



DEESME

National schemes for energy efficiency in SMEs

Deliverable 2.1

Inventory of needs and requirements of NAs

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DEESME has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 892235.

Project information

Project Title	Developing national schemes for energy efficiency in SMEs
Project Acronym	DEESME
Project Number	892235
Project coordinator	IEECP, Deger Saygin – deger@ieecp.org
Project dates	September 2020 – August 2023

Deliverable information

Nature: Public

Version: 1

Delivery date: 21.01.2021

Rev.	Written by	Date	Checked by	Date
1	KAPE	05.01.2021	IEECP	13.01.2021
2	KAPE	22.01.2021	IEECP	

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About

Unlike the large companies, SMEs have less technical human and financial resources to improve their energy efficiency. Barriers have been deeply investigated including lack of awareness, low capital, difficulty to access financing, doubts around actual saving potential and the lack of technical human resources. To provide SMEs with technical resources such as methodologies, best practices, technology inventories and subsidies, national schemes exist. Some of the schemes introduce mandatory actions (energy analysis) to obtain such subsidies. Nevertheless, national policy schemes have failed to some extent to convince SMEs that the energy audit is something more than a “bureaucratic fulfilment” to obtain a contribution and to push large companies to take the step from the analysis to the investment. To overcome that, DEESME aims at:

- a) Enabling companies to manage the energy transition by taking profit of multiple benefits and energy management approaches,
- b) Supporting the development and implementation of energy efficiency EU policies in the framework of article 8 of the Energy Efficiency Directive, beyond the project, by providing national authorities with guidelines and recommendations on how to strengthen the national schemes, and
- c) Enhancing the adoption of the DEESME approach by National Authorities beyond the project timeline through the implementation of institutionalization activities.

The project will identify and share best practices from national schemes, EU projects and other initiatives with national authorities and support them in developing more effective schemes dealing with energy audits and energy management systems. It will finally assist SMEs to develop and test the technical DEESME solutions by organizing information and training initiatives, realising energy audits and implementing energy management systems starting from international standard and adding the multiple benefits energy efficiency approach.

The project is built on a consortium of academics, research organisations, consultancies and government offices from Belgium, Bulgaria, Germany, Italy, the Netherlands and Poland, namely: IEECP (NL, coordinator), FIRE (IT), SOGESCA (IT), Fraunhofer ISI (DE), CLEOPA (DE), SEDA (BG), ECQ (BG), KAPE (PL), EEIP (BE).

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Abbreviations

EPBD - EU Energy Performance of Buildings Directive 2010/31/EU
 ESCO - Energy service company
 EU EED - EU Energy Efficiency Directive 2012/27/EU
 HVAC - heating, ventilation, and air conditioning
 ITC - Information and communications technology
 MS – Member States
 EMS – Energy Management system
 EAMS - Eco-Management and Audit Scheme
 NA - National Authorities
 SME – Small and medium-sized enterprises
 NEB - Non-Energy-Benefits

Executive Summary

The aim of the report is to identify needs and challenges from the perspective of National Authorities (NA) in the implementation of Art. 8 of the European Energy Efficiency Directive 2012/27/EU (EU EED). This will further support the creation of good practices for the NAs to help overcome the identified challenges in the following actions of the DEESME project.

As a first step this inventory of needs and challenges has been elaborated. The data for this assessment was collected by means of a questionnaire filled in by the DEESME project partners with the support of representatives of the NA. Topics both relating to the implementation of Article 8 in both large enterprises and SMEs topics are covered. Challenges, needs and requirements identified in the answers to the questionnaire are reported. Additionally, desk research was performed to complement the results from the survey with a wider context to compare findings with earlier researches.

In case of obligated large enterprises, most common issues for NA are related with the identification of obligated companies, especially for those newly formed or with complicated ownership structures. Companies qualification criteria are perceived as confusing and the monitoring of companies' power consumption is problematic. Another widely mentioned topic is general energy audit quality and issues with monitoring of its implementation. Companies compliance with guidance of auditors should be improved as well. IT-related challenges – data storage, security, web application were mentioned as well.

To encourage SMEs two major challenges were identified, namely their general lack of awareness and the interest of companies in improving energy efficiency. Support and education mechanisms to overcome SMEs limited resources and to increase know-how are needed. Creating and maintaining communication with SMEs is a challenge as well.

1. Introduction

The aim of the report is to identify needs and challenges from the perspective of National Authorities (NA) in the implementation of Art. 8 of the EU Energy Efficiency Directive 2012/27/EU (EU EED) concerning energy audits and management systems in companies with a special focus on small and medium enterprises (SMEs). This will further support the creation of good practices for the National Authorities to help overcome the identified challenges in the following actions of the DEESME project.

1.1. Art.8 EED

Art. 8 of the EU Energy Efficiency Directive, which has been transposed into national legislation in all EU Member States (MS), requires all large enterprises (non-SMEs status) to comply with the energy audit obligation – they have to either carry out energy audit or implement energy management system within the audit equivalent is carried out.

The EU MS are required to ensure large companies meet these requirements and subsequently they should encourage SMEs to do the same. Implementation challenges are similar across the MS and include identifying and encouraging relevant companies and monitoring the implementation of the audits.

1.2. Methodology

The data collection for the needs assessment was carried out by means of a questionnaire filled in by the DEESME project partners with the support of representatives of the NA. The questionnaire (see Annex 1) consisted of 63 questions across 3 topics: (i) energy audit obligation for non-SMEs, (ii) energy audit encouragement for SMEs and (iii) non-energy benefits knowledge and implementation in the supporting instruments.

