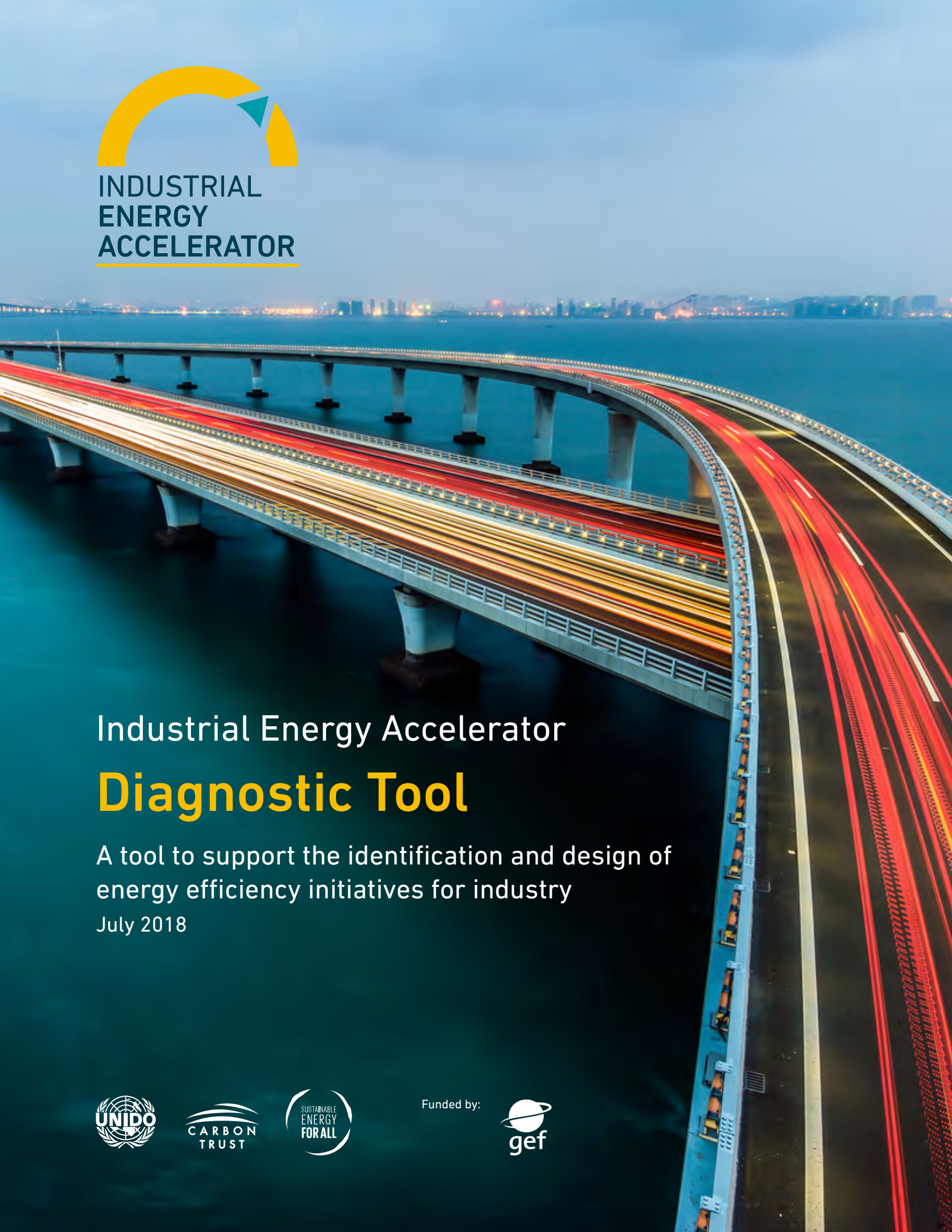

INDUSTRIAL ENERGY ACCELERATOR

Industrial Energy Accelerator

Diagnostic Tool

A tool to support the identification and design of energy efficiency initiatives for industry

July 2018

UNIDO CARBON TRUST SUSTAINABLE ENERGY FOR ALL

Funded by: gef

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Introduction

Background and objectives

In September 2015, the world's leaders came together to agree on 17 Sustainable Development Goals (SDGs). To achieve one of those goals, 'affordable and clean energy' (SDG 7), the United Nations created the SEforALL initiative (SEforALL) to achieve **three objectives**:

1

Ensure universal access to modern **energy services.**

2

Double the global rate of improvement in **energy efficiency.**

3

Double the share of **renewable energy** in the global energy mix.

As part of the second objective, a number of *Energy Efficiency Accelerators* were formed. The **SEforALL Industrial Energy Accelerator (The Accelerator)** is one of these. The Accelerator aims to secure public commitment from governments, industrial corporations and associations, and utilities to drive the adoption of Energy Management Systems (EnMS), best practices and innovation in industry. This initiative represents a substantial opportunity to improve energy efficiency, as global industry accounts for 37% of the world's total final energy consumption and one third of global GHG emissions; yet 60% of identified energy efficiency potential is still to be realized.[1]

Industrial energy efficiency is key for saving costs, reducing stress on the electricity grid and climate change mitigation.[2] Energy efficiency investments create jobs to the tune of 3 additional jobs per million invested because they shift resources from the less labour intensive energy sector to more labour intensive sectors such as industry.[3] Furthermore, for industry the gain from energy efficiency is not only from reduced bills but much more so from increased productivity. While the savings themselves give an average payback period of 4.2 years for energy efficiency investments, the additional productivity gains reduce this massively to 1.9 years.[4]

GLOBAL INDUSTRY
accounts for
37%
FINAL ENERGY CONSUMPTION

THE ACCELERATOR

15 COUNTRIES
with the aim of catalyzing the necessary uptake of **ENERGY EFFICIENCY**

7 AFFORDABLE AND CLEAN ENERGY

BY
2025
to help achieve
SDG 7

1 International Energy Agency (2012), *World Energy Outlook 2012*. (Potential based on efficiency scenarios to 2035).

2 International Energy Agency (2014), *Capturing the Multiple Benefits of Energy Efficiency.*

3 American Council for an Energy Efficient Economy (2012), *How Does Energy Efficiency Create Jobs?*

4 Worrell E. J. A. Laitner, M. Ruth and H Finman, (2003), *Productivity benefits of industrial energy efficiency measures.*

Brazil, Sao Paulo, district Morumbi, skyscrapers, Financial center, bridge Octavio Frias de Oliveira.

The Accelerator will target 15 countries with the aim of catalyzing the necessary uptake of energy efficiency by 2025 to help achieve SDG 7. The full program could total around US$45 million, with anticipated private sector leverage across the supply chain totaling over US$1 billion. The United Nations Industrial Development Organization (UNIDO) and the Carbon Trust are co-conveners for delivering this work.

The Accelerator seeks to support energy efficiency in key industrial sectors through four pillars:

1

Developing country-specific industrial energy efficiency **POLICY MEASURES**

2

Creating in-country **CAPACITY BUILDING** to develop a portfolio of local energy efficiency expertise and management approaches

3

Developing a **PIPELINE** of **investable industrial energy EFFICIENCY PROJECTS**

4

Generating **FINANCING SOLUTIONS** to unlock industrial energy efficiency potential

The Accelerator will support engagement between leading government officials, business leaders, trade associations, research agencies and investors to create a clear vision of how to further mobilize investment for energy efficiency in the key industrial sectors.

How to use this Diagnostic Tool

The Industrial Energy Accelerator (The Accelerator) has developed a Diagnostic Tool to support countries in carrying out an assessment of the industrial energy efficiency opportunity in their market, to understand where to focus the support of the Accelerator and also to help prioritise future programmes.

The Diagnostic Tool is based on the extensive expertise of the Carbon Trust and UNIDO in designing and implementing large-scale energy efficiency programmes around the world. The structure was informed by two years of prior research, covering case studies from 15 different countries and interviews with over 50 different institutions and energy efficiency experts[5].

The Diagnostic Tool uses six fundamental questions (**Figure 1**) to understand the potential for an industrial energy efficiency programme. These questions form a systematic architecture for how to think about designing effective (in terms of GHG emission reduction and energy savings) and sustainable (via continued private sector investment) programmes.

Figure 1. Key questions for appraising an industrial energy efficiency market.

5 AATS; CIF Evaluation

This manual outlines the Diagnostic Tool in the form of a "living document" for stakeholders to appraise the status of their industrial energy efficiency market and create effective interventions to address potential barriers preventing deployment. Each chapter explores the rationale for its defining question, how the concerns fit within the wider framework, and the key methodological steps, questions and data points required to create suitable interventions for accelerating the development of industrial energy efficiency markets.

Chapters and guide to colour coding

For a user, the aim is to understand what are the important factors that characterise different elements of a market, identify where the problems are, and select an appropriate solution package to address them in the long-term.

Accordingly, each chapter sets out what information a user should be looking to obtain and answer in the form of specific **data points** or **research questions**.

Understanding how these data points or research questions relate to each other, there are a number of **templates** to help guide the analysis.

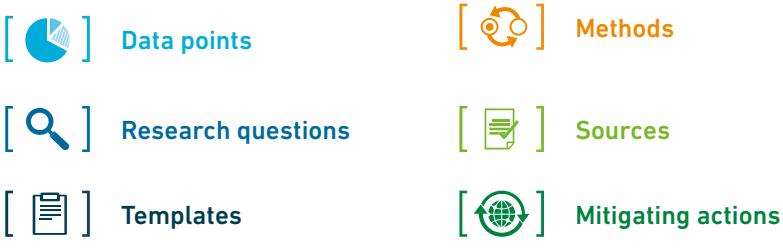
There is guidance on the potential **methods** and **sources** that users can leverage to secure the information required.

However, in many countries the necessary information outlined in this manual can be difficult to obtain, may be of poor quality or non-existent. For situations such as these, there are **mitigating actions** suggested at the end of each chapter to help provide guidance on how to work around commonly cited issues.

Please note this Diagnostic Tool is designed to be generic so that it can be applied to a wide variety of different countries and markets. Therefore, where it might not account for nuances or particularities relevant to specific countries or markets, there must be a degree of flexibility in its application. The user should use their own discretion regarding the best course of action where this is the case.

Ultimately, it is important to recognise that this is a first attempt at classifying the process of appraising industrial energy efficiency markets on a global scale. Therefore, the co-conveners, UNIDO and the Carbon Trust, welcome suggestions and improvements in order to refine this "living document" as more individuals and institutions experience using it in their own contexts. For such inquiries, please refer to the individuals cited in the Authors section above.

Icon and colour coding



1. What is the target market?

Defining the target market will shape the parameters of any initiative. A rigorous market analysis is a vital starting point for designing any effective and sustainable solution package. Given any programme will have limited resources available, the target market needs to be clearly identified for maximum impact. Therefore, a prioritisation exercise will decide what target market within the industrial sector is the most suitable for programme.

Building in the night time of Zhangjiajie City China

Important indicators include:

- **Energy benefits** [ ] as measured by demand reduction, cost savings to energy consumers, and the energy system as a whole; and
- **Non-energy benefits** [ ] such as avoiding GHG emissions, increasing productivity, reducing energy poverty and other socio-economic benefits.

This section begins from looking at the economy as a whole, which involves measuring the size of the industrial market, before focusing on the specific characteristics of key industrial sectors.

In general, it is expected that the majority of the information should be available via **desk-based research** [ ] and **online sources** [ ]. Where this is not readily available, the relevant **government departments** [ ] should have databases.

However, where even this is challenging, a programme may need to design appropriate **surveys, interviews and/or workshops** [ ] to try and gather sufficient data – with the understanding that qualitative data is not a like-for-like replacement of missing quantitative information, and therefore the final recommendations may change accordingly, such as data reporting and collection being a high priority.

Outcome

Understanding of where the major energy and non-energy benefits lie within the industrial sector of a country – and therefore where an energy efficiency programme could have the most significant impact.

Links to other chapters

C 2

CHAPTER 2

Are there drivers for action?

Appraising the target market by uncovering what are the major sectors, their constitution, and how they use energy in a particular country will help to inform an understanding of how particular policy or economic drivers are effective, or not, at motivating them to deploy energy efficiency.

C 3

CHAPTER 3

Is there a supply chain?

The target market are the end-users of energy. How appropriate suppliers of information, finance and technology can help them realise efficiency savings will be defined depending on the selected target market. To be efficient in the programme design, analysing the target market and gauging the size of the opportunity is an important process before deciding on a focus sector/s and investigating its wider supply chain.

C 4

CHAPTER 4

What are the barriers?

Each target market will have its own set of significant barriers. Generalising across sectors without due diligence can lead to a misdiagnosis of the key obstacles for certain end-users. Therefore, being precise in analysing and then selecting the target market will ensure that the barrier analysis is accurate.

C 5

CHAPTER 5

What solutions can address these barriers?

Similarly to the commentary on the barriers above, without fully understanding the characteristics of the target market, solution packages can be misguided and therefore fail to hit their targets. Well-defined target markets will improve the chances of solution packages being effectively designed and implemented.

C 6

CHAPTER 6

How can change be sustained?

