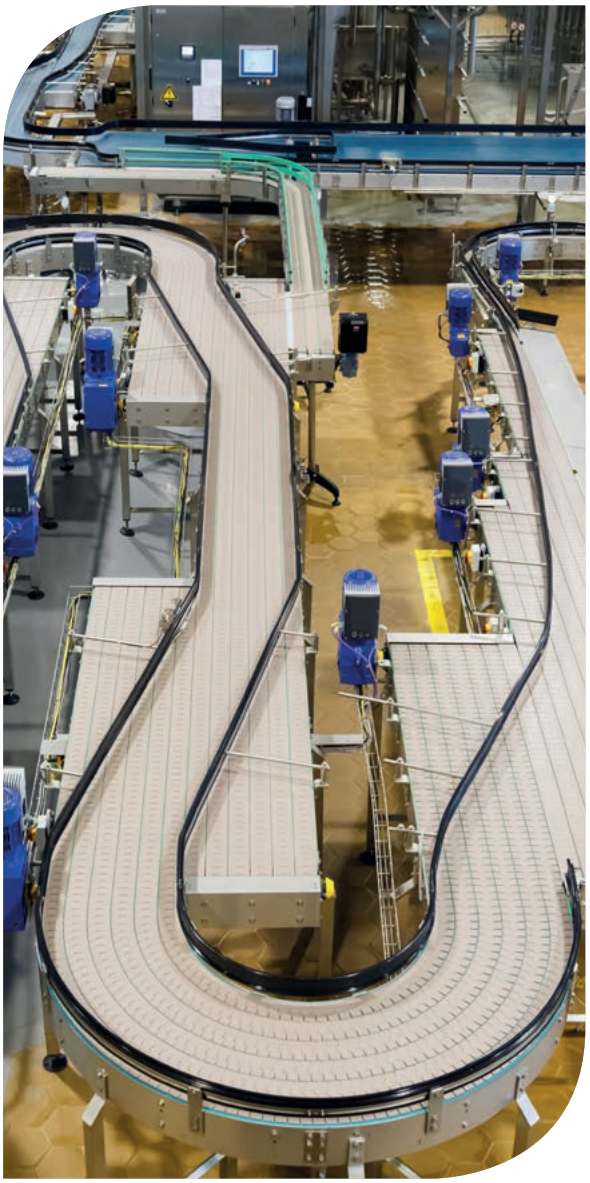
The contribution that other stakeholders can make has been demonstrated by CDP (formerly Carbon Disclosure Project), an independent, not-for-profit organisation working to reduce GHG emissions and promote sustainable water use by businesses and cities. It provides a platform for companies and cities around the world to measure, disclose, manage and share environmental information. CDP runs a supply chain programme in which companies disclose information on the impact of their supply chain (Goldberg et al., 2012).

The objective of the CDP supply chain programme is to better understand how global businesses are managing climate risks and how they are positioned to exploit opportunities – and to encourage both purchasing companies and their suppliers to take action (CDP, 2015). The 2014 supply chain programme involved 66 companies with USD 1.3 trillion in procurement spending (CDP, 2015). In 2015 there were 75 supply chain members representing over USD 2 trillion. Participating corporations receive performance scores and a leadership index for SME suppliers and corporations to recognise achievements.

Lessons from supply chain projects

Lessons learned from working to improve energy efficiency within supply chains:

- **A clear value proposition is needed**. For corporations that engage with their supply chain, the starting point is to show the potential benefits to supplier companies, such as improved competitiveness, productivity, business relationships and resilience, and lower energy costs.



- **Incentives and clear criteria help.** Using purchasing companies' purchasing power to encourage action and provide recognition or rewards for achievements, such as preferential contracting arrangements, can be an effective approach. However, it is important to provide clear procurement criteria and to avoid overburdening suppliers with reporting requirements.

- **Sharing of best practices helps SMEs engage.** Sharing of best practices, case studies and technical resources helps to engage supply chain SMEs. This should be followed with the provision of support and training for the implementation of energy management systems and energy audits, engaging employees in smart low-cost/no-cost operations and maintenance improvements, as well as larger capital projects.