The first step of the process was to collect information from national legislation and implementing documents of 11 chosen EU MS. After that, one-on-one interviews with NA representatives were carried out to complement the collected data and identify challenges in the implementation of Art. 8 as seen by the Authorities. For that questionnaire 11 EU MS were chosen which are: Austria, Belgium (Walloon region), Bulgaria, Croatia, Finland, Greece, Ireland, Italy, Poland, Slovenia and Spain. The 11 MS represent 41% of the EU-27's total final industrial energy demand and the respective SMEs of these countries cover 51% of the region's total. MSs that were suspected to be facing most challenges based on the previous reports on the Art. 8 implementation were chosen. Avoiding the communication and language barriers between project partners and chosen countries was also considered when selecting the 11 countries to avoid the misunderstandings and allow for detailed inquiries. In the first version 9 countries were covered, which are Austria, Belgium (Walloon region), Bulgaria, Croatia, Finland, Greece, Ireland, Italy and Poland. Details regarding Slovenia and Spain were added in the update of the report, when full answers were collected.

As a result, the findings from this assessment are therefore representative to draw conclusions for the rest of the EU-27 – at least in case of needs and challenges. Challenges, needs and requirements identified in survey answers are included in this report.

Additionally, desk research on this topic was performed to complement the results from the survey with a wider context. Some challenges might have been identified in the past. By comparing results included in this report with some papers published before, it is possible to notice what issues are relatively new.

The challenges described in this report are a preparatory step for finding solutions suited for each targeted NA by describing best practices that could serve as a response to the identified challenges for a wider audience in the EU. In addition, the findings will be input to DEESME's subsequent steps, notably the experience sharing workshops and developing energy audit and management system models integrated with the multiple benefits approaches.

2. Requirements and needs – energy audit obligation for large enterprises

2.1. Introduction

The first part of the analysis is dedicated to energy audit obligation mechanisms for large companies implemented in EU MS. This part of the analysis followed the national implementation cycle along six steps. The idea of the cycle is based on the standard policy-making process (Young and Quinn,2002) on a national level with additional steps that are considered important for the energy audit obligation. The steps for problem definition, policy formulation, choice of solution and policy design were not included in the cycle as they relate to the EU level and were the national level is an the implementation of the Art. 8 of the EU EED. Instead, a legal framework step was added to cover the means of the transposition of the directive and informing the stakeholders. Special attention was given to the implementation phase which was split into 4 steps: identification, implementation, enforcement and monitoring. A set of challenges and needs were identified for each step of the cycle. All needs and challenges identified during these topics are covered in sections below.

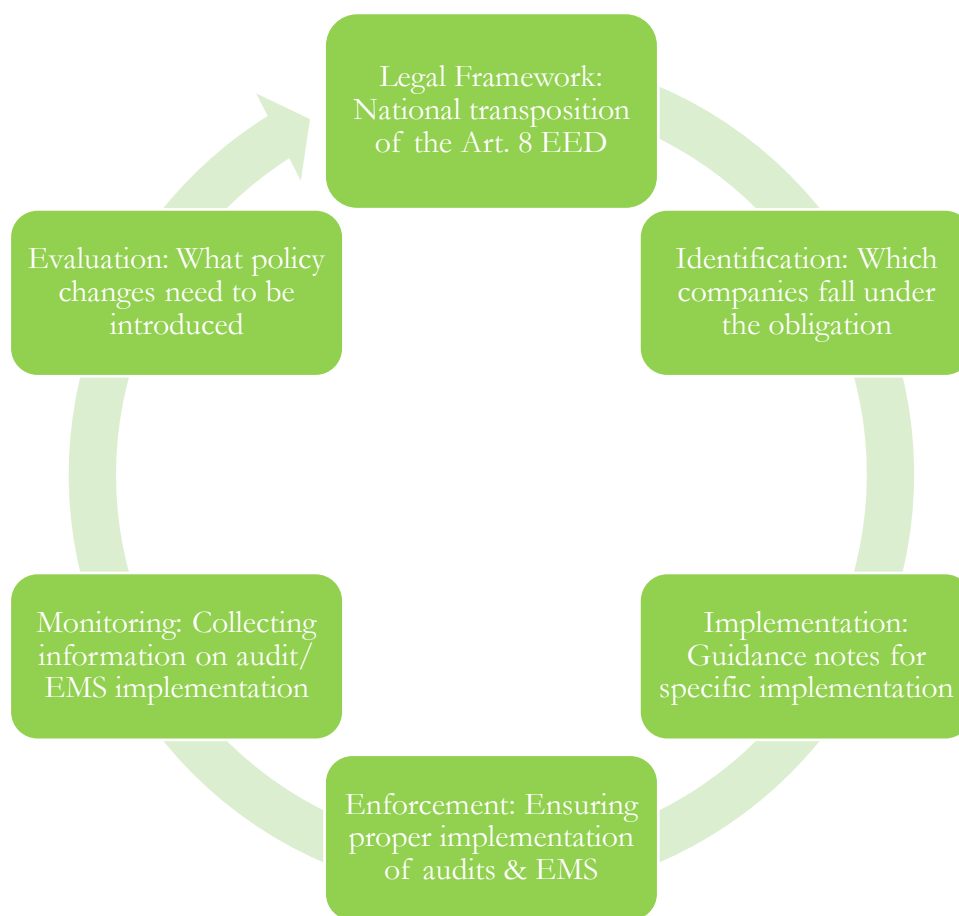


Figure 1 Implementation cycle for the energy audit obligation mechanisms

The first step of the cycle is the legal framework, which covers the national regulation of the energy audit obligation such as deadline setting and detailed requirements for scope of the energy audits. The means of informing the companies about the obligation was additionally covered.

The identification step focuses on the precise definition of the obligated enterprises, its practical implementation and exemptions from the obligation. In this part, the cooperation process of different bodies was also covered. For the implementation phase, different options of fulfilling the obligation were looked into. The possibilities for the implementation of environmental or energy management systems was also considered as this is an important challenge for many EU MS.

In the enforcement step, the ways of assuring the auditors qualifications were investigated. Monitoring and incentivisation for the implementation of measures suggested in the audit is included too. Enforcement means through penalties and fines were also addressed.

For the monitoring step of the cycle, the scope of the data collected from the energy audits was analysed as well as the means for data collection and storage. The means of analysis and presentation to the public were also assessed.