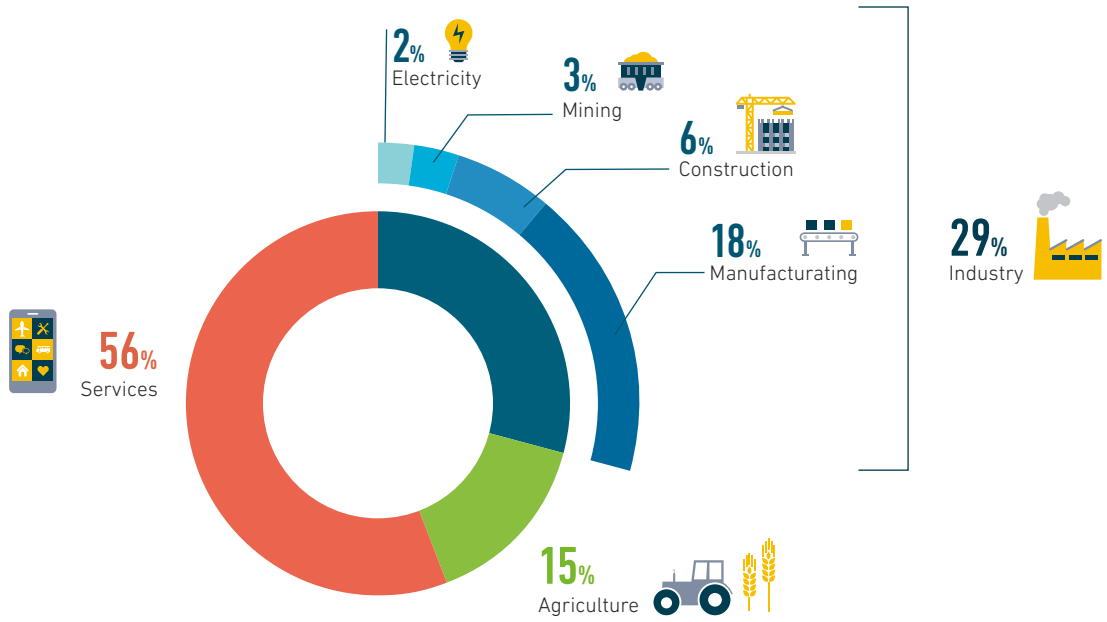
In the long-term energy efficiency has to become business-as-usual for end-users. Hence, appreciating the characteristics, concerns and nuances that define the business for the target market will be essential to informing a long-term strategy to ensure such. Without this, interventions are liable to fail to integrate energy efficiency within the working culture of the end-users.

1.1 Macroeconomic data

At the outset of the analysis, painting a broad picture of an economy is important to explore how the industrial sector fits within it. This will help provide justifications for interventions, due to its relative importance on economic and/or environmental factors, as well as build a basic understanding of what an industrial sector looks like in a given country.

DATA POINTS
Population (millions)
GDP (USD)
GDP/capita (USD/capita)
Sector contribution to GDP (USD; USD/capita; %) (see example **Figure 2** below)
Energy production (Mtoe)
Net energy imports (Mtoe)
Electricity consumption (TWh)
Energy intensity (MJ/$PPP GDP)
CO_2 emissions per annum (Mt of CO2)
CO_2 emissions/capita (Mt of CO2/capita)
CO_2 intensity (Mt of CO2/ $PPP GDP)

SOURCES
World Bank
International Energy Agency (IEA)
National statistical office of the relevant country if available



Souce: Castel, 2016

Figure 2. Contribution to GDP (USD) by sector, Morocco, 2016

1.2 Energy supply

The primary environmental benefit of increasing the efficiency of energy use is related to cutting CO_2 emissions. Certain countries and sectors receive their energy from different sources. Those that are reliant on fossil fuels will represent larger potential for mitigating CO_2 emissions than those that utilize renewable energy.

Moreover, from an economic standpoint, countries that have to import their energy supplies can realise significant fiscal savings if they become less dependent through increasing the efficiency of their energy use. On top of this, the potential benefits for energy security can be a crucial justification for securing political buy-in.

Therefore, characterizing both the current and the future sources of energy are important for quantifying the potential environmental and economic impact that energy efficiency could have in a country.

DATA POINTS
Total energy supply (Mtoe)
Energy mix – relative percentage of different types of energy sources (MW for capacity; MWh for supply)
Future projections of energy the energy mix across energy sources (MW for capacity; MWh for supply)

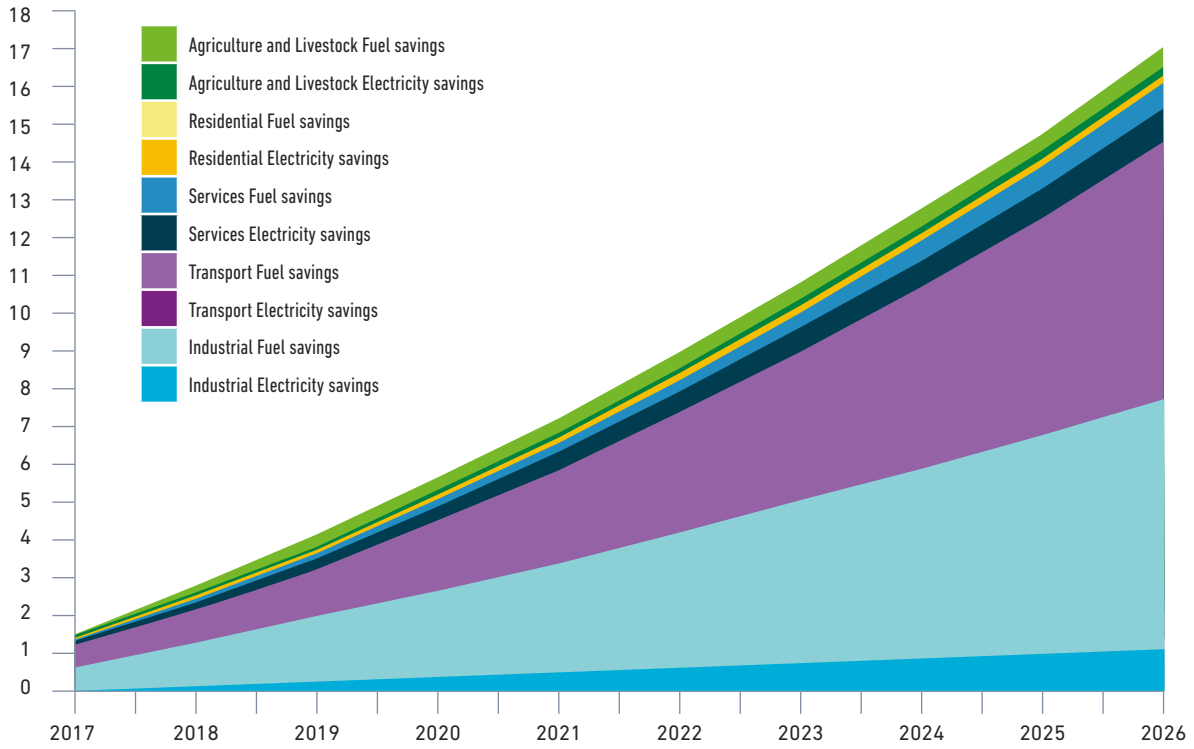
SOURCES
IEA Statistics
US Energy Information Administration (EIA) Statistics
Ren 21 Renewables Interactive Map
IRENA Renewable Energy Country Profiles
National statistical office, department of energy and/or environment of the relevant country if available

1.3 Energy demand

Ultimately energy efficiency measures seek to reduce energy demand. Looking into a country's total energy consumption, and the significance of the industrial sector in this context, is the best place to start. This investigation should include categorizing energy consumption by fuel type – recalling that there will be the largest environmental impact for sectors that rely on fossil fuels (and within them, recognizing that some emit far more CO_2 than others). Where information is available the investigation should also include an understanding of future projected energy demand.

From this broad picture, it is then necessary to dive into the energy intensity (how much energy is used to produce economic value) by sector. Combined with an understanding of what energy sources are commonly used, the energy intensity can be benchmarked against international best practice to highlight the industrial energy efficiency potential. Hence, providing targets for a future programme to aim for, as well as highlighting the evidence to convince potential funders that there is a significant opportunity when compared to other sectors.

DATA POINTS
Total energy consumption (Mtoe)
Energy consumption by sector:
– Industry
– Transport
– Agriculture
– Residential
– Commercial and public services
Energy consumption by sector and fuel type (Mtoe)
Energy intensity by sector (kJ/$)
Energy efficiency potential (Mtoe) (see **Figure 3** below for an example)



Source: Pde 2026 & Sebrae 2017

Figure 3. Projected energy savings per sector, Brazil (Mtoe)

SOURCES

International Energy Agency (IEA)
Third party (academic/consultancy/international development organisation) report on energy use by sector in a particular country
National statistical office, department of industry, energy and/or environment of the relevant country if available

1.4 Industrial sector mapping

It is possible, but unlikely, that an industrial energy efficiency programme will address the whole industrial sector. More likely, it will select a sub-sector, or a handful, to focus on. This helps to promote efficiency in the design and implementation of the programme, whilst ensuring the solution package is targeted at specific barriers in those sub-sectors, because there are less ground to research and less variables to account for.

As a consequence, it is vital to build a comprehensive understanding of what sub-sectors make up the industry in the country. This process involves exploring how the major sub-sectors compare in their consumption and intensity of energy, to identify the potential savings opportunities, as well as their contribution to the economy (GDP and employment), which highlights their relative importance for a programme aiming to make an impact on factors beyond energy.

Example sub-sector categories could include:
Mining
Non-metallic minerals
Food and tobacco
Metal and metal products
Chemicals, rubber and plastics
Textiles, clothing, leather and shoes
Pulp, paper, cardboard and print
Construction
Machine manufacturing
Transport manufacturing
Energy production

1.4.1 Contribution to the economy by sub-sector

Targeting sectors that produce significant value in a particular economy will be beneficial for convincing national and international stakeholders that a programme can bring added value to support economic growth, employment and, hence where applicable, poverty reduction.

DATA POINTS
Contribution to GDP by industrial sub-sector
Number of employees by industrial sub-sector

SOURCES
World Bank
National statistical office or department of trade/ commerce/industry of the relevant country if available

IN CHINA
ELECTRICITY and **COAL**
are **MAIN ENERGY CONSUMPTION**
sources in the identified
9 SUBSECTORS

1.4.2 Energy use by industrial sub-sectors

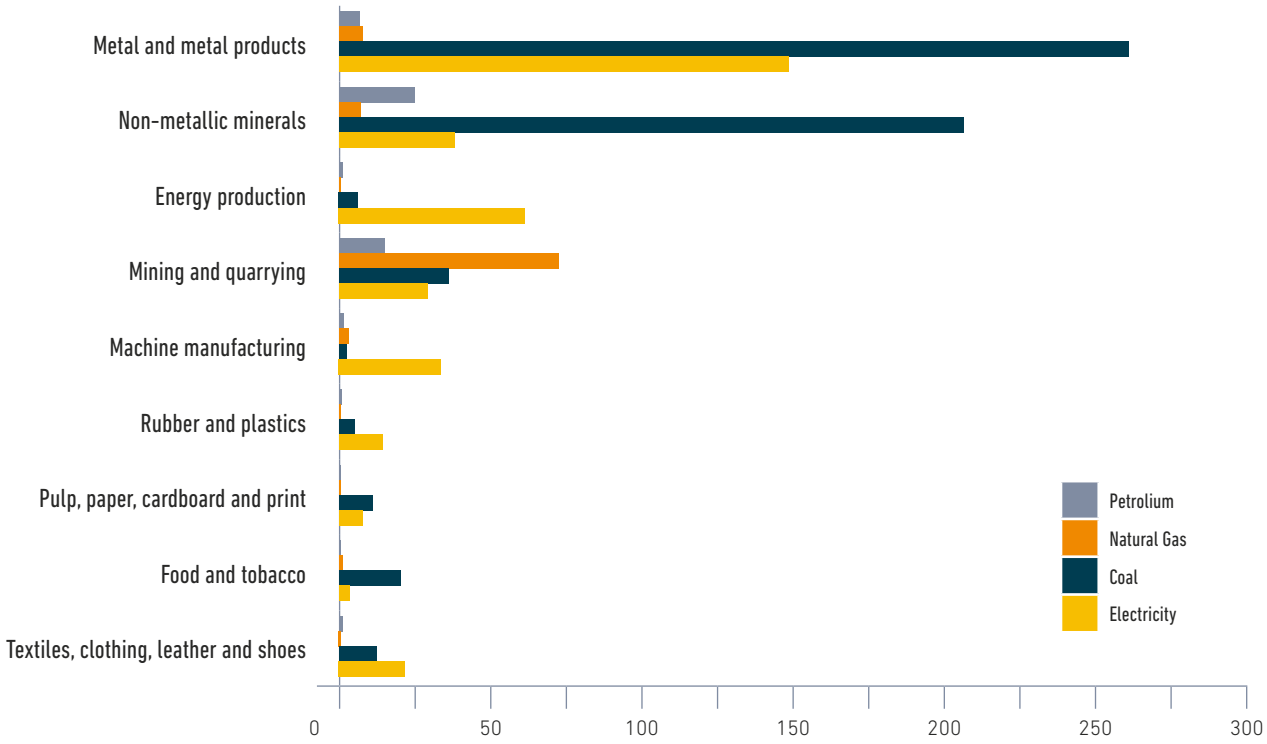
Energy use can be split into three main concerns: source of energy; consumption; and intensity.

DATA POINTS
Source of energy (fuel type) by sub-sector (Mtoe)
Energy consumption by sub-sector (kWh)
Energy intensity by sub-sector (kJ/$)

See **Figure 4** below for an example that breaks down the major industrial sub-sectors, what fuels they use and how much they consume.

If there is a lack of economy-wide data, it should be possible to focus on top 20 industries and/ or 50 companies with largest electricity/energy consumption per annum through information from the relevant government departments and/or utilities.