- **Recommendations are not enough.** Technical recommendations should be connected with project financing and with energy efficiency programmes run by governments, utilities or development banks that offer technical support, financial incentives and recognition.

Conclusions

Supply chain energy efficiency programmes are a promising approach that could achieve significant improvements with limited public resources, but are still in an early phase. Supply chain programmes can be an effective way to stimulate and support SMEs to work continuously with energy efficiency as part of their customer strategy. Involving corporations may help to motivate and scale up SME energy efficiency projects. Supply chain programmes can further offer governments and stakeholders an effective way of reaching SMEs, a notoriously difficult policy target because of the large number of small businesses and their diverse nature.

There is a growing interest from corporations in improving the sustainability of their supply chains as a strategy to reduce costs, limit risks and contribute to a positive public image. Governments can play an important role in accelerating the engagement of corporations with their supply chains on energy efficiency by providing incentives. Supply chain efficiency offers a way of aggregating energy efficiency project financing. However, this is still an area that lacks developed financial products.

Conclusions

Accelerating the implementation of energy efficiency measures by SMEs could lead to substantial energy savings. It could also generate significant economic benefits, by improving SMEs' productivity, competitiveness and resilience, as well as wider social and environmental benefits.

However, the large potential for energy efficiency in the sector will not be realised without support programmes that target SMEs. This Policy Pathway shows how governments, industry associations, financial institutions and other stakeholders can develop and implement effective programmes.

Better engagement with SMEs

Engaging SMEs in energy efficiency programmes requires a good understanding of SMEs' constraints and their needs. National governments may not always be best placed to reach out to SMEs directly, but they can provide incentives and support to other stakeholders, such as industry associations, to work directly with SMEs. Working with regional networks, industry associations or other entities that SMEs trust and consider authoritative can also improve programme participation. Local governments may be better placed to work more directly with SMEs than central governments due to their proximity and better insights into local business conditions.

Building on existing communication channels can reduce the resources needed for engagement and information delivery. For communication to be effective, it needs to be in language that is understandable for general managers; overly technical language may not raise interest. Effective engagement also relies on presenting a good business case for energy efficiency, by focusing on aspects that are of interest for managers such as profitability, risk mitigation and product quality. Once SMEs are engaged, programmes need to make it as easy as possible for SMEs to participate and obtain support.

Capacity building is important for SMEs and their partners

Capacity building for SMEs should be an integral part of energy efficiency programmes. However, other stakeholders such as government staff, business associations, auditors and financial institutions also need capacity building to enable them to provide support and services needed to help SMEs. Staff or partners working on energy efficiency programmes may benefit from capacity building to help them better understand and meet the needs of SMEs.

The competence of auditors and the quality of audits, quick checks or walk-throughs is essential for ensuring industry participation and implementation of recommendations. Audits that are perceived by SMEs as being of low quality can dissuade companies from participating in the programme and future energy efficiency programmes. Capacity building of local banks can have far-reaching effects in counteracting barriers to access to finance.

Cost-effectiveness is possible

The costs of implementing (or administering) energy efficiency programmes that target SMEs are higher than those for large enterprises because of the large number of SMEs spread over many industrial sectors, with smaller energy savings per entity. However, careful planning, partnering, and use of existing resources or replication of successful models can help to ensure cost-effectiveness. Developing programme elements relevant for a large number of industrial segments is a key challenge (e.g. a cheese factory is very different from a steel rolling mill in terms of processes).

Solutions include focusing on particular industrial segments or clusters, developing industry-specific guidance documents or focusing primarily on improving support processes that are similar across industry segments. A large share of energy is used for support processes such as lighting, heating and cooling, which are similar across SMEs. This opens up possibilities for standardised solutions, which can help improve cost-effectiveness.

Using existing channels of communication can further help cut costs. Partnerships can help expand a programme's resources. Providing incentives for other stakeholders such as business associations or corporations to work more actively with SME energy efficiency can enable governments to achieve significant results at low cost. Adding an energy efficiency component to existing business development, innovation or other types of programmes can be a cost-effective way of improving energy efficiency in SMEs, as can the provision of additional support to enable SMEs to participate in existing programmes targeting large enterprises.