The cycle ends with the evaluation step. Here, it is crucial whether the evaluation of national implementation of energy audit obligation from Art. 8 EED was carried out and what the scope of the evaluation was.

2.2. Legal framework

The legal framework covers general requirements that large enterprises are obligated to meet as defined in the national law. This part covers aspects such as: the extent of energy use that should be covered by the audit and timeline for carrying out the audit. Additional means of informing the enterprises about

obligation were also covered in this section. In other words, legal framework is related with national transposition.

2.2.1. Survey results

Most crucial challenges identified in in section are:

- Regulatory rules and procedures are too complicated
- Identification of non-SME is problematic
- Self-declaration is an insufficient tool for company identification
- Energy consumption threshold should be added to the criteria

In **Belgium (the Walloon region)** main needs are the simplification and enhancement of the legal framework both on a regional and EU level. The NA in Walloon region is looking into increasing representativity criterion for enterprises participating in voluntary agreements or engaged in an energy management system - from 60 % of energy consumed to 80 % - like other enterprises. Currently companies which participate in voluntary agreements or are engaged in an energy management system may analyse only 60% of total energy consumption while obligatory energy audits have to cover 80% of total energy consumption. The revision will lead to the same representativity criterion of 80% of the total energy consumption for all enterprises.

From the public authorities' side, simplification of companies identification is needed in a form of new website tools with a smart electronic template (pre-filled with official data about companies, secure e-identification, central storage & access as well for obliged enterprises as for the implementation & verification authority). From the practical side, some enhancements are needed including education & sanctions for better compliance, easier verification of the audit quality and better technical support to the accredited auditors. Implementation of new tools and templates in Walloon region has started in December 2020, but it is not formalised yet in an official program.

In **Belgium** also the identification of non-SME is challenging. There is ambiguity about how the subsidiaries of large enterprises are accounted for in the obligation. Currently a detailed case by case study of financial and organisational links between enterprises is required which is not always effective due to difficulties in finding economic figures for the participation and share criteria. Some simplification for the obligation could be introduced to relief the burden of the detailed analysis for the managing authorities. Similar challenges are stated in in Policy Guidelines on Energy Audit (Energy Community, 2019). The number of enterprises that are part of multi-national companies may be small and have insignificant energy consumption. It is possible that undertaking energy audit in these enterprises would be uneconomical – the identified savings may not even cover the cost of the audit. Moreover, these companies would be faced with an additional administrative burden. Authors Policy Guidelines on Energy Audit claim that cost-effectiveness of the energy audits may be accomplished by setting a threshold based on energy consumption and creating audit methodologies including clustering and sampling of the enterprise operations. However, in cases where sampling is allowed, but no minimum sample size is defined, the risk of having too few companies for auditing increases (European Commission, 2015). **Austria, Bulgaria** and **Ireland** also find identification of non-SME challenging. In **Austria** the identification of companies is mentioned as the main challenge regarding legal frameworks. In **Bulgaria** main challenge regarding the identification of companies is that the only way to identify the obligated companies is to rely on their annual self-declaration. SEDA has a list of the obligated companies that declared themselves as obligated, but it is not publicly available. It includes an information about energy consumption – 3000 MWh/year is a threshold. There is no unified national register for non-SMEs.

The main challenge in **Ireland** regarding identification is that there is no list of obligated enterprises. The process of creating such list is very demanding particularly for the private enterprises.

In **Spain** such list exists - made by central government, but it is not public and not complete. Limited number of people dedicated to inspections

The major challenge for **Croatia** is that the NA does not have data on the implemented ISO 50001 certificates and therefore does not have data on total implementation of the obligation, so it seems as if there are a lot of obligatory companies without audits.

In **Slovenia** the NA is not responsible for determining the legal framework, but it is not being implemented in the defined pace, although there are defined fines, because the legislation, which provides control over the implementation of regular energy audits, was accepted in the second half of 2019.

A significant challenge in **Finland** is the negative impact of the obligation on voluntary agreements. Introduction of the obligated energy audits lowered number of audits implemented under voluntary agreements.

Greece identified a need for clearer and more transparent legal and regulatory rules. Simplifying the rules would lead to obliged companies taking over the responsibility and understanding that is for their own benefit.

In **Italy**, the main issue is correct identification of associated and subsidiaries of obliged companies.

For **Poland** there is a need for additional monitoring of the implementation of energy efficiency measures suggested by the energy audits. Lack of obligations of parties to invest according to the EED makes it difficult to be implemented in the national law, which usually closely follows the requirements of the EU legislation.

In **Spain** regulation is based on the central government (which role is mainly of coordination) and the Autonomous Communities (to which the responsibility of implementing art. 8 is delegated). Such system cause a frequent and not always efficient interaction between communities and the central government.

Spain notices, that one point to improvement could be a change in the directive in a way, that would make companies obligated to implement some of the measures found during the audit, but this could not be done “voluntarily”. So such obligation would be put at European level.

Slovenia notices, that implementing regulations should be define in detail individual specific areas and determine possible exceptions, such as: the inclusion of leased spaces in which a large company operates, more precise definition of conditions for energy auditors, especially in the field of transport and process.

The study from 2016 (European Commission, 2016) lists two challenges regarding legal framework in the area of transportation and building –companies that deal with cross border transport and construction companies are problematic in case of energy audits. In principle, the same cross-border transportation activities can be subject to two audits if these activities are subject to mandatory energy audits in two MS at the same time. In such cases the measures proposed in audit are less cost-effective. However, if cross-border transportation is excluded in two Member States, it might not be considered at all. Multi-national companies also have difficulties with different requirements across Member States regarding buildings. There is still a need for Member States to clarify which parts of a building should be covered in the audit process in individual countries.

There is also a problem how to deal with situations where an enterprise consumes energy at a site, but does not have final responsibility for a building (e.g. rented offices) (Energy Community, 2019).

Article 11 of the EPBD imposes an obligation on the Contracting Parties to establish a system of certification of the energy performance of buildings and in specific cases it is possible that certification under the EPBD in a given contracting Party may fulfil the requirements of Article 8 and Annex VI of the EED (for instance in case of auditing office buildings).