SOURCES
International Energy Agency (IEA)
World Bank
Third party (academic/consultancy/international development organisation) reports on energy use by sector in a particular country
National statistical office, department of industry, energy and/or environment, utilities of the relevant country if available



Source: National Energy Statistics Yearbook, 2016

Figure 4. Industry sub-sector energy consumption by fuel-type (Mtce), China, 2015

1.4.3 Key market characteristics for major sectors

This sub-section provides more detail and depth beyond macroeconomic and energy data in an attempt to highlight market characteristics that are important to account for when appraising industry and energy efficiency in a particular country. It is important to comprehend the dominant structures, motivations and wider working cultures within key industrial sub-sectors so that a programme can secure local stakeholder buy-in and successful implementation.

To illustrate, if a sub-sector is defined by a handful of large corporations it will behave differently to one that is made up of a hundreds, if not thousands, of family-run SMEs. Getting to grips with these nuances is vital for a programme to accurately define its target, appraise its barriers and propose an appropriate solution package.

A selection of key market characteristics include the following **data points** [ ]:

DATA POINTS

Ownership, size and distribution of companies by sub-sector

This is important when both engaging in fact-finding through the diagnostic – mapping out what stakeholder engagement is preferable and possible given the size and distribution of companies – as well as the type of energy efficiency programme that results. Whether an industry is dominated by larger multinationals, local SMEs or state-owned enterprises is often a key indicator for ability to leverage expertise and finance to invest in energy efficiency, and what future support they may require.

Growth and productivity

It is commonplace that these two are the primary business concerns for companies (energy efficiency is secondary in comparison). Hence understanding the recent history and potential developments in growth and productivity for companies will enable better communication of how energy efficiency can support their short- and long-term business aims. Moreover, it is important to recognise that growing industries are more likely to be willing to invest in novel projects, which energy efficiency will be for many.

Supply chains and customers

These are fundamental cogs of any business model and an appreciation of whether they can assist, through supply of technology/expertise or demand for 'greener' goods (or hinder, through the lack thereof) implementation of energy efficiency is key for the long-term sustainability of a programme (note, this is explored in more detail under the value chain sub-section in Chapter 3 C3).

Support for investment

Ultimately organisations will have to make investments to deploy energy efficiency (for either technology or expertise), and so establishing whether there are existing channels or initiatives for encouraging such investment is important for understanding the capabilities and opportunities for a target market (note, this is explored in more detail in under existing initiatives sub-section in Chapter 3 C3).

The information outlined above will be a mix of quantitative and qualitative data points to adequately describe the key market characteristics. However, key data points may not be readily available via desk-based research in all countries and markets. Therefore, interviews and/or workshops will be necessary to fully understand the workings of each sub-sector. It is probable that this analysis will follow a high-level decision on which industrial sub-sector/s to focus on given the above macroeconomic and energy data, as well as decisions by key stakeholders (e.g. government ministry).

SOURCES

International Energy Agency (IEA)
Third party (academic/consultancy/international development organisation) reports on energy use by sector in a particular country
National statistical office, department of industry, energy and/or environment, utilities of the relevant country if available
Key market characteristics will most likely require interviews and/or workshops with relevant companies and industry associations to uncover the latest developments in a target market

METHODOLOGICAL CHALLENGES AND MITIGATING ACTIONS

Lack of data is a common problem in many countries, with a lack of accessible data in quantity and/or quality. If online research leaves significant gaps, certain data points can be filled by working with the relevant government ministry to acquire key entries. Moreover, utilities may prove to be another useful avenue for collecting data on the most significant energy users in a given country. Lastly, if there is sufficient time and resources available, then constructing, disseminating and analysing a simple survey to send to the most important companies via the government to uncover vital data points is plausible, but the risk of a low response rate is high.

If this quantitative data collection is not possible, the underlying analysis will have to make recommendations based on qualitative data – and therefore should proceed with extra interviews and workshops to counterbalance the lack of quantitative information. Furthermore, in the final recommendations, building capacity to collect sufficient data should be a high priority.

2. Are there drivers for action?

This question is investigating whether the business case for energy efficiency in the target market is fundamentally undermined or supported by existing policy (regulation) and/or market (incentives and competitiveness) drivers.

Key themes are:

- Do **policy drivers** such as standards, regulations and incentives support and/or enforce the business case for energy efficiency?
- Do **economic drivers** such as energy price, competitiveness and productivity adequately incentivise the business case for energy efficiency?

These fundamentals determine whether energy efficiency can become a serious consideration for an industrial sector. Whilst they are related to the analysis of barriers that comes later (**Chapter 4 C4**), they are the overriding policies and economic circumstances that define a market and are too significant to include with more specific barriers related to energy efficiency.

Here are three examples to illustrate

No matter what other barriers are identified, if the price of energy is too low, energy efficiency investments will not be feasible, let alone attractive – alternatively, if the **energy price** is high, that is a strong positive driver for action to cut energy bills;

Or

If there is a complete absence of **energy efficiency standards,** then there will not be a functioning market for energy efficient goods – but where there is a clear understanding of what is an efficient product, this can define the possibilities for action;

Or

In the context of an **economic recession**, convincing companies to make new investments is often misguided when they are concentrating on surviving – but in industries which are growing, they will want to become more productive and competitive through effective investments.

If industrial energy efficiency is ultimately undermined by the drivers, it is likely that any programme would be too. This would require careful consideration into whether the subversive driver/s could be addressed, at least in part, by the programme, or whether resources are better allocated elsewhere. In general, energy efficiency measures are difficult to deploy, therefore a positive environment does not indicate policy should shift into new areas, but that there is great opportunity to realise significant deployment and impact for energy efficiency.

Outcome

Comprehensive understanding of the policy and economic environment that the industrial sector operates in and how it can help or hinder an energy efficiency programme.

City tram on a street of Casablanca, Morocco

Links to other chapters

C 1

CHAPTER 1

What is the target market?

Different policy and economic drivers affect different target markets. Therefore having an idea on what target market is the focus will enable research into the most relevant drivers.

C 3

CHAPTER 3

Is there a supply chain?

Certain policies are very influential in providing the parameters for flows of information, technology and capital. For instance: mandatory audits and/or reporting increases the need for quality information; standards can establish minimum performance requirements for technologies in a market; and regulation around energy performance contracting or leasing can either allow or prevent energy efficiency financing through these channels. Moreover, the economic context of a supply chain – whether it is growing, competitive, skilled etc – are key pieces of knowledge for understanding its relative maturity, and what a programme can hope to achieve in the circumstances. Essentially, understanding the drivers is fundamental when taking account of the characteristics and possibilities of an energy efficiency supply chain.

C 4

CHAPTER 4

What are the barriers?

There is a very close relationship between drivers and barriers – as discussed above. The most important takeaway is that drivers are what sets the context for the market. Therefore, they can be barriers themselves (e.g. low energy prices) but ultimately they are overriding factors that define everything else. Individual barriers are specific to particular industries, supply chains and organisations – drivers define the market for all of these three groupings.

C 5

CHAPTER 5

What solutions can address these barriers?

Ultimately, correcting the barriers in a market will be necessary but insufficient to creating a sustainable market. The drivers will have to encourage long-term behaviour change; this can be very difficult and often beyond the scope of one programme. Nevertheless, it is worth considering how they can be influenced by individual and collective efforts across energy efficiency initiatives. For example, even though reducing energy subsidies may be a long-term political challenge, an energy efficiency programme can develop and demonstrate case studies that prove at what level energy efficiency investments are attractive and encourage the government to look into alternatives to subsidies.

C 6

CHAPTER 6

How can change be sustained?

As stated above, the long-term sustainability of an energy efficiency market will be reliant on drivers supporting, not undermining, it. Questions around whether a political or economic context is too challenging for long-term change following a programme should influence decisions on whether the target market is appropriate, or efforts might be better spent elsewhere.

2.1 Policy drivers

Legislation is important for stimulating both supply and demand in energy efficiency markets. Having a comprehensive map of what policies are relevant to a target market and whether they are effective are the two key objectives. The former can often be solved through desk-based research, utilizing both international and national sources of information. However, investigating the efficacy of policies, particularly around their enforcement, will require stakeholder engagement through surveys, interviews and/or workshops if there is not adequate literature available.

Do **examples of the following policies and regulations** [ ] that are relevant to the industrial sector exist – at an international, national or sub-national level – or are there plans to implement them.

EXAMPLES
Energy price subsidies
Carbon price
Energy audits
Mandatory energy reporting
Energy efficiency targets and roadmaps
Certification and accreditation
Codes and standards
Tax breaks or other incentives
Energy efficiency ministry or agency
Utility efficiency program

SOURCES
IEA policy database
World Energy Council
ESMAP RISE
Climate Scope
reegle – Clean Energy Info Portal
Surveys, interviews and/or workshops with government and industry representatives

Whilst looking into the relevant policies, there **is an overriding concern: is the relevant legislation enforced? If not, why not?** [ ]

These questions often go beyond what is found in catalogues of the policies (e.g. ESMAP RISE) and can be challenging to answer, particularly as governments have an interest in insisting policies are effective. Therefore, unless there have been evaluations – most likely by third parties (e.g. consultants or academics) – this will require stakeholder engagement via questionnaires, interviews and/or workshops to uncover the true efficacy of the most relevant policies.

As an example, **Table 1** (shown below) presents an indicative engagement strategy and set of research questions for investigating the effectiveness of a particular policy – in this case, mandatory reporting.

Table 1. Example stakeholder engagement strategy for investigating the effectiveness of a particular policy >

POLICY
MANDATORY ENERGY REPORTING

STEP 1	
Interviewer to define the policy and its objectives	Mandatory energy reporting includes external reporting of energy use for compliance with government policies, and internal reporting (for example from energy managers or internal auditors to chief executives or board of directors).
	The objectives of the policy are to increase understanding about the energy efficiency opportunity in your business and thereby improve the chances of implementation.

STEP 2	
Interviewee awareness of the policy (closed questions)	Have you heard of this policy of mandatory energy reporting?
	Are you obliged to act under this policy?
	Do you know what actions it involves?

STEP 3	
Interviewee action on the policy (open questions)	What steps or processes have you put in place to report your energy use due to the mandatory reporting policy?
	Has this reporting led to any further action on implementing energy efficiency measures?

STEP 4	
Interviewee evaluation of the policy (open questions)	If you have taken action on energy efficiency, what was your motivation? Did the policy play a role, if so was it significant?
	If no action was taken, please explain why? E.g. lack of awareness, time, resource or design fault with the policy
	What policies or support would help you to act on energy efficiency in the future?

STEP 5	
Interviewer evaluation of the policy	Analyse feedback from interviewees to assess what extent the mandatory energy reporting policy has been effectively i) understood, ii) enforced, iii) implemented, and iv) evaluated, in the context of its objectives. This can utilise quantitative analysis for the closed questions; and qualitative for the open questions.
	Comment on ways to improve the policy, or similar initiatives, in the future based on feedback from interviewees.

2.2 Economic drivers

Ultimately, energy efficiency deployment in industry will be driven by business priorities. The current **economic climate** of a country, and its industry, is a key determinant of such.

This sub-section is intimately linked to the analysis of the target market in **Chapter 1** C1, but takes a different approach – instead of cataloguing the significant characteristics of a target market, this analysis is trying to understand what might, or might not, **critically define the business case** for energy efficiency.

Once again, it is important to stress that whilst there are clear relationships with the barriers identified in **Chapter 4** C4, this sub-section is concerned with the overriding economic drivers – that affect whole markets, not just individual businesses. As such, they can act as **primary economic obstacles or motivations** for an industrial energy efficiency programme.

The **important questions** [🔍] are as follows, and could largely be answered through desk research - however when investigating specific industries in more detail, interviews may be required:

QUESTIONS
Is the economic climate favourable to new investment – i.e. it is not going through a contraction/recession?
What is the industry structure? Who are the major players in the sector, are they international/national/regional; big/small; specialized/diverse; vertically integrated, etc.?
What is the overall economic condition of the sector? Is it growing rapidly or stagnating?
Is the industry competitive internationally? Does it export? If so, to whom? Who are its competitors? Do they benefit from low energy costs / EE?
What are the prevailing market trends that help or hinder the industry to sell its products (e.g. cost of technology, cost of alternatives, etc.) and what is driving them?
What has happened, and is forecast to happen, to revenue and profit in the sector?
Does the sector find it easy, indifferent or difficult to access finance for new investments? What type of finance is typically used?

SOURCES
International and national case studies on industrial sector and/or focus sub-sectors
National statistical office, department of industry, energy and/or environment of the relevant country if available
Surveys, interviews and/or workshops with key government and industry stakeholders

< Charcoal furnace on the eucalyptus farm in Minas Gerais , Brazil.

METHODOLOGICAL CHALLENGES AND MITIGATING ACTIONS

Negative drivers

The overarching influence of drivers can define energy efficiency markets. Unfortunately, they can have a significantly detrimental effect on the growth of the market. For example, critical problems can relate to subsidised energy prices, absence of standards, poorly enforced regulations and/or a lack of incentives to make new investments. These challenges can be entrenched in local markets and politics, and therefore very difficult to address, particularly in the short-term.

However, any proposed solution package should not overlook them and attempt to avoid their influence – the sustainability of any impact will be undermined if they are left unaddressed. Therefore, whilst it should not necessarily be the primary objective of a single industrial energy efficiency programme to address negative drivers (given the inherent political challenges), it should attempt to lay the ground for a transformational change through its work.

This may involve collecting valuable data points for future regulations, demonstrating and disseminating the economic success of energy efficiency projects, as well as engaging in a long-term dialogue with key policymakers to develop the case for changes in fundamental polies. In sum, if negative drivers define a market – it is essential that they are recognised and considered in the proposed recommendations.

3. Is there a supply chain?

To realise the benefits of energy efficiency in a target market, there needs to be:

- A **flow of information** to build essential knowledge, skills, and behavioural change;

And

- Appropriate **flows of technology** and funding (where capital investment is needed).