Approaches and resources used in past or existing energy efficiency programmes targeting SMEs can be used or replicated in other programmes. Surveying current and historic domestic policies, as well as international experiences, can save time, effort and costs in the design of programmes for SMEs.

Getting better data

When working with the SME sector, all programmes will encounter a lack of data. Integrating data collection into programme objectives and mechanisms will contribute to an improved understanding of the sector, which will help to further develop programmes and initiatives. All countries have at least some existing data sources that can be used to estimate energy demand, potentials and the value of other benefits. Reviewing calculations and programme evaluations from other jurisdictions can provide guidance and insights. Existing data sources can show the magnitude of energy savings that can be achieved in various sub-sectors or the types of energy efficiency measures that can be adapted to local circumstances. Increased efforts in the area will also help generate an interest in and funding for programmes. Data collection efforts should be based around information that is useful and valuable to SMEs, and opportunities to help SMEs develop better capabilities to measure, assess and verify data should be utilised.

Monitoring and evaluation are essential

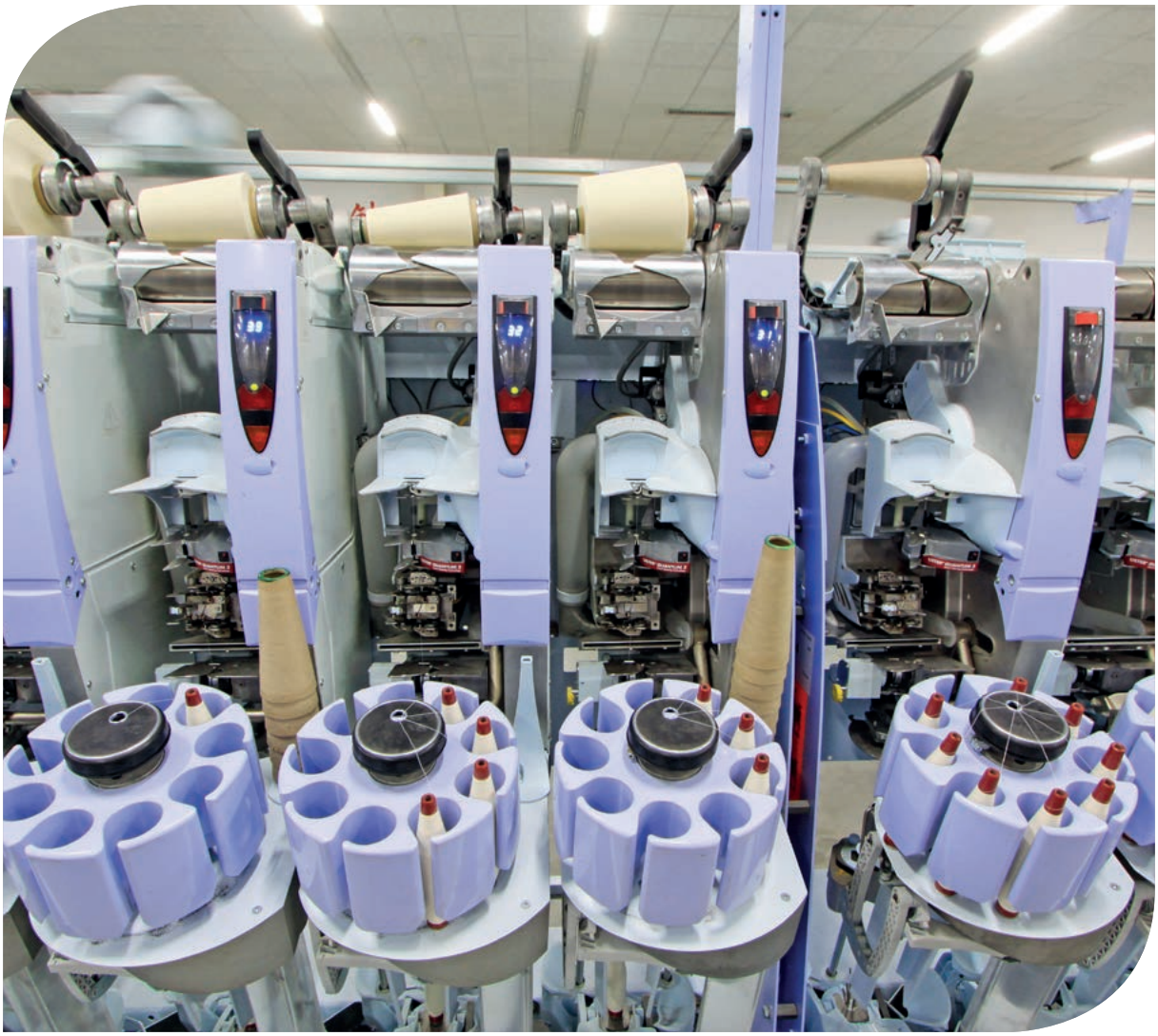
Monitoring and evaluation are essential steps to enable improvements and to report on progress and results. Well-designed and well-conducted evaluations can facilitate access to further funding and enable programme continuation or expansion. Optimally, evaluations include a quantitative assessment of energy savings, monetary savings and the value of other benefits. Furthermore, it is important that the evaluation includes the qualitative identification of the key programme success factors. Reporting requirements should be built into the programme and issues concerning confidentiality need to be dealt with.