Regarding legal framework, authors of Policy Guidelines on Energy Audit (Energy Community, 2019) also raise the question if companies in the public sector should fall under the obligation to have an energy audit provided that staff or turnover requirements are met. Austria, for example, states that facilities subject to the public right (e.g. local authorities, institutions under public law, funds or foundations under public law) are not covered by its regulation. In Italy the obligation does not apply to public administration offices, and in UK regulations do not apply to publicly funded bodies. Germany decided to exempt all municipalities and institutions with predominantly statutory activities. (European Commission, 2016)

2.2.2. Summary of challenges for the legal framework

All identified needs and challenges related to legal framework are presented below.

Table 1 Summary of challenges for the legal framework – energy audit obligation for large enterprises

Need identified	Countries surveyed	External sources
Adding energy consumption threshold to the criteria for the energy audit obligation	Belgium	(European Commission, 2016), (Energy Community, 2019)
Simplification of regulatory rules and procedures	Belgium, Greece	
Introduction of new ICT tools	Belgium	
Education & sanctions for better compliance, easier verification of the audit quality, better technical support to the accredited auditors	Belgium	
Undergoing revision for a representativity criterion for enterprises participating in voluntary agreements or engaged in an energy management systems	Belgium	
Change the directive in that way, that a company could be obligated at European level. to implement some of the measures found during the audit.	Spain	
Implementing regulations should be define in detail individual specific areas and determine possible exceptions.	Slovenia	
Challenge identified	Countries surveyed	External sources
Lack of the list of obligated companies	Ireland, Spain	
Self-declaration as an insufficient tool for company identification	Austria, Bulgaria	

Accounting for associated and subsidiaries of obliged companies for the obligation	Italy	(European Commission, 2015), (Energy Community, 2019)
Energy authorities have difficulties with checking the “participation rules” in thresholds calculations	Belgium	
Introduction of new ICT tools	Belgium	
Limited stress in the law for monitoring of the implementation of the measures proposed in the audit (on the national and EU level)	Poland	
Legal framework seems as not being implemented in defined pace since there are no data on EMS	Croatia, Slovenia	
Introduction of an obligation has lowered number of audits implemented under voluntary agreements.	Finland	
Limited number of people dedicated to inspections	Spain	
Regulation is based on the central government and the Autonomous Communities. Such system cause a frequent and not always efficient interaction between communities and the central government.	Spain	
Other sources		
Coverage of building in energy audits		(European Commission, 2016)
Representative sampling and clustering		(European Commission, 2015) (Energy Community, 2019)
Obligation of companies in public sector		(Energy Community, 2019)
Interactions between energy audits and energy performance certification for buildings		(Energy Community, 2019)
Approach to leased assets: How to deal with situations where an enterprise consumes energy at a site, but does not have final responsibility for a building e.g. rented offices etc.		(Energy Community, 2019)
Creating qualification criteria for energy auditors		(European Commission, 2015)

2.3. Identification

A second part of implementation cycle – Identification, comes down to definition which enterprise is considered large and falls under obligation to carry an energy audit.

2.3.1. Survey results

Most crucial challenges identified in in section are:

- Lack of the list of obligated companies
- Identification of new companies or companies with complex ownership
- Energy consumption threshold should be added to the criteria

Grand majority of countries lacks information required to identify obligated company. In **Austria** and **Bulgaria**, obligated companies must self-declare whether they fall under the obligation. In **Poland** and **Ireland** the problem lies in the lack of the list of obligated enterprises. This is a challenge as there is limited possibility to confirm if all obligated companies fulfilled their obligation to identify themselves. Identification of new companies is also problematic – dynamics of ownership and changes in shareholders (and their shares) and the changes on the market were found source of challenges in **Austria, Belgium, Italy** and **Poland**.

In case of additional criteria in the definition of large enterprise, the complexity of determining the status of a company increases. Both MS and companies have to consider the three main criteria for the EU definition, plus information on the ownership structure, in the case of linked companies, as well as additional criteria for inclusion or exemption. Without clear guidance, this task can become challenging for both the institutions and the companies (European Commission, 2016).

In **Austria**, main challenge regarding the identification of companies is the ownership structures of corporations.

In **Belgium**, the NA sees need to improve the identification of large companies in relation to the shareholding impact on the definition.

The main challenge in **Ireland, Poland and Spain** is that there is no list of obligated enterprises. The process of creating such list is ongoing, however it is also based on some general assumptions so not all of the companies will be correctly identified.

In **Italy** the main issue is correct identification of associated and subsidiaries of obliged companies. Ministry's register is updated annually, but it is possible that some list is missing or has changed within the year.

The major challenges in **Poland** are the lack of the list of all obligated enterprises and the fact that changes on the market are too difficult to track and to be considered in the obligation fulfilment (companies that fall under the definition of large companies only in some years). Tracking of all obligated companies is difficult and resource intensive.

Belgium, Greece and **Poland** indicate that employee and turnover thresholds are insufficient. The cost - effectiveness of the measures proposed in energy audits largely depends on company's energy consumption, where some non-SMEs have rather low energy consumption and some SMEs have significant energy consumption. Greece wants to identify companies based on both power installation and annual energy consumption. Now energy thresholds exist in Bulgaria and Italy.

Thanks to cooperation with chambers register in **Croatia** and **Slovenia** there are no specific challenges regarding the identification of companies. **Finland** also did not mention specific challenge regarding the company identification.

2.3.2. Summary of challenges for the identification

All identified needs and challenges related to identification of companies are presented below.