Institutions and companies, with the sufficient expertise and connections to deliver them efficiently and reliably, facilitate these flows. These can be both local and international, public or private institutions.

It is important to note that the supply chain in focus here is not simply the value chain that supplies the energy efficiency goods. It also includes the government departments or international development organisations trying to create and catalyse industrial energy efficiency markets.

The main task is to map out the relevant **value chain/s** for the sector/s in focus (**Figure 5** below), and investigate where assistance is needed, such as:

There is an existing local supply chain that can satisfy the needs of information, technology, and capital but requires synchronisation through better integration between the three;

Or

There are some local institutions and companies that have the potential to provide the needs for a supply chain, but overall they lack the internal capacity or skills;

Or

There is a gap in the supply chain that cannot be filled by existing local capacity and so either requires inviting foreign entities into the market or stimulating the entry of new local entities.

Figure 5. Example of a generic value chain for energy efficiency services

This section also involves developing a picture of the institutional landscape and past and present energy efficiency initiatives that are relevant to the industrial sector. Understanding what their objectives, methods, impact and timelines are will help guide analysis towards whether there are significant gaps and/or opportunities for collaboration and scale-up across the supply chain.

Outcome

An accurate mapping of the supply chain, which allows identification of where the major strengths and weaknesses for delivering energy efficiency lie across a supply chain, and therefore targeting where a programme can have the most impact.

Links to other chapters

C 1

CHAPTER 1

What is the target market?

Many of the in-depth questions about particular supply chains will require a decision to be made on what the target market of the programme is prior to undertaking that analysis. The clearer the definition and boundaries of the target market, the easier it will be to identify and analyse its supply chain.

C 2

CHAPTER 2

Are there drivers for action?

Supply chains are heavily influenced by the policy and economic drivers that define their markets. Supportive drivers can help encourage rapid growth of supply chains as businesses spot new sources of revenue; however, negative drivers can severely limit the opportunities for supply chains, ensuring they remain immature. Therefore, understanding the wider policy and economic contexts is vital for investigating the current and potential capacity of a supply chain.

C 4

CHAPTER 4

What are the barriers?

Many barriers are connected to the gaps, weaknesses and/or misalignment of the supply chain mentioned earlier. Highlighting the crucial pieces of the supply chain where the flows of information, technology and/or capital fail to pass will help to identify and target the most significant barriers.

C 5

CHAPTER 5

What solutions can address these barriers?

It is vital that solutions take account of the whole supply chain – even if they cannot address all the different stakeholders across it. Understanding why a solution package may not be getting the results envisaged often has something to do with problems not fully understood elsewhere in the supply chain, therefore comprehensively mapping it out and analysing its capacity will help to locate potential problems early on and mitigate them effectively.

Moreover, it is important that any proposed solution package works well with existing initiatives and stakeholders across the supply chain. Avoiding a duplication of efforts whilst trying to accelerate developments or fill potential gaps related to other initiatives will help to make new programmes more efficient and effective at delivering impact.

C 6

CHAPTER 6

How can change be sustained?

Long-term, sustainable markets are only possible where there are sufficient skills and capacity across the supply chain to deliver energy efficiency services commercially. Accordingly, a long-term strategy for encouraging a highly skilled and qualified supply chain across all aspects (information, technology and finance) is fundamental for laying long-lasting foundations that will remain in place beyond the expiry of a particular energy efficiency programme.

3.1 Value chain: information, technologies and services

The emphasis in this sub-section is to sketch out how the target market can access the required information, technologies and services for implementing energy efficiency measures. Naturally, this means that this analysis will be tailored according to the sector/s that is in focus, as per the analysis in **Chapter 1** **C1**.

Based on **Figure 5** above, the value chain can be broken down into different categories, with key research questions pertinent to each outlined below.

3.1.1 Identification of demand

Identifying the energy efficiency opportunity in industry can either be the responsibility of the end-users themselves, or external experts. It requires pre-existing knowledge and skills in both energy and the sector of focus too.

The latter can be a particular problem in industries that have unique processes that can even be different from facility to facility. For instance, agriculture is a sector that uses a whole host of different processes depending on the raw materials, environment, technology and produce, and can vary from farm to farm even in the same country.

In an ideal scenario, the end-users are capable of identifying energy efficiency opportunities in their own organisations. However, given the fact that energy efficiency is a novel idea in many industries, this is often not the case.

Instead, external experts are necessary to assess, identify and evaluate the potential for energy efficiency measures to make an impact for the end-user. Typically, these are auditors or similar organisations who can provide consultancy and advisory services.

Hence, the **key questions** [🔍] to answer are:

QUESTIONS
Are there local auditors or similar consultants who can identify energy efficiency opportunities in the target market?
Is there a certification or accreditation service to prove these organisations are suitably qualified?
Is there a standard template or procedure for undertaking the audit, or does it differ between organisations?
Are audits mandatory for the target market?
How are audits payed for – is there financial support on offer (e.g. government grants) or is it left to the end-user?
Is there any other wider support for identifying demand beyond energy audits – for example, marketing campaigns, remote advice, conferences, workshops and training for in-house energy experts?

To answer these questions, there may be **academic papers, consultancy reports or government documents** [📝] that outline the situation in a particular country. However, the most effective way to answer them comprehensively will be through **interviews** [📝] with auditors themselves, as well as end-users and government officials.

3.1.2 Manufacture and sale of products

Once an opportunity is identified, the suitable technologies and/or services need to be available. Particularly in immature energy efficiency markets, this can be problematic.

First, knowing what an energy efficient product actually is can be an obstacle. There needs to be clear, well-understood standards, and perhaps accreditation of "best-in-class", to signal to the target market what products can actually realise energy savings.

Second, energy efficiency goods are often sold at a premium when compared to the market standard (or in many cases, far cheaper second-hand alternatives). Without energy efficiency being in demand, there is little reason for manufacturers and retailers to market more expensive products, leaving a significant gap in the local supply chain.

Therefore, marrying the identification of demand with appropriate products is the objective. In order to understand how this can be encouraged, and where problems may lie, the **questions that need answering** [ ] include:

QUESTIONS
Does the product/s in focus for the end-users address a function or process that is standardized? This is crucial because processes that are the same across end-users can reach significant scale, and therefore impact, more easily than those that have specific requirements for different end-users.
Are there clear, well-understood energy performance standards for the products that can deliver energy savings in the target market?
Is there "best-in-class" accreditation of the top performing products to enable end-users to achieve the maximum savings?
What is the cost differential between the inefficient, minimum energy performance and "best-in-class" products?
What is the potential payback period of different products – could end-users aim to maximize energy savings with "best-in-class" products?
Are there relevant local or international manufacturers or retailers currently operating in the market? Note, local governments may wish to prioritise those manufacturers or retailers who are local, or international companies who have a significant local footprint.
Are manufacturers and/or retailers trusted in the market? Are they accredited/certified suppliers? A common problem is a lack of confidence and trust in the ability of energy efficiency products to realise the promised savings, and this can be down to misleading by those who sell them.
Is there an existing relationship between manufacturers, retailers and end-users? Are there any ongoing support mechanisms or initiatives to promote these relationships – for example, marketing campaigns, financial support, matchmaking, conferences and workshops?

It is hoped that many of these questions may be answerable through **online resources**.[ ] This includes technology databases, supplier websites and/or previous research into available technologies for a sector and/or country. However, it is understood that these resources are not always readily available. In such instances, it is necessary to design and roll-out targeted **surveys**[ ] and **interviews**[ ] with key stakeholders to source primary data within a particular market.

3.1.3 Evaluation and investment

Following the identification of both the energy efficiency opportunity and the products that can satisfy it, a **convincing business case** needs to unlock the necessary investment. The business case needs to win over the **decision makers** in the organisation to dedicate sufficient funds for implementing the energy efficiency measures. This inevitably means that other potential business investments are deprioritized in comparison. Therefore the business case needs to be constructed in terms of the business priorities and clearly communicated to the senior management, who are unlikely to be familiar, let alone experts, with energy efficiency.

Once again, this process can be the responsibility of the internal energy manager or the external expert hired to identify and evaluate the energy efficiency opportunity. What is important for scoping a market is investigating whether either of these parties is adequately equipped with the skills and tools to produce a convincing, investment-grade business case.

As a result, these are the **important research concerns** [🔍]:

QUESTIONS
Are there templates, tools and advice available to help create an investment-grade business case for energy efficiency proposals?
Is there training and/or qualifications for energy managers, auditors or similar parties on how to prepare effective business cases?
Do these parties have access to the decision-makers in the organization who will sanction any new investments?

The answers to the first two research questions should be discoverable through desk-based research. Typically there may be government, or government-sponsored, websites or reports that outline the assistance on offer. But for the last question, whilst there may be evaluations provided by previous academic or consultancy reports, this is likely to require interviews with key stakeholders with the target market (companies or industry associations in particular).

Beyond convincing the decision-makers within an organization, for most energy efficiency investments it is also vital to secure the approval of potential creditors. Financing energy efficiency investments can be alien to existing creditors – the concept of taking on debt to realise future cost savings is not a typical investment for businesses who normally ask for loans to finance growth in production, and therefore revenues.

Although some creditors may be comfortable financing these investments on the basis of their strong pre-existing relationship with the end-user, others can be skeptical at best. Therefore identifying which financial institutions are able and willing to underwrite energy efficiency investments is an important part of mapping the supply chain. Moreover, understanding their requirements will be central to convincing them to lend to a particular project.

The **relevant questions** [🔍] to answer include:

QUESTIONS
Do end-users in the target market have established lines of credit for financing investments that do, or could, include energy efficiency? Or would they need to secure new sources of finance?
Are there financial institutions with a history of funding energy efficiency investments? This could include banks, leasing companies or energy service companies (ESCOs) depending on the market.
Is there technical or financial support for financial institutions – such as from the government or international development organizations – looking to invest in energy efficiency?
Can the target market access finance that is off balance sheet / unsecured to collateral, or must it account for it on its balance sheet / secure it with assets?

Investigating the first three questions should at least begin with **desk-based research** – scanning the internet for examples of ongoing financial support, run by both international and national institutions. However, to uncover some detail about their relative success will likely require **interviews** with the relevant institutions, and their partners, unless there are **third party evaluations** available. The last question can also be partly answered through these means if there is sufficient information on offer, but to be comprehensive in the research and analysis, **interviews** with the stakeholders from the target market are necessary.

One of the questions above refers to **ESCOs**. These companies specialize in using energy performance contracts (EPCs) to sell energy efficiency investments. In short, EPCs guarantee that the end-user will realise a minimum amount of cash savings from an energy efficiency investment – if this fails to materialize, the ESCO will cover the difference.

Historically ESCOs have had mixed results across the world. They are most prevalent in the USA and, more recently, in China (see **Figure 6** below), but have struggled to take root in developing countries where their business model is less trusted and there is not sufficient legislation or enforcement to protect end-users.

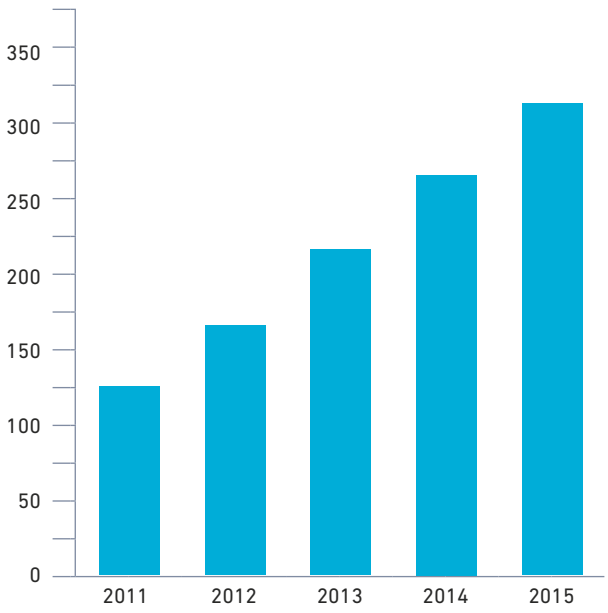


Figure 6. Total value of output of ESCOs, China, 2005-2011 (billion RMB)

The key lesson from their varying degrees of success is that ESCOs are not a solution to creating energy efficiency markets in and of themselves. Instead, they are merely a type of supplier who can provide the necessary services when there is sufficient demand for their services, and adequate regulations, technologies and finance in the market.

Where ESCOs have established themselves, it is **important to ask** the following:

QUESTIONS
Are EPCs enshrined in legislation?
Are there means of certifying/accrediting ESCOs?
How many ESCOs are there?
What is their historical growth rate?
How many people do they employ?
Do they have their own trade association?
Do end-users and financiers view them positively?

For countries where ESCOs are prevalent, there should be available **analysis and reports online** that examine their situation and potential. In particular, if there is an collective association for ESCOs in a country, they should host some of the relevant information. Moreover, sources such as the ESMAP RISE database should provide answers to questions around policies for ESCOs. However, both for countries where ESCOs are less common, and the more in-depth questions regarding views on ESCOs and their employment, will likely necessitate stakeholder engagement through **surveys, interviews and/or workshops** depending on which is most efficient and effective for securing adequate information.

3.1.4 Delivery and installation

Once a business case is successful, the purchase and installation of the energy efficient technology can take place. Gathering information on whether there are local delivery channels established, or whether these need to be developed, is important for comprehending the scalability of a local market. Moreover, the quality of installation can be a factor in the performance of energy efficient equipment, therefore understanding whether the responsible parties are trusted is also a potentially significant factor.