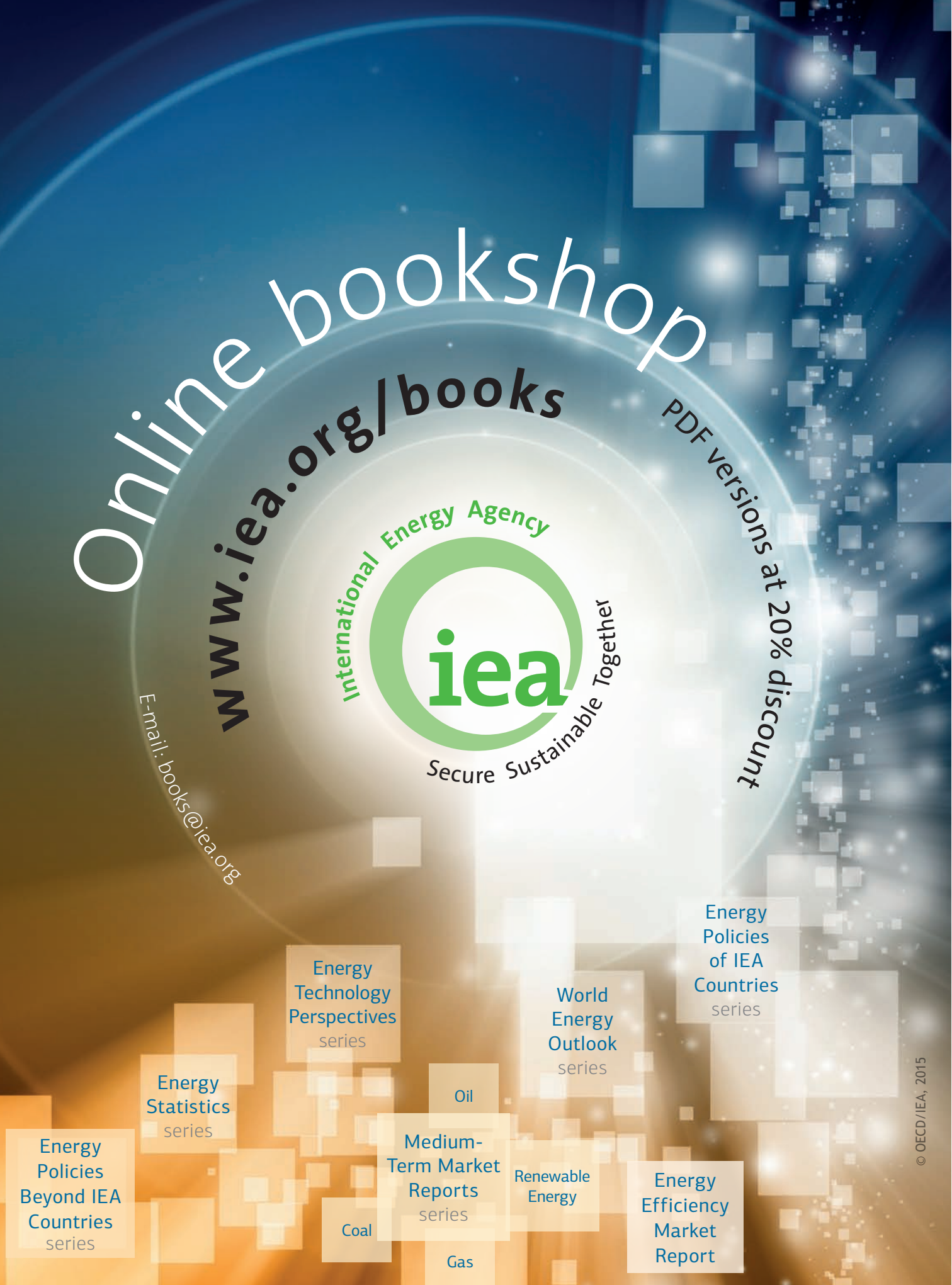
Further evaluation of which programme elements are the most effective would greatly improve future SME programmes. Currently, not every programme is evaluated, and some that are evaluated opt not to publish the results. Initiatives aimed at sharing experiences between programme designers and general managers would further facilitate the development of effective programmes.