Table 2 Summary of challenges for the identification – energy audit obligation for large enterprises

Need identified	Countries surveyed	External sources
Adding energy consumption threshold to the criteria for the energy audit obligation	Belgium, Greece, Poland	(European Commission, 2016), (Energy Community, 2019)
Challenge identified	Countries surveyed	External sources
Lack of list of obligated enterprises	Ireland, Poland, Spain	
Self-declaration as an insufficient tool for company identification	Bulgaria	
Identification of new obligated companies (dynamics of ownership and changes on the market are difficult to track)	Austria, Poland	
Identification of size of the enterprise in relation to shareholding	Belgium	
Identification of associated and subsidiaries of obligated companies	Italy	
Lack of awareness on energy efficiency and energy audits in companies	Greece	
Other sources		
Complexity of definition in case of additional criteria		(European Commission, 2016)

2.4. Implementation

Implementation itself is a third part of the implementation cycle. This part covers information on how the energy or environment management systems interact with the audit obligation and how are the companies incentivised in addition to the obligation to implement the energy audits.

2.4.1. Survey results

Most crucial challenges identified in in section are:

- Lack of compliance of obligated companies with audit recommendations and not meeting the deadline
- Overall quality of audits should improve

Many countries have difficulties with non-compliant companies or companies not meeting the deadline of energy audits, namely **Austria, Bulgaria, Croatia and Italy. Belgium, Italy, Ireland, Finland and Poland** have mentioned limitations in the quality of audits as well. Some additional issues, mentioned by fewer countries were: need of nomination of at least two auditors (HVAC and electrical systems) since each focuses more on their part limiting the findings in the other field (**Finland**), issues that pertain to

the lack of financial support schemes and assuring cost-effectiveness of the audit (**Bulgaria** and **Greece**), preparing guidelines and educating the companies (**Ireland** and **Belgium**). In **Poland** and **Slovenia**, lack of awareness of obligated companies about what the energy audit should be and the benefits it can bring was found as a challenge in case of the Art. 8 implementation.

In **Austria**, main challenge is checking whether all parts of the group are included in the notifications.

In **Belgium**, main challenges are identifying the set of obligated companies and ensuring the quality of the audit.

In **Bulgaria**, main challenge is mainly related to financial aspect of energy audits. The energy audit is usually expensive especially for large enterprises.

In **Croatia** and **Finland**, there were no specific challenge for large companies.

In **Greece**, the potential for national operational programs to fund energy audits as supplementary action especially for facilitating the measurement and verification of energy saved was acknowledged. Such support could be broader and cover SMEs which could further encourage them to carry out energy audits at their facilities.

In **Ireland**, improving the quality of the energy audits is a challenge. The verification carried out in 2018 showed that the quality of the audit varied case by case. To enhance the quality of the audits NA decided to prepare additional guidelines for the companies, which are currently under development.

Spain once again mentions issues with identifying all obligated companies and spreading this information to all Communities.

In **Poland** and **Slovenia** main challenges regarding the implementation of the obligation is awareness of the companies on which of what the energy audit should be and the benefits it can bring is an important challenge – the cost effectiveness of measures is a key part, which is not always clearly reflected in the audits. Additionally, the obligation criteria does not always target the energy intensive companies. Some companies must realise the audit because of the employee criterion (e.g. the private security companies), where the energy consumption is rather low and difficult to track.

One of the main challenges regarding implementation also is achieving cost-effectiveness of measures proposed in the energy audits. Mostly it depends on the audits' quality. Quality of the energy audit could be provided by establishing appropriate accreditation system to ensure auditors' professional qualification. Identification of energy savings could be improved by providing that energy audits in companies are undertaken by auditors specializing in the company's sector (**Energy Community, 2019**). To avoid situations where audits are undertaken by more generalist auditors whose specialist knowledge could potentially limit the audits' outcome, some MS define additional scopes of accreditation applicable to different audit types - buildings, industrial processes/facilities and transport etc. (**European Commission, 2015**). Similar approach is seen in **Finland**, where at least two auditors have to be nominated – one for HVAC system and one for electrical system.

To ensure quality of the energy audit, energy data should be calculated solely with reference to measurements taken from a measuring instrument, for example an electricity meter or a fuel gauge (**European Commission, 2015**). However, some of the companies may not have a continuous period of measured data on energy consumption due to interruptions such as meter errors/failures or lost records. For Finland, uncertainties about energy savings were mentioned as a challenge regarding enforcement. The accuracy of the data used for the audit is different since in some cases the measurements are too expensive and some estimates need to be introduced

Sometimes energy consumption in certain areas may be immaterial or difficult to measure causing additional burden for the company. Moreover, in some areas there is minimal opportunity to reduce energy consumption. Excluding these areas from the scope of the audit improves the cost-effectiveness of the audit. However, requiring all operations to be included in an audit maximises the potential to identify energy savings opportunities. To safeguard that energy audits are proportionate to both the company and the scale of the possible energy savings, some MS choose to set a de minimis.

A study (European Commission, 2016) claimed that in 2016 there was a lack of English language guidance documents and legislation in several countries. Documents are often provided only in national languages so multi-national companies have difficulties with fully understanding the requirements across the various MS in which they operate.

2.4.2. Summary of challenges for the implementation

All implementation needs and challenges related to identification of companies are presented below.

Table 3 Summary of challenges for the implementation – energy audit obligation for large enterprises

Need identified	Countries surveyed	External sources
Adding energy consumption threshold to the criteria for the energy audit obligation	Poland	(European Commission, 2016), (Energy Community, 2019)
Financial support schemes to improve the cost-effectiveness of the energy audit	Bulgaria, Greece	(European Commission, 2015) (Energy Community, 2019)
Preparing guidelines and providing education for the companies to ensure quality of the audit	Ireland	(European Commission, 2016)
Challenge identified	Countries surveyed	External sources
Improving quality of the energy audits	Belgium, Ireland	
Lack of awareness on energy efficiency and energy audits in companies	Poland, Slovenia	
Companies not meeting the deadline, non-compliant companies	Austria, Bulgaria, Croatia, Italy	(European Commission, 2016)
Checking whether all parts of the group are included in the notification	Austria	
Identification of all obligated companies	Belgium, Spain	
Other sources		
Availability of accredited or qualified energy auditors		(European Commission, 2015)
Providing training programmes for the qualification of energy auditors		(European Commission, 2015)
Accreditation of energy auditors		(European Commission, 2015) (European Commission, 2016) (Energy Community, 2019)
Lack of measured data		(European Commission, 2015)
Setting a de minimis		(European Commission, 2015)
Lack of English language guidance documents		(European Commission, 2016)

2.5. Enforcement

Fourth part of the cycle – enforcement, covers all measures that lead to effective Art. 8 EED implementation such as fines for non-compliance.