Accordingly, the research **questions to ask** [🔍] are:

QUESTIONS
Are there experienced companies and/or individuals who have a track record of successfully delivering and installing the required energy efficient equipment in the country?
If so, how many are there and where are they based?
Do the answers to these questions make it feasible for the target market to access them, or is matchmaking required?
If there aren't sufficient numbers of competent and qualified companies and/or individuals, is there training or other support mechanisms in place to address this issue?

Unless there has been an extensive research project that looked into industrial energy efficiency in a country, then it is unlikely that the majority of the necessary answers to these questions will be found without local **stakeholder engagement** [📝]. The final question is the least like this, whereby it should be possible to identify support mechanisms and training programmes for suppliers. However, this is not guaranteed, and if so then **interviews** [📝] are required.

3.1.5 Long-term operations and maintenance

Fundamentally, energy efficiency measures will only realise the maximum energy savings when operated and maintained properly. Whilst this will often be the responsibility of the end-user, occasionally external experts will be required. For example, when a technology is leased to a company, the leasing agent can assume responsibility for operating and maintaining it, given that they still own the equipment. Or alternatively, there may be external monitoring and verification teams to assess whether the end-user is abiding by its responsibilities so that they can judge the impact of a programme and/or the end-user can unlock financial incentives for successful operation.

Therefore, there are two sides to this issue – the capabilities of the end-user and any external experts. These can be uncovered by investigating the following **questions** [🔍]:

QUESTIONS
Are end-users in the target market sufficiently knowledgeable and skilled to operate energy efficient equipment properly?
If not, is there available training and guidance (such as remote advice) to assist them?
Are there sufficient numbers of skilled monitoring and verification specialists in a country? If so, are they experienced working in the target market or is matchmaking necessary?
If not, is there training and education programmes available for them?

For the questions around support and advice measures, there may be **information available online** [📝] through development organisations, government or industry associations. For the other issues, it is worth looking out for previous **government, academic or consultancy reports** [📝] that investigate industrial energy efficiency to see if these issues are touched upon. However, ultimately to secure satisfactory information will require likely **interviews** [📝] with the target market and potential monitoring and verification specialists.

3.2 Key stakeholders and existing initiatives

3.2.1 Key stakeholders

This sub-section focuses on describing and analysing the **institutional landscape** in a particular country. This includes the government (national and regional), the private sector, and the civil/third sector.

The information presented should explain what these bodies are and how they might be relevant to the sector or technology in the brief. An example matrix is given below (**Figure 7**) that outlines the cross-section between categories of key stakeholders and the important functions and/or roles they can play in industrial energy efficiency initiatives and markets.

Further, the relationship between the stakeholders needs to be understood – a process that involves mapping out the energy efficiency supply chain. **Figures 8 and 9** below provide examples.

	FUNCTION / ROLE						
STAKEHOLDER CATEGORY	*Developing policies & regulations*	*Setting targets & strategic directions*	*Capacity building & training*	*Providing access to finance*	*Coordination of various EE initiatives*	*Raising awareness*	*Deploying EE solutions*
Government ministries & agencies – from national to local	■	■		■	■	■	
International donors & development organisations			■	■	■	■	
Public and private financiers (with a track record in EE)			■	■		■	
Energy efficiency service providers			■			■	■
Industry associations			■		■	■	■
Utility companies						■	■
NGOs, universities or other research / conultancy-based organisations		■	■			■	
Platforms, events or other initiatives that bring stakeholders together			■		■	■	

** key: dark blue = relevant*

Figure 7. Example matrix highlighting the roles typically played by different stakeholders*

Beyond mapping who are the key stakeholders in a market, and the links between them, it is necessary to explore whether there are any significant gaps, weaknesses or misalignment across the ecosystem.

First, it is important to see if there are any clear **gaps** in the functions and/or roles performed in a particular market (as per the example matrix above). For instance are the stakeholders that should provide access to finance non-existent within the country. If so, there is a clear gap in the supply chain which needs to be addressed by future initiatives to build a functioning energy efficiency market.

Relevant **research questions** [ ] to identify potential gaps:

QUESTIONS
Can a complete supply chain be drawn for flows of sufficient information, technology and finance to the end-users?
If not, where are the gaps?
Are there existing initiatives or support on offer to help fill these gaps?

Second, there is an objective to uncover whether the institutions and organisations are **capable** of fulfilling their supposed functions/roles. If they lack the skills, experience and/or capacity to adequately perform in the supply chain then a future programme should target this weakness.

Key questions [ ] to investigate the experience, skills and capacity of a supply chain:

QUESTIONS
Across the supply chain mapped out, are there any significant points where an institution or organisation has a lack of experience with energy efficiency projects?
If so, are they still keen to develop the experience and are there existing support initiatives on offer to help them do so?
Are there any institutions or organisations who have experience but are insufficiently skilled to develop new projects to an investment-grade standard?
If so, are they still keen to develop the necessary skills and are there existing support initiatives on offer to help them do so?
Are there any institutions or organisations who have experience and the skills to develop new projects but lack adequate capacity and resources to grow their offer to their clients?
If so, are they keen to develop this new capacity and are there existing support initiatives to help them do so?

Third, for the supply chain to function these organisations will have to **work together**. Therefore it is imperative to explore if they do so already, and if so, how successfully. This tees up the sub-section on existing initiatives, which immediately follows, whilst also introducing the notion that the quality of their working relationships need to be understood. When this relationship is poor, or misaligned, then it can subvert the supply chain and any future initiatives that attempt to leverage it. Hence, asking questions to work out who would work well together whilst avoiding potentially difficult partnerships is significant for the success of a programme.

Important questions [ ] regarding the relationships across the supply chain:

QUESTIONS
Across the supply chain, are there are significant stakeholders that have not worked together before?
Are there any stakeholders who have had bad experiences working together?
Are there any stakeholders who refuse to work together?

Apart from the very first question around mapping the supply chain to identify potential gaps, there is very little that can be answered merely through desk-based research. Instead satisfactorily tackling these issues requires an extensive stakeholder engagement programme, particularly with a focus on **interviews** [ ] in order to dive into the details of different capabilities, working relationships and desire to participate in a future programme.

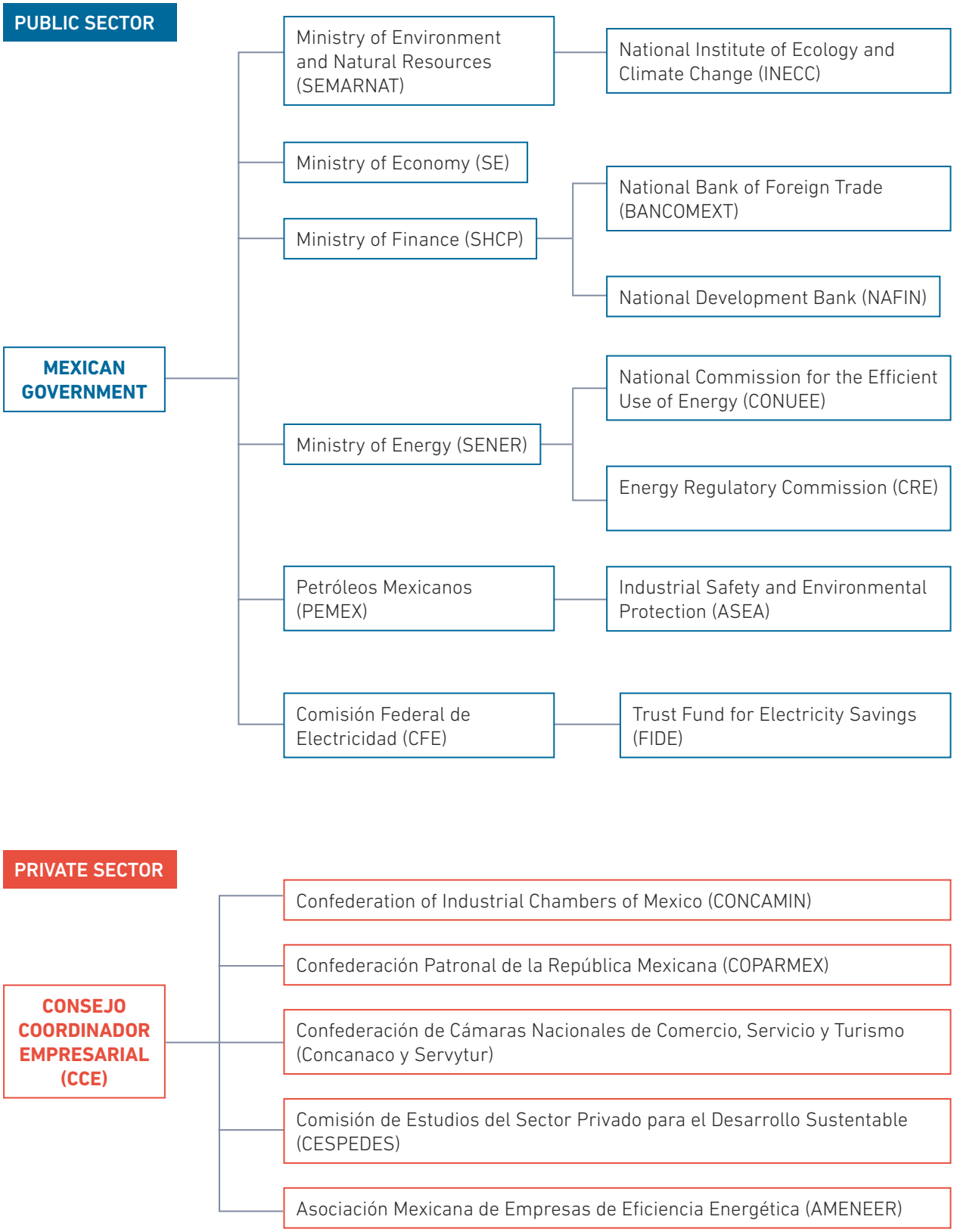


Figure 8. Stakeholder map for public and private sectors, Mexico

3.2.2 Existing initiatives

Given that industrial energy efficiency is a relatively novel concept in many markets, it is important to identify and appraise the existing support initiatives that are recently concluded, ongoing or planned for the future. On the one hand this will help the Accelerator to avoid replication, whilst on the other it can provide a basis for supporting collaboration, and therefore greater scale of impact, between well-aligned initiatives.

Energy efficiency initiatives [ ] can be economy-wide or by sector/technology and may include:

INITIATIVES
Demonstrations of energy efficiency technologies
Awareness-raising / marketing campaigns
Educational / training opportunities
Match-making
Certification / accreditation
Policy development
Finance schemes

The information can be presented using the **sample template below** [ ].

Implementing bodies	Program	Period	Sector / topic	Funding (US$m)
National government & international development organisation	Policy development	2010 - 2014	Minimum energy performance standards for compressors	$2m

Table 2. Example template for mapping existing energy efficiency initiatives

Example research questions [ ]

EXAMPLES
What was the motivation for the new policy?
How does it link to other existing or future policies?
Have you analysed international best practice?
How did you secure industry support?
How have you promoted the policy?
Have you evaluated the impact of the policy to date? If so, what are the results?

Implementing bodies	Program	Period	Sector / topic	Funding (US$m)
International & local consultants	Training & capacity building for the supply chain	2012 - Present	Training for local EE auditors & technology suppliers	$0.5m

Example research questions [ ]

EXAMPLES
What was the motivation for the programme?
Have you analysed international best practice?
What methods and/or tools are you using to implement the training?
How did you select the participating organisations?
How did you secure industry support?
How have you promoted the programme?
Are you undertaking follow-up support for participants?
How does this programme link to other initiatives and/or policies?
Have you evaluated the impact of the programme to date? If so, what are the results?

Implementing bodies	Program	Period	Sector / topic	Funding (US$m)
Local government & industry association	Pipeline generation	2015 - Present	Developing case studies in the cement sector	$0.25m

Example research questions [ ]

EXAMPLES
What was the motivation for the programme?
Have you analysed international best practice?
What methods and/or tools are you using to develop case studies?
What support does the programme provide and what is necessary for the participants to provide?
How did you select the sector, participating organisations and type of energy efficient technology or service?
What is the payback of the energy efficient technology or service in focus?
How did you secure industry support?
How have you promoted the programme?
Are you undertaking follow-up support for participants?
How does this programme link to other initiatives and/or policie

Implementing bodies	Program	Period	Sector / topic	Funding (US$m)
International donors & local banks	Financing	2008 - 2014	SMEs	$100m

Example research questions [ ]

EXAMPLES	
What was the motivation for the programme?	What finance does the programme provide and what is necessary for the participants to provide?
Have you analysed international best practice?	Is there a technical assistance package? For who? What does it consist of? Does it cost the recipients?
What financial product/s are you using?	How did you select the sector and the participating banks?
What is the interest rate of loans?	How did you secure industry support?
What is the tenor of loans?	How have you promoted the programme?
What is the grace period of loans? `	Are you undertaking follow-up support for participants?
Are there subsidies/incentives? Is there a plan to move beyond them in the future?	How does this programme link to other initiatives and/or policies?
Is there a risk sharing mechanism? If so, who shares the risk and at what proportion?	Have you evaluated the impact of the programme to date? If so, what are the results?