Need to scale up

Finally, there is a need to expand and scale up SME programmes so that the benefits of energy efficiency improvement become more widespread. This will require greater understanding of and confidence in the potential benefits; better programme evaluations to reveal what works; more skilled personnel to design and implement programmes; and resources to support the implementation of programmes so that they can deliver on their potential.

When scaling up, it is vital to build on lessons both from national programmes and programmes in other countries. It makes sense to build on existing initiatives, replicate successful programme elements and develop standardised approaches that reduce resource requirements.

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Abbreviations and acronyms

AP Govt	Andhra Pradesh Government
BAFA	German Federal Office for Economic Affairs and Export Control
BEE	Bureau of Energy Efficiency
CAGR	Compound annual growth rate
CHUEE	China Utility-Based Energy Efficiency Finance Program
DECC	UK Department of Energy and Climate Change
DoE	Department of Energy
EBRD	European Bank for Reconstruction and Development
ECCJ	Energy Conservation Center, Japan
ECF	European Climate Foundation
EEIG	Energy Efficiency Information Grants
EEN	Energy Efficiency Network
EJ	Exajoules
EMAK	Energy Management Action Network
ESCO	Energy service company
EST	Energy Saving Trust
ETO	Energy Trust of Oregon
GDP	Gross domestic product
GEF	Global Environment Facility
GHG	Greenhouse gas
GSEP	Global Superior Energy Performance Partnership
IAC	Industrial Assessment Centres
IFC	International Finance Corporation
IPEEC	International Partnership for Energy Efficiency Cooperation
ITC	International Trade Centre
KyrSEFF	Kyrgyz Sustainable Energy Financing Facility
NSIC	National Small Industries Corporation
METI	Ministry of Economy, Trade and Industry in Japan
NABARD	National Bank for Agriculture and Rural Development
NBI	National Business Initiative
OECD	Organisation for Economic Co-operation and Development
PSEE	Private Sector Energy Efficiency
R&D	Research and development
SBI	State Bank of India
SCLAA	Supply Chain and Logistics Association of Australia
SEAI	Sustainable Energy Authority of Ireland
SEEP	Supplier Energy Efficiency Program
SEFF	Sustainable Energy Financing Facility
SEP	Superior Energy Performance, US Programme
SIDBI	Small Industries Development Bank of India
SIDO	Small Industries Development Organization
SME	Small and medium-sized enterprises
SPT	Sustainable Energy Policy and Technology
UKEEP	Ukraine Energy Efficiency Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
WB - GEF	World Bank Group's Global Environment Facility

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