2.5.1. Survey results

Most crucial challenges identified in in section are:

- Limited resources of managing institutions prevent successful enforcement.
- Quality of energy audits should improve

Most challenges for the enforcement result from previously mentioned challenges. Even with the penalties in place their enforcement is difficult to carry out since there is a significant issue in identifying the companies that should fall under the obligation. Moreover, there is a quantity issue as for some countries it is difficult to address all obligated companies (e.g. as mentioned by **Austria** in previous section). The definition of the SMEs does not fit the obligation well and other criteria (based on energy consumption) should be introduced as noted by representatives from **Belgium**. The limitation in resources of the managing institutions prevents successful enforcement as mentioned by **Poland** and **Ireland**.

For **Bulgaria, Croatia** and **Greece**, no specific challenges were identified regarding the enforcement of the obligation.

For **Austria**, the main challenge identified is the difficulty in addressing all obligated enterprises.

For **Belgium**, the challenges concern the SMEs definition which is difficult to apply for the obligation.

For **Finland**, uncertainties about energy savings were mentioned as a challenge. The accuracy of the data used for the audit is different since in some cases the measurements are too expensive and some estimates need to be introduced. Additionally, the quality of the energy audits was mentioned. The scope of the audit requires two auditors to be involved in the process (one for heating, ventilation and air conditioning (HVAC) and one for electrical systems) because otherwise the audits were found to lack in one of those areas.

For **Ireland**, identification of companies create challenges in the enforcement. Following up on the implementation of measures is deemed to be too resource consuming.

For **Italy**, the quality of the audits and data collection were mentioned as challenges. In particular the issues with the definition of reference period for the audit and the changes in what methods could be used for the energy consumption monitoring were mentioned. However, a significant improvement of the quality of the audits was noticed after the certification of the of auditors has been introduced in the last obligation cycle.

Slovenia has problems with checking the adequacy of energy audits with the prescribed methodology, which in compliance with the Regulation on energy audits must be based on the guidelines SIST EN ISO 50002 and EN 16247 and the adequacy of energy auditors.

Poland identified a challenge with limited staff and financial resources for effective implementation, enforcement, monitoring and verification of the obligation. Once again the lack of the list of the obligated parties does not allow for successful enforcement of the obligation. For **Poland** also the dissatisfactory quality of the audits was mentioned, however since the audits have not been verified to a large extent this conclusion is based on the market signals.

In **Spain** difficulties with small delegations of multinational companies were identified. Additionally, NA had problems with general encouragement to implement the measures by means of loans or incentives.

Penalties imposed by the MS may be applied either to a non-complaint company, its management or the energy auditor. To be effective, a penalty for non-compliance needs to exceed the costs of conducting an energy audit. Although financial penalties for non-compliance exist in every Member State only few penalties was applied. Furthermore, in **Bulgaria, Croatia, Greece, Ireland and Poland** there was no sanction so far.

The introduction of an environmental or energy management system requires the establishment of an adequate organisational structure in a company. Due to this broader scope and the need to realise an organisational change, the introduction of management systems requires a considerably longer time than undertaking an energy audit. Therefore, a sufficient timeframe is crucial so that companies can fully implementing such alternative systems (European Commission, 2016).

2.5.2. Summary of challenges for the enforcement

All enforcement needs and challenges related to identification of companies are presented below.

Table 4 Summary of challenges for the enforcement – energy audit obligation for large enterprises

Need identified	Countries surveyed	External sources
Need for nominating at least two auditors (one responsible for HVAC system and one responsible for electrical system) to ensure quality of the audit	Finland	
Challenge identified	Countries surveyed	External sources
Lack of the list of obligated companies	Ireland, Poland	
Improving quality of the energy audits	Poland, Finland	
Identification of all obligated companies	Belgium	
Addressing all obligated enterprises	Austria	(Energy Community, 2019)
Issues with the definition of reference period for the audit	Italy	
Measuring at least part of the analysed energy consumption	Italy, Finland	
Limited staff and financial resources for the implementation, enforcement, monitoring and verification	Poland	
Difficulties with small delegations of multinational companies	Spain	
Encouragement to implement the measures- loans, incentives.	Spain	

Check the adequacy of energy audits with the prescribed methodology	Slovenia	
Other sources		
Appropriateness of penalties for non-compliance		(European Commission, 2016)
Timeframe for introducing management systems		(European Commission, 2016)

2.6. Monitoring

Monitoring is a fifth pillar of effective Art. 8 EED implementation. It contains all gathered information on audit, tools used by obligated companies and monitoring of energy consumed by tracked companies.

2.6.1. Survey results

Most crucial challenges identified in in section are:

- IT related challenges – data storage, security, web / application design
- Finding balance between collected data and administrative burden
- Tracking of recommendations implementation

Majority of MS mention all IT-related challenges – data storage, data collecting, data security, web / application design. Additionally, **Belgium, Ireland** and **Poland** find tracking of measures implementation recommended during audit problematic. The amount of collected data is a challenge identified in **Poland** and **Austria** – **Poland** sees the need for collection of more detailed information, when **Italy** and **Austria** strives to find balance between collected data and administrative burden to process and report it.

Spain claims data gathered from the audits is insufficient, but does not provide any further explanations.

Poland lacks of verification process of the energy audits as well.

In **Croatia** reports in the register are considered unreachable as they are stored internally.

To ensure quality of the energy audits Member States also have to provide independent supervision of audits and energy auditors (European Commission, 2015).

2.6.2. Summary of challenges for the monitoring

All needs and challenges related to monitoring are presented below.