Piecing together the mapping of the key stakeholders and initiatives could yield a synthesised diagram as below:

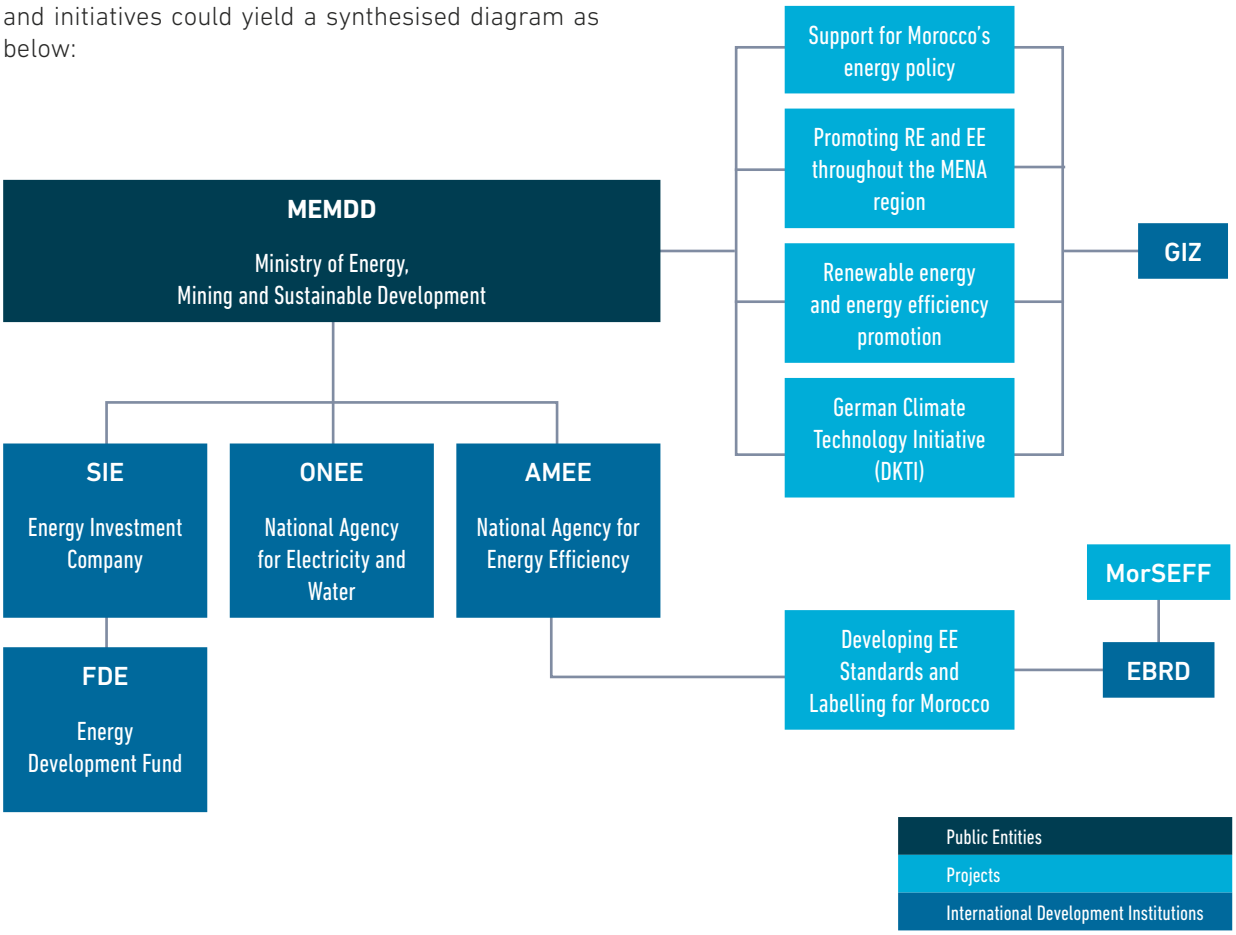


Figure 9. Key stakeholder and initiative map, Morocco

SOURCES

International donor/financier websites
National government – particularly department of industry, energy and/or environment
Local banks and other financiers
Industry associations – both end-users and energy efficiency service providers

METHODOLOGICAL CHALLENGES AND MITIGATING ACTIONS

Stakeholder disagreement

When different stakeholders hold contrasting views and/or do not have a productive working relationship, programmes can find their path to successful implementation blocked. This can be a severe challenge that is more often than not outside of the remit of an industrial energy efficiency programme.

Consequently, part of the stakeholder mapping must include an analysis of who are the key decision-makers that need to sign-off on a particular programme, and what are their priorities. These individuals must be convinced of the merits of a programme, therefore it should align with their priorities, and significant resource should not be spent on detailed programme design unless they will approve it.

Key mitigating actions could include:

1. synchronising programme objectives with their priorities;
2. enabling their ownership of the analysis and programme through local steering groups, regular dialogue and responding effectively to feedback;

and

3. providing outputs, such as tools, that have long-term utility and can be re-used after the end of the initial programme.

4. What are the barriers?

The immediate objective of a programme is to confront the unfamiliar and/or unattractive business case that manifests in barriers that prevent the flow of information, technologies and capital across the supply chain. Barriers can be very specific to a particular context, and apply to individual components of the supply chain, as well as to the connections between them.

Engineering in factory

Whilst there may be some literature sources, such as ongoing programmes, government analysis or research by academics, the best source of knowledge will come from local stakeholder engagement. Interviews and workshops are both advisable to find out what prevents industrial energy efficiency being deployed at scale. Both market-wide and sector-specific barriers are important to analyse.

In an immature market, the barriers are likely to be numerous and varied, but there are three broad categories that they are likely to fall within:

- **Awareness and commitment**
- **Technical solutions and expertise**
- **Financial resources**

The following outlines an approach to investigating the different components of these categories and identifying their significance within a particular market.

Outcome

Identification of where the major strengths and weaknesses for delivering energy efficiency lie across a supply chain, and therefore targeting where a programme can have the most impact.

Links to other chapters

C 1

CHAPTER 1

What is the target market?

Each sector and sub-sector will have its own variation of barriers. It is important to not generalise across sectors without sufficient knowledge of their similarities. Defining a clear target market will improve the efficiency of the research into uncovering the most significant barriers.

C 2

CHAPTER 2

Are there drivers for action?

As discussed in Chapter 2, the drivers and barriers in a given market are often inextricably linked to each other. Establishing whether barriers within individual organisations are approachable will determine in large part whether the key economic and policy drivers are not too negative and overwhelming. If they are, a barrier analysis will be helpful but overall the drivers will undermine attempts to overcome the barriers without being addressed themselves.

C 3

CHAPTER 3

Is there a supply chain?

Fully understanding a supply chain will help to correctly identify the barriers related to the gaps, weaknesses and/or misalignment of the supply chain mentioned earlier. Highlighting the crucial pieces of the supply chain where the flows of information, technology and/or capital fail to pass will help to identify and target the most significant barriers.

C 5

CHAPTER 5

What solutions can address these barriers?

Matching appropriate solutions to barriers is the main methodological objective for any energy efficiency programme. Without careful, rigorous and accurate assessment of the barriers, a solution package is in danger of being misguided and consequently ineffectual. Being as specific as possible with the details of each barrier (what it is, how common it is, how severe it is) is imperative. The more detailed the appraisal of the barriers, the greater the chance of a targeted and effective solution package being designed.

C 6

CHAPTER 6

How can change be sustained?

Fundamentally, energy efficiency programmes need to aim for the elimination of barriers in the long-term. This might not be possible at the first attempt. Therefore there must be a long-term strategy for continuing to target the barriers identified by the programme beyond its lifetime. This strategy should form the basis for a business case for future programme proposals.

4.1 Key barriers

Although there may be literature that evaluates the barriers in an energy efficiency market – particularly government-sponsored reports, evaluations of pre-existing programmes or academic articles – there is **no substitute for stakeholder engagement** here. This is because third party reports are often written in the past, and so whilst they can provide initial guidance, they may not be representative of the current moment. Moreover, the specific barriers faced by particular markets, sectors and stakeholders that are the focus of a programme may not be represented.

To find out the required information to make an effective decision on what solution package is chosen, there needs to be a sufficient stakeholder engagement process – via **surveys, interviews and/or workshops** – that speaks with a large range of those parties involved across the supply chain mentioned in the previous chapter. At a minimum this should include 1 to 2 representatives from each of the stakeholder categories outlined in Figure 8 in the previous chapter to narrow the focus of the programme – identifying priority sectors, avoiding overlap with existing initiatives and recognizing where the need is greatest across the supply chain.

Once there is a target market and supply chain in focus, then there should be a longitudinal process of in-depth analysis into the barriers preventing energy efficiency deployment. This should amount to tens of interviews with the key parties across the supply chain and additional workshops to begin dialogue between these important actors.

Recognising that energy efficiency is often afflicted by multiple barriers at once, it is preferable to avoid asking open ended questions such as, "What are the major barriers preventing you from deploying energy efficiency measures?". These questions will likely lead to limited responses around the 1 or 2 major problems faced, but will not provide a comprehensive picture. Moreover, these can often be very general and not specific enough to create a targeted intervention. As a result, any solution package may be designed to address the headline barriers, but miss some specific concerns that still prevent deployment of measures.

Therefore, it is recommended that the engagement (survey/interview/workshop) be structured around the **three main barrier categories** in order to extract **specific and detailed answers**. The following sub-sections illustrate how this might be achieved.

4.1.1 Awareness and commitment

The issues here lie on a spectrum. To begin with, there needs to be a basic awareness of what energy efficiency is and how it can be realised within an organisation (note, not just the end-users but also the wider supply chain, e.g. financiers). This level of basic awareness is necessary but far from sufficient for making a decision to invest in energy efficiency. Before this investment can take place there must be commitment. This is final stage of the spectrum, from basic awareness to commitment, that organisations need to reach before energy efficiency – even one individual project – gets realised.

The **key barriers** [ ] often cited under this category are as follows:

KEY BARRIERS
Lack of knowledge about what energy efficiency is and how it can help an organisation;
Scepticism and misunderstanding of the benefits of saving energy for an organisation;
Low priority given other business concerns (growth and productivity in particular) and difficulty in communicating business cases to senior decision makers in an organisation;
Hassle of having to learn about something new, implement measures that may disrupt business-as-usual processes and require attentive operations and maintenance beyond the initial investment;
Low energy prices which undercut the returns available when investing in energy efficiency; and
Lack of policy and regulatory drivers – standards, reporting, targets etc – that would drive greater awareness and commitment.

To extract which out of these is most prominent for any given actor, the **key questions** [ ] to ask are:

QUESTIONS
Are you aware of the energy efficiency opportunity for your organisation? Can you provide details - e.g. potential extra revenue, specific measures etc?
Is there anything that prevents you committing to realising energy efficiency opportunities? If so, what – please be as specific as possible?
What measures or support (e.g. policies, training, incentives etc.) do you think would be necessary for you to commit to realising energy efficiency opportunities?

4.1.2 Technical solutions and expertise

Energy efficiency is a technical issue. Even with an understanding and commitment to implementing it, it necessitates the correct technologies and skills to realise the opportunity. For the majority of businesses, because energy efficiency lies outside of their core business operations and concerns, they lack the in-house capabilities to deliver deployment.

Understanding the exact technical deficiencies will be vital to prescribing the correct solutions. For instance, where there is an absence of sufficiently skilled individuals in a supply chain to deliver energy audits, then training is necessary. However, if there are enough experts but they do not have the right tools – say standardised and trusted templates for audits – then their skills will not be utilised.

Accordingly, some of the **most significant barriers** [ ] to look out for are:

SIGNIFICANT BARRIERS
Insufficient skills to realise energy efficiency opportunities – either in-house or across the supply chain – due to inadequate or non-existent training;
Insufficient capacity to develop skilled individuals who are capable of realising energy efficiency opportunities due to resource constraints;
Difficulties identifying, appraising, executing and/or verifying projects – appreciating at what point in the project cycle there is the most significant obstacles will influence the targeting of the solution package;
Lack of standardisation across technologies, services and/or contracts that undermines trust and limits scalability (due to increased transaction costs);
Absence of trust in technologies, services and/or suppliers due to inexperience with energy efficiency or bad historical experiences, perhaps due to a lack of official certification/accreditation, that leads to a mistrust of the technical solutions and expertise offered.

Addressing these concerns, the following r**esearch questions** [ ] are necessary:

QUESTIONS
Do you have the technical skills and capacity in your organisation to realise energy efficiency opportunities?
If not, can you highlight whether it is in the identifying, appraising, executing and/or verifying of energy efficiency projects that you struggle?
Are there technologies, services and/or contracts easy-to-understand and implement?
Are there trusted technologies, services and/or suppliers that you are aware of in the market?

4.1.3 Financial resources

The perception of high investment costs, combined with prohibitive calculations of risk and return, constrain both the supply of affordable capital and the demand for such investments.

The former applies to creditors, who are often unfamiliar with energy efficiency and the business model of making repayments due to cost savings, and therefore perceive the investments as high risk. This either precludes them from offering finance or providing it at high interest rates. Addressing their concerns by introducing them to successful investments, sharing the risks of early ventures and training their staff to accurately appraise the risks are the necessary steps to begin to create a market for lending.

The latter relates to end-users who can struggle to raise their own finance for new investments and therefore need to see clear, attractive returns to seek out extra debt for new ventures. Again, the novelty of energy efficiency and its promise of future cost savings often undermines the business case – in particular when combined with the concern that end-users have other priorities for investment that aim to grow their revenues.

When identifying why there is a lack of affordable finance in a market **needs to consider the following** [ ]:

DATA POINTS

High upfront investment costs of energy efficient technologies and services when compared to business-as-usual damages the business case when seeking finance;

High perception of risk that the investment does not payback as promised, due to unfamiliarity with the technologies, services, contracts and/or suppliers, will prevent risk-averse businesses from investing;

Difficulty accessing appropriate types of finance – key issues include the balance sheet or collateral requirements, cost of capital and length of loan tenors to match the payback periods.

These issues prompt **research questions** [ ] that aim to find out what is preventing the flow of capital:

QUESTIONS

FOR CREDITORS

Do you have experience appraising and financing energy efficiency projects?