Table 5 Summary of challenges for the monitoring – energy audit obligation for large enterprises

Need identified	Countries surveyed	External sources
Collecting more detailed information about the measures to improve analysis of energy efficiency potentials	Austria, Ireland, Italy, Poland, Spain	

Challenge identified	Countries surveyed	External sources
Finding balance between the collected data out of energy audits and the administrative burden for the companies	Italy	(European Commission, 2016)
Lack of the verification process of the energy audits	Poland	(Energy Community, 2019)
Lack of system monitoring implementation rate of measures	Belgium	(Energy Community, 2019)
Reports in the Register are impossible to reach as they are stored internally	Croatia	
Other sources		
Data storage – type of information, formats, retention, security, web/application design		(European Commission, 2015)
Independent supervision		(European Commission, 2015)

2.7. Evaluation

The last part of Art. 8 EED implementation cycle is evaluation. It means reviewing of all previous work, gathering all needs and challenge and deciding what policy changes should be introduced.

2.7.1. Survey results

Most crucial challenges identified in in section is:

- Recommendations implementation rate should be improved

The main challenge for Member States is improving implementation rate of measures identifies in energy audits (Energy Community, 2019). Currently this challenge is significant especially for **Austria, Ireland and Poland**.

Austria Ireland and Poland claim that implementation rate of measures identified in energy audits should be improved. **Bulgaria, Greece, Spain and Italy** mention incentives and other encouragement measures for the companies to undergo energy audit as a need.

Finland noticed, that introducing of an obligation has lowered number of audits implemented under voluntary agreements.

Italy mentions development of widespread energy consumption monitoring system within audits, energy management systems and sectoral standardization with benchmark.

Ireland notices, there is lack of clarity around confidentiality of data provided in the energy audits and deadlines for completion of audits.

In **Croatia** there is a problem with targeting companies with ISO 5001.

Greece mentions extending the application of energy audits in all companies of tertiary sector.

2.7.2. Summary of challenges for the evaluation

All needs and challenges regarding evaluation are presented below.

Table 6 Summary of challenges for the evaluation – energy audit obligation for large enterprises

Need identified	Countries surveyed	External sources
Simplification of regulatory rules and procedures	Belgium, Slovenia	
Creating guidance documents, audit template etc. to ensure quality of energy audits	Ireland	(Energy Community, 2019)
Challenge identified	Countries surveyed	External sources
Lack of the list of obligated companies	Ireland, Poland, Spain	
Identification of new obligated companies (dynamics of ownership and changes on the market are difficult to track)	Austria, Poland	
Identification of all obligated companies	Belgium, Bulgaria, Greece	
Finding balance between the collected data out of energy audits and the administrative burden for the companies	Austria	(European Commission, 2016)
Improving quality of the energy audits	Belgium, Poland	
Companies are not obligated to implement the measures	Ireland, Poland	
Improving implementation rate of measures identified in energy audits	Austria, Ireland	(Energy Community, 2019)
Creating incentives for the companies to undergo energy audit	Bulgaria, Greece	
Informing the obligated companies on the benefits of the energy audits	Bulgaria, Italy, Greece	
Introduction of an obligation has lowered number of audits implemented under voluntary agreements	Finland	
Development of a widespread energy consumption monitoring system within audits	Italy	
Development of energy management systems	Italy	
Creating sectoral standardization with benchmark	Italy	
Extending the application of energy audits in all companies of tertiary sector	Greece	

Clarity around confidentiality of data provided in the energy audits	Ireland	
Lack of clarity around deadlines for completion of energy audits	Ireland	
Targeting companies with ISO 5001	Croatia	

2.8. Summary

Most crucial challenges identified in first part:

- Regulatory rules and procedures are too complicated
- Identification of non-SME is problematic. There is lack of the list of obligated companies. Companies with complex ownership are an issue as well.
- Self-declaration is an insufficient tool for company identification
- Energy consumption threshold should be added to the criteria
- Lack of compliance of obligated companies with audit recommendations and not meeting the deadline
- Overall quality of audits should improve
- Limited resources of managing institutions prevent successful enforcement.
- IT related challenges – data storage, security, web / application design
- Finding balance between collected data and administrative burden
- Tracking of recommendations implementation
- Recommendations implementation rate should be improved

In conclusion, DEESME partners identified many needs and challenges related to Art. 8 EED implementation. One of most crucial are issues with identification of obligated companies, especially newly formed or with complicated shareholding. Companies qualification criteria are confusing – MS notice, that tracking of companies power consumption is problematic. Another widely mentioned complaint is general energy audit quality and issues with its implementation monitoring. Companies compliance should be improved as well. Last but not least majority of participants mention IT-related challenges – data storage, security, web application design.

Table 7 The summary of overlapping challenges and needs

Need identified	Element of cycle (countries surveyed)
Adding energy consumption threshold to the criteria for the energy audit obligation	<ul style="list-style-type: none"> ● legal framework (Belgium) ● identification (Greece) ● implementation (Poland)
Simplification of regulatory rules and procedures	<ul style="list-style-type: none"> ● legal framework (Belgium, Greece) ● evaluation (Belgium)
Challenge identified	Element of cycle (countries surveyed)
Lack of the list of obligated companies	<ul style="list-style-type: none"> ● legal framework (Ireland) ● identification (Ireland, Poland) ● enforcement (Ireland, Poland) ● evaluation (Ireland, Poland)

Self-declaration as an insufficient tool for company identification	<ul style="list-style-type: none"> • legal framework (Austria, Bulgaria) • identification (Bulgaria)
Identification of new obligated companies (dynamics of ownership and changes on the market are difficult to track)	<ul style="list-style-type: none"> • legal framework (Austria, Poland) • evaluation (Austria)
Identification of all obligated companies	<ul style="list-style-type: none"> • implementation (Belgium) • enforcement (Belgium) • evaluation (Belgium, Bulgaria, Greece)
Improving quality of the energy audits	<ul style="list-style-type: none"> • implementation (Belgium, Ireland) • enforcement (Poland, Finland) • evaluation (Belgium, Poland)
Finding balance between the collected data out of energy audits and the administrative burden for the companies	<ul style="list-style-type: none"> • monitoring (Italy) • evaluation (Austria)
Lack of awareness on energy efficiency and energy audits in companies	<ul style="list-style-type: none"> • identification (Greece) • implementation (Poland) • evaluation (Poland)

3. Requirements and needs – encouragement for SME to carry the energy audit and implement energy efficiency measures

Surveys contained questions related to four topics formed in a cycle that is specific to workflow with encouraging SME's to carry out energy audit in context of Art. 8 EED. All needs and challenges identified during these topics are covered in sections below.