What is your perception of risk for these projects? If it is high, what in particular are the main concerns?

Is there demand from your existing clients for financing energy efficiency projects?

What would be required for you to begin lending to energy efficiency projects as a matter of business-as-usual?

FOR END-USERS

Do you have experience investing in energy efficiency projects? If so, is that out of your own capital supplies or from external finance?

If you have previously, or would in the future, use external finance, was this via a loan or another financial product (e.g. leasing)?

If you have failed to invest in energy efficiency projects, is this because you perceive them as too high risk or your creditor did not provide affordable finance?

What would be required for you to begin investing in energy efficiency projects as a matter of business-as-usual?

4.1.4 Barrier analysis

In sum, once the stakeholder engagement process is complete it is necessary to assess the **frequency and severity** of the barriers.

The former can be quantified through the **classification and categorisation** of the feedback from the stakeholder engagement – which could adhere to the barrier categories/sub-categories (the more granular the analysis, the better, therefore it is preferable to categorise according to sub-categories) outlined above.

The severity of the barriers is more difficult to quantify. This could be achieved through a self-scored **ranking process** by the interviewee or the interviewer – labelling the barriers cited as high, medium or low impact for instance.

An example output that summarises the findings could look like the **template below** [ ].

SOURCES

Where possible, recent academic literature or findings from ongoing initiatives (internationally and locally financed)

However, the indispensable source will be feedback from the local stakeholders (donors, government, energy efficiency service providers, financiers and end-users) across the supply chain via interviews and workshops

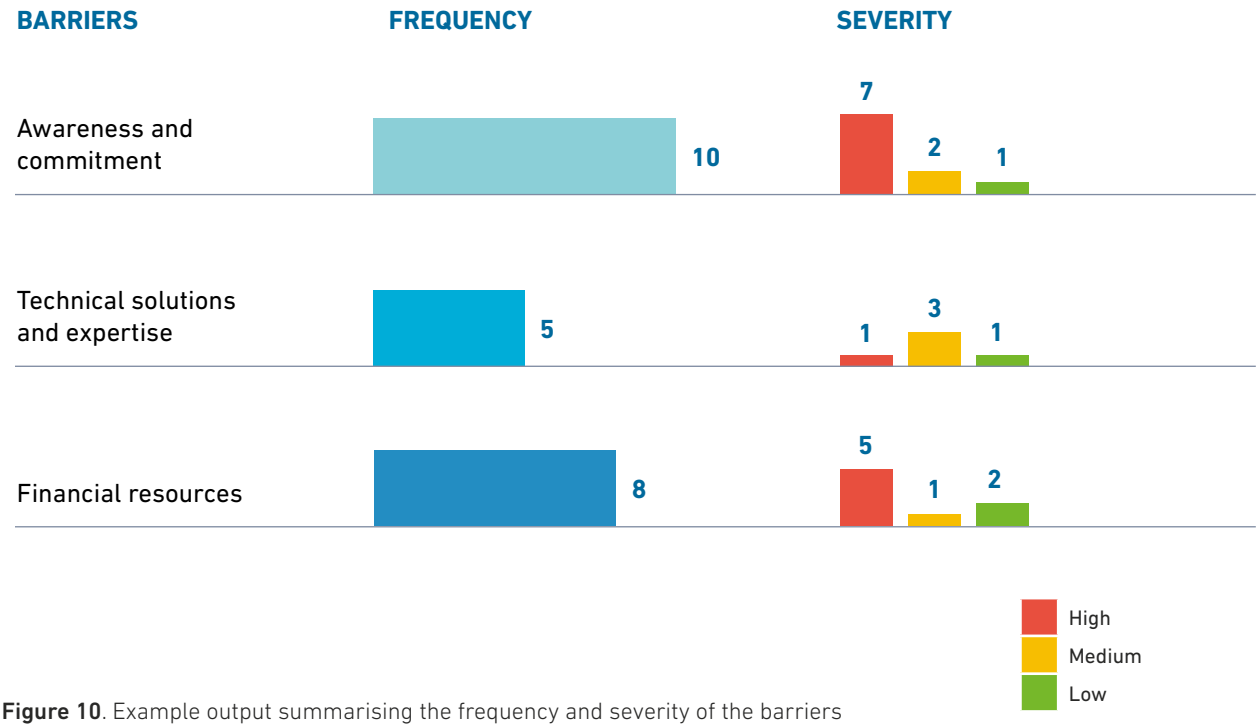


Figure 10. Example output summarising the frequency and severity of the barriers

5. What solutions can address the barriers?

The Accelerator has an opportunity to design solutions that can have a significant impact in scaling-up energy efficiency in the industrial sector. Before prescribing solutions, it needs to have a strong understanding of the market and its local nuances – the analysis in the stages above should provide the platform for such. Once there is a sound appreciation of what the potential is, and where the problems lie, there is a need to prioritise specific markets, sectors and/or technologies according to how additional the Accelerator can be.

The flexibility of the Accelerator, through its ability to address one or more of four pillars (see below), enables it to provide additionality where the need is greatest.

Pillars: focused around industrial EE priorities in each country

1

Develop country-specific industrial energy efficiency **POLICY MEASURES**

2

In-country **CAPACITY BUILDING** to develop local energy efficiency experts and management approaches

3

Develop a **PIPELINE** of investable industrial energy efficiency projects

4

Generate **FINANCING SOLUTIONS** to unlock industrial energy efficiency development

The primary activity to answer this question is a **gap analysis**. This will involve close collaboration with local stakeholders, particularly the relevant government ministries, to decide where a future intervention can be most additional given the information collected.

The process will take the form of calls, meetings and/or workshops to prioritise the optimal programme for a shortlist that emerges from the diagnostic analysis. It is likely to be an iterative process, with numerous ideas proposed, feedback provided, reworked and then finalised before a decision is confirmed. This will ensure that the final package is closely aligned with local needs and methods.

Importantly, to maximise impact, the proposed solution package does not have to be entirely novel. In fact, working closely with existing initiatives can help realise impact through efficient coordination and scale.

Outcome

Identification of where the major strengths and weaknesses for delivering energy efficiency lie across a supply chain, and therefore targeting where a programme can have the most impact.

Links to other chapters

C 1

CHAPTER 1

What is the target market?

Solution packages must be tailored to the structure, characteristics and culture of the target market. If they are not sensitive to local dynamics then they will struggle to secure sufficient stakeholder buy-in. Understanding the nuances of the target market is therefore vital to designing an effective solution package.

C 2

CHAPTER 2

Are there drivers for action?

Drivers are often beyond the scope of solution packages. Whilst proposed measures must take account of the drivers and their influence, it can be difficult to influence significant policy or economic factors in a single programme. Where possible, the solution package should look to work in contexts with supportive drivers. However, where this is not possible, solutions should attempt to encourage key stakeholders to account for and begin to address the fundamental factors that undermine the business case for energy efficiency. For example, whilst a programme might not be able to immediately change a subversive policy, it could build the evidence base and tools necessary for a government to change course.

C 3

CHAPTER 3

Is there a supply chain?

Solution packages should target any gaps, weaknesses and misalignment across the supply chain. Accurately identifying where these lie will lead to better targeted solutions. Whilst sometimes it has been seen that specifically addressing one part of a supply chain can unlock development in other parts, often solution packages will have to be multi-faceted to help numerous parts at once. Therefore, being clear on which stakeholders to engage and how they relate to each other will be crucial for synchronising an effective programme.

C 4

CHAPTER 4

What are the barriers?

The primary objective of the solution package is to mitigate the barriers identified. The more detailed and comprehensive the barrier analysis, therefore, the better equipped a solution package should be. Testing the ideas for potential solutions with key stakeholders is an important process for validating their potential effectiveness.

C 6

CHAPTER 6

How can change be sustained?

In the long-term, the energy efficiency programme designed is unlikely to last more than a few years. Accordingly, it is fundamental that the solution package aims to push the market towards operating on sustainable, commercial terms. Considerations around incentives and how to wean the stakeholders off them, as well as how to create a strong supply chain that has lasting skills and qualifications, are key. Where this might not be possible within one programme's lifetime, there should be a clear plan of action for how follow-on initiatives can aim to create a self-sufficient market following the initial intervention.

5.1 Solution prioritization

5.1.1 Focus market, sector, technology

This section outlines what should be the key considerations when selecting the most appropriate market and pillar/s for the Accelerator in a given country. The focus market, sector and/or technology for the intervention should be selected based on the size of the opportunity, the potential additionality of the Accelerator and the ease of implementation.

I. For the size of the opportunity, the analysis of the industrial sector and the potential for energy efficiency improvements is the key measure.

II. The additionality of the Accelerator relates to whether there are key barriers that the programme can address and whether they are already being addressed by other ongoing activities – if not, the Accelerator is a strong platform from which to create an appropriate intervention.

III. Lastly, the ease of implementation relates to how committed the focus market is to the potential intervention, demonstrating indispensable local stakeholder buy-in.

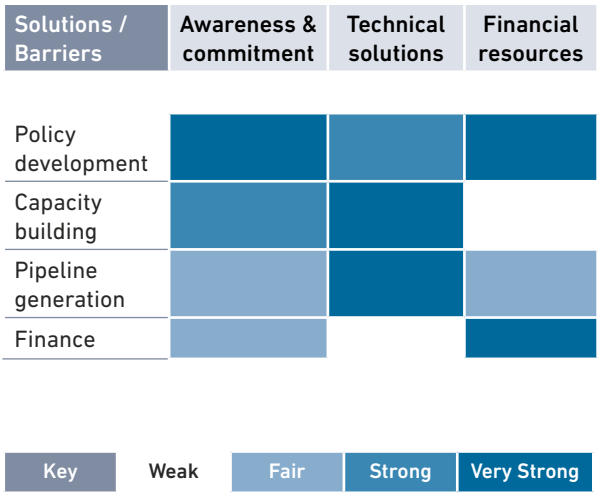


Table 3. Matrix highlighting where the pillars are most relevant for addressing the key barrier categories

5.1.2 Selecting solutions package

Once the focus market, sector and/or technology is selected, it is necessary to leverage the analysis from the previous chapter on barriers to construct the most appropriate and effective solution package. Based on the three main barrier groups outlined in the previous section, and matching them with the relevant pillars of the Accelerator, at a general level **Table 3** below outlines which solution types are most appropriate depending on what barriers are dominant.

At a deeper level, it is possible to sketch out what specific measures come under each pillar to address these barriers – **Table 4** below.

The final package will need careful deliberation and continuous **dialogue** [ ] with the relevant stakeholders across the supply chain. It is very likely that a combination of solutions will enable a programme to address the significant barriers most effectively. Accordingly, choosing actions that will complement each other, and timing their deployment effectively so that they do, is very important. **Learning from previous case studies** [ ] from around the world is very helpful in this regard.

The analysis undertaken as per each of the previous chapters will inform the most suitable set of measures and, within those measures, how they should be constructed and implemented in a local market. No energy efficiency market is the same, therefore no energy efficiency programme will be either. There is no 'cookie cutter' approach – therefore each programme needs to be attentive to local circumstances and flexible in its approach.

This last point is particularly important; a significant degree of flexibility should be built-in to both the selection process for a solution package, and its eventual implementation. It is important to recognize that the facts-on-the-ground in a market are dynamic and can change, relatively rapidly on occasion. Consequently, selecting and creating a solution package that identifies the potential risks and is responsive to them with appropriate mitigation actions pre-determined would greatly benefit the likelihood of successful implementation.

Solutions / Barriers	Awareness & commitment	Technical solutions	Financial resources
Policy development 	Regulations	Regulations	Energy price reform
	Standards & labelling	Standards	Tax reform (breaks, discounts, accelerated depreciation)
	Reporting		Carbon pricing & trading schemes
	Roadmaps		Subsidies
	Voluntary agreements or measures		
Capacity building 	Accreditation (technology, suppliers, auditors, financiers)	Training on project identification, assessment and aggregation	Training financiers
	Energy Management Systems	Monitoring, reporting and verification support	
		Standardisation (procedures, decisions, contracts)	
Pipeline generation 	Marketing campaigns	Project identification, assessment and aggregation	Public procurement
	Events	Matchmaking	De-risking measures (standard business cases & contracting)
	Labelling & certification	Learning networks	Incentives (concessional credit lines, subsidy, tax break)
	Roadmaps	Voluntary agreements or measures	
Finance 	Promotion of financial instruments	Training financiers	On-bill financing
	Promotion of new business models (including ESCOs)		Unsecured lending
			Supporting new business models – e.g. leasing or ESCOs
			Insurance
			Guarantee
			Credit line

Please note, some solutions are repeated as they are relevant across numerous pillars and/or barriers

Table 4. Table outlining the catalogue of solutions by pillar to address each barrier

5.2 Solution examples

To illustrate what these solution packages could mean in the context of this Accelerator, the following tables below provide examples of what is possible in the initial (years 0-2) and then subsequent (years 3 onwards) phases of the programme for each pillar.