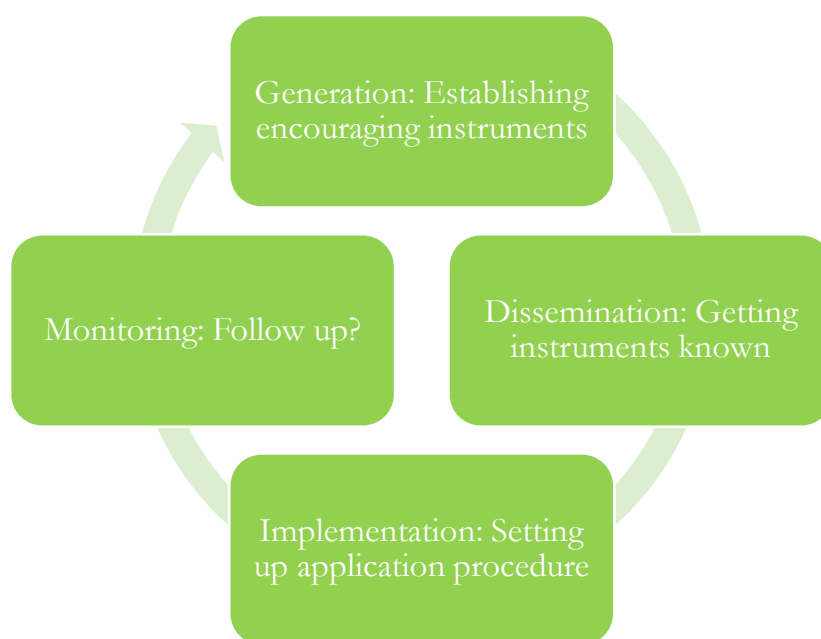


Figure 2 Policy cycle for encouragement for SME to carry the energy audit and implement energy efficiency measures

The four steps of the cycle are as follows:.

1. In the first step – generation, the most important mechanisms that are currently in place and discontinued mechanisms were identified in each of the surveyed countries. Furthermore, key barriers were identified and the national authorities evaluated how well are those addressed by current policies.
2. The second step is dissemination where the methods of informing the companies were looked at. Additionally, types of organisations included in the dissemination process were identified.
3. . In the implementation step, the means for technical assistance for SME so as additional criteria for participation were looked at. Moreover the deadlines for different support mechanisms to encourage audits were looked at.
4. The last step was monitoring, which covered standards and guidance for institutions operating the support for SMEs to undergo energy audit and implement energy efficiency measures. It also covered the information if the outcomes of the previously mentioned support are publicly available.

3.1. Generation

Generation is a first part of cycle that leads to increased number of SMEs that implement Art. 8 resolution. It contains establishing all measures that may be used to this purpose – any incentives and their origin were introduced.

3.1.1. Survey results

Due to (European Commission, 2016) the main challenge in 2016 regarding generation was establishing programmes specifically targeting SMEs. In **Latvia** and **Spain** no support schemes for SMEs were identified. In **Estonia** and **Greece** support schemes were still being developed. In **Austria** no support scheme for SMEs was available, although there were various regional programmes for companies which could also be requested by SMEs. In **Denmark** there was no special scheme which addresses the high initial costs of implementation for SMEs. In **Poland** no scheme which especially aims to support SMEs in implementing energy audits was established. Slovenia was planning grants for the implementation of energy audits in the future.

Some of the Member States also were finding establishing support schemes to help implement management systems challenging. In **Austria, Belgium, Estonia, Greece, Latvia, Lithuania, Malta, Poland, Portugal** no schemes regarding energy management systems which specifically target SMEs have been identified. In **Finland** scheme named ECOSTART targeting SMEs had been run for about 4-5 years, but SMEs did not take it up and scheme had been abandoned. Later in **Finland** EcoCompass management systems were available and **Finland** did not perceive any need to do more. In **Hungary** no specific instruments for energy management systems have been implemented, but issue was partially covered by virtual power plant programme. In **Romania** no schemes for SMEs to implement energy management systems were established – except for those SMEs that meet the 1 000 toe threshold and are mandated to undertake audits. **Slovenia** was planning grants for the implementation of energy management systems in the future.

Now majority of participants find SMEs awareness of energy consumption being relevant to the costs of energy in their overall production costs. It is unclear, that energy efficiency is in fact economically feasible. Creating support mechanism to overcome SMEs limited financial capacity, limited personnel resources and limited know-how are generally considered as moderate challenges. Minor issue is support in decision making process. Support mechanism to help create position in SMEs responsible for energy issues is considered the biggest challenge in generation.

Increasing the awareness of decision makers in companies and of energy experts has been recognized as an important factor in case of **Austria, Finland** and **Spain**. This supports the implementation of energy efficiency measures on voluntary basis. In **Austria** as a solution to decision-making problems, it was proposed to provide an external dedicated person in charge of energy issues in SMEs.

A country specific issue in **Bulgaria** concerns voluntary agreements where it is challenging to get significant results. This situation can be improved by information campaigns and education seminars. Lack of financial and human resources to administer the support mechanism is noticed by **Ireland**.

In **Belgium** it has been noted that it is important to ensure the good balance between quality & simplification of the audit mechanism. To this purpose, more information should be obtained from audits.

Greece claim that awareness campaigns and support programs for energy efficiency measures implementation must be launched.

3.1.2. Summary of challenges for the generation

All needs and challenges regarding generation are