Activity	Initial GIEEA phase (Years 0-2)	Scaled-up activity for market transformation (Years 3+)
Description	Main tasks for that activity	Main tasks for that activity
Output	Expected results	Expected results
Time	Estimated duration	Estimated duration
Cost	Estimated resource	Estimated resource
Example	Evidence based on prior experience	Evidence based on prior experience

Table 5. Key to illustrative example solution packages under the Accelerator

Pillar # 1
Develop country-specific industrial EE policy measures

Activity	**Options appraisal and cost-benefit analysis**	**Modify existing / design new policy**
Description	Landscape study of existing policies and gap analysis	Working hands-on with the relevant government agencies
	Stakeholder engagement with 20 interviews and 2 workshops with 40 people in total	Based on recommendations, to design implementation roll out plan: MEPs, targets, roadmaps, incentives, regulations
	Cost-benefit prioritisation of policy options	Consultation and response with industry
		Impact assessment
Output	Policy report presenting industrial EE policy options and recommendations for implementation	Policy ready for implementation
Time	6-12 months	2+ years
Cost	$100-200k+	$1.5-2m+
Example	Carbon Trust – Design of new minimum building performance standards (2009)	ASEAN SHINE / EU SWITCH Asia – Implementation of air con standards across ASEAN region (2013-2016)

Pillar # 2
In-country capacity building to develop local EE experts & management

Activity	Analysis of supply chain, skills gaps and training needs	Design and deliver training schemes	Program to roll-out EnMS, managers and qualification schemes
Description	Landscape study of industrial EE capacity and capabilities	Prepare training materials – tools, presentations, case studies, guides	Nationwide training program to upskill significant numbers of energy managers and local trainers
	Stakeholder engagement with 20 interviews and 2 workshops with 20 people in each	Deliver training – 2-4 days with 10-20 people	Establish qualification scheme
	Establish targets and prioritised skill segments to focus training on		
Output	Prioritised training needs and potential programs	Trained industrial EE experts – trainers and in-house energy managers	Train 100s of qualified energy managers and trainers
Time	3-6 months	3 months	2+ years
Cost	$50-100k	$50k per module (eg EE in the cement sector)	$2m+
Example	TBC	TBC	UNIDO - IEEMMS in Malaysia ($20m / 2011-2016)

Pillar # 3
Develop a pipeline of investable industrial EE projects

Activity	Pipeline appraisal	Investment case studies	Awareness-campaign and advice
Description	Evaluate unexploited sector- and technology-specific EE opportunities	Hands-on project development with industrial stakeholders – including audits, financial assessment and evaluation	Design and deliver a national marketing campaign to build demand at scale – advertising, workshops, conferences
	Identify programmatic solutions		Deliver advice program for continued development of the pipeline
	Define delivery routes and investment case		
Output	Prioritised and costed programmatic interventions to support pipeline creation	Shovel-ready case studies for financing	100s of companies reached and supported from identification to financing of potential EE projects
Time	6-12 months	1-2 months per case study	2-5 years
Cost	$100-200k	$25k per case study – including audit	$5m+
Example	Carbon Trust / GGGI – Identification of de-risking facility development opportunities in RE & EE markets in Peru (2017)	Carbon Trust / CDKN – Peru EE case studies (2017)	Carbon Trust / NBI / DFID – South Arica Private Sector Energy Efficiency Program (2010 – 2014 / $12m)

Pillar # 4
Generate financing solutions to unlock EE development

Activity	Design financial solutions	Training financiers	Implementation of financial solutions
Description	Engage with financiers to assess local barriers to financing industrial EE investments	Hands-on training with financiers – including assessing and validating project proposals	Establish financial packages and delivery routes
	Identify programmatic solutions – eg credit lines, guarantees, insurance etc		Deliver complementary technical assistance
Output	Prioritised and costed programmatic interventions to support investment	Financiers capable of appraising and executing industrial EE projects	Financing community taking on EE as a product and 100s of companies financing of EE investments
Time	6-12 months	1 week - 1 month per training	2-5 years
Cost	$100-200k	$20–100k per training	$100m+
Example	CT / FCO – India Industrial EE Finance Program (2016)	Carbon Trust / GIZ training of FIDE auditors (2013)	CT / NAMA / IDB – Brazil Beef Resource Efficiency (2017 / €15m TA; €100m capital)

5.3 Potential risks

As touched upon above, it is vital to be prepared adequately if circumstances demand changes to the approach of an intervention. There needs to be a thorough appraisal of the risks that any intervention may face and appropriate mitigation actions prepared in advance to ensure damage limitation.

This involves a process of:

- **Identifying the risks** through a continuous process that should be structured at the outset of the intervention and updated at regular intervals.
- **Appraising the risks** by evaluating the likelihood that the risks will materialize and their potential impact on the objectives of the programme.
- **Addressing the risks** via formulating appropriate and effective mitigation actions in advance of them materializing so that they are nullified as soon as possible without destabilizing the programme.

A "live" risk register should be constructed at the outset the programme design, and updated regularly as it progresses. To illustrate, see the Table 6 for some generic examples of risks and suggested mitigation actions.

High
Medium
Low

Table 6. Example risk register >

Risks	Severity	Likelihood	Mitigating actions
LANGUAGE Local dialects are not spoken by the programme team therefore communication is difficult and their first-hand engagement with the target market is limited.	Medium	Medium	Hire local experts and translators to be part of the programme team and mediate with local stakeholders.
PROCUREMENT In-country rules and regulations insist that services and products are procured from local sources.	Medium	Low	Identify local service providers at the outset and look to partner with them to deliver the programme effectively.
CONTRACTING There are legal obstacles that prevent local stakeholders from signing up to the programme.	High	Low	• Explore potentially easier routes, such as memorandums of understanding or partnership agreements, rather than contracts. • However, if even these are difficult, then seeking alternative local stakeholders will be necessary.
FOREIGN EXCHANGE The exchange rate between the funds earmarked for programme delivery and the local currency is volatile.	High	High	• Explore options to hedge the risk of the foreign exchange rate to avoid seeing the programme's resources vary considerably during its implementation. • For instance, buying local currency at a fixed exchange rate prior to implementation.
DATA QUALITY Lack of trustworthy data on the industrial sector and its energy efficiency potential due to the immaturity of the market.	High	Medium	• Where possible, utilize government resources or other soruces (such as utilities) that may hold the required data. • Otherwise look to use substantial qualitative research methods (surveys, interviews, workshops) to gather sufficient information. • Prioritise data collection and establishing a sustainable mechanism for future data collection as a part of the programme's tasks and outputs.
DONOR ALIGNMENT There could either be i) an overcrowding of donors in a particular country/sector, or ii) it could be a low priority for them. For the former, this poses a question to the programme's perceived additionality. For the latter, a programme could struggle to receive sufficient political, financial and/or technical support for implementation.	High	Low	• Adequate research before investing significant resources is required to scope out the current donor activity and priorities for a country/sector. • Regular dialogue with potential donors will help provide them with visibility on the objectives and actions of the programme, as well as enabling the programme designers to incorporate their demands in the early stages of development.
LOCAL STAKEHOLDER COMMITMENT A lack of understanding, interest and/or commitment to the programme from local politicians and/or businesses that prevents adequate buy-in to its aims and implementation.	High	Medium	• Identifying the important local decision-makers is a vital step in the initial phases of the programme design. • Beginning the dialogue with these stakeholders early on will provide them with an understanding of the programme and allow them to present their priorities. • Incorporating their concerns into the design through regular engagement is fundamental to ensuring smooth approval and delivery.

6. How can change be sustained?

Once a solution package has been decided upon, it is important to design it in a fashion that ensures sustainable impact. At the outset, there should be heavy involvement and partnership with key local stakeholders across the supply chain – working collaboratively with them to construct a package that is well-suited to local dynamics.

Tugboat pulling heavy loaded barge of black coal in the Mahakam river, Indonesia

It is recommended that a local steering group, consisting of the relevant stakeholders, is set up immediately after a market and/or sector is prioritised. This will help to tailor the solution package to the local context and provide an indispensable source of ongoing advice and guidance as the programme develops.

Whilst each context has unique elements in this respect, there are some key commonalities for achieving sustainability. In general:

- On the technical side, a programme must ensure sufficient transfer of expertise across the local supply chain for it to continue without needing practical support;

And

- On the financial side, solutions must leave behind a sufficient confidence and skills in the market for there to be sustained flows of capital into energy efficiency investments under business-as-usual conditions.

Moreover, whilst energy efficiency markets are still in their infancy, the political commitment from governments will remain key for establishing the appropriate legislation to create and enable these markets to grow. Therefore, the political sustainability of a market must also be considered when assessing the long-term sustainability of an intervention – even if it is outside of the remit of the programme itself.

It is not demanded of the Accelerator's initial programmes to fully achieve these goals; however, it is imperative that they guarantee these considerations are in-built from the very beginning to support the long-term sustainability and impact of industrial energy efficiency in the target markets.

There needs to be a long-term perspective integrated within the design of any programme. This should include considerations of what comes next. Some of the fundamental considerations are outlined below.

Outcome

Create a long-term strategy for the accelerating the deployment of energy efficiency measures in the industrial sector – both for the lifetime of the initial programme and beyond its expiry.

Links to other chapters

C 1

CHAPTER 1

What is the target market?

The final goal for energy efficiency programmes worldwide is instilling the behaviours necessary to continue to realise energy efficiency deployment within the target market beyond their lifetime. Inevitably, this long-term process requires sufficient awareness-raising, capacity building and the necessary policy framework to create demand that sustains itself as business-as-usual. Being fully cognizant of the current status of these three elements in relation to the target market, and their potential for development, is crucial for mapping out a possible route to achieving long-lasting behaviour change.

C 2

CHAPTER 2

Are there drivers for action?

As has been previously emphasised, the policy and economic drivers are the fundamental conditions that define energy efficiency markets. Accordingly, they must be supportive in the long-term for sustainable change to occur. As mentioned above in the introduction to this chapter, political commitment is of central importance. Many of the questions related to this chapter relate back to the drivers in order to understand whether long-lasting change is conceivable in the current environment within a country, and what needs to differ for that to happen.

C 3

CHAPTER 3

Is there a supply chain?

Stakeholders across the entire supply chain need to have enough awareness, skills and capacity to play a role in sustaining a market. This refers to both the technical and financial capabilities of the key actors. Creating permanent sources of training, qualification and advice are important for sustaining the supply of information, technology and capital. As is nurturing an environment where there are sufficient incentives for new enterprises to seek out business opportunities in the market – hence, there are strong links to creating the long-lasting demand through addressing key issues across the target market and drivers.

C 4

CHAPTER 4

What are the barriers?

Barriers must be permanently eliminated for sustainable markets to take hold. This requires comprehensive solution packages, and effective linkages with other ongoing initiatives, to tackle the multiple and entrenched barriers that currently define many energy efficiency markets. Disseminating lessons learned and incorporating best practice into future initiatives will help to encourage consistent targeting of obstacles. Understanding and being able to recognise where future problems may arise, and therefore being flexible and quick-to-act with new solutions is vital for markets that can change in short spaces of time.

C 5

CHAPTER 5

What solutions can address these barriers?

As emphasised earlier, any energy efficiency programme designed is unlikely to last more than a few years. Hence, it is imperative that a long-term strategy is designed as part of the solution package from the outset that aims to introduce and integrate commercial conditions across the supply chain. Understandably, this is often not feasible within one programme's lifetime, and so planning in advance for how follow-on initiatives can be designed, proposed, and executed as part of an initial programme is highly recommended.

6.1 Sustainability concerns

The following guidance highlights the major questions any programme should seek to answer when assessing the potential sustainability of the market it hopes to create or accelerate.

These questions should be attempted during the initial design of the programme to test whether a future programme would actually have lasting impact. If the answers prove disappointing in this respect, resources may be best applied elsewhere.

Furthermore, through the implementation of the programme the answers to these questions should be continually updated.

This provides **two main benefits:**

1. it helps to guide future plans for closing the programme and designing follow-on initiatives effective;
2. it makes evaluating the programme at its conclusion an easier process.

The **key questions** are categorized according to the main barrier categories that will influence the sustainability of a market: awareness and commitment; technical solutions expertise; and financial resources.

QUESTIONS
AWARENESS AND COMMITMENT
Is the government committed, preferably via legislation, to pursuing energy efficiency in the long-term?
What legislation is in place to support the long-term health of the energy efficiency market? Is there any future policies planned?
Are all political parties committed to improving energy efficiency?
If there are subsidies for energy prices, what is their projected future?
Are there long-term economic reasons – e.g. growth, competitiveness, productivity, trade balance – for continued government support for energy efficiency?
Are government departments and agencies sufficiently skilled to continue to develop and deploy support for energy efficiency?
Is there an interest and willingness from international donors to invest and support energy efficiency in the country? Do they have a good relationship with the key government officials?
Is there visible, long-term demand from the target market? Are there sustainable incentives in place to create it?
Is there ongoing marketing and educational campaigns to continue growing the potential market of end-users?

TECHNICAL SOLUTIONS AND EXPERTISE
Are there are any outstanding gaps, weaknesses or misalignments across the supply chain? Can a follow-on programme aim to address these?
Is energy efficiency widely known and understood across the target market?
Is there sufficient and available data in the public domain?
Are the necessary long-term commitment to energy efficiency instilled within the target market? Does this extend to key decision makers in the boardrooms?
Are energy managers sufficiently skilled to identify and implement energy efficiency opportunities?
Are energy efficiency service providers (auditors, technology providers, ESCOs etc) numerous and skilled enough to provide quality services for the target market without external support?
Are energy efficiency service providers trusted by the target market?
Are there qualification, certification and/or accreditation processes for services providers and/or technologies?

FINANCIAL RESOURCES
Is there sufficient appetite and capabilities in the private sector to provide a sustainable source of future finance? If not, could a follow-on programme hope to achieve such?
Do commercial financiers accurately understand the risks associated with energy efficiency investments? Are they comfortable absorbing them?
Is long-term public financial support would be necessary? If so, in what form – e.g. credit, risk-sharing, incentives etc?
Who could provide follow-on financial support? Are they active in the market already? What are their requirements?
If financial incentives are used, is there a plan to reduce them over time and move towards commercial terms? If not, why not?
Is the target market aware and capable of applying for finance to invest in energy efficiency projects?
Are there different financial products for different types of clients available – e.g. large corporates and SMEs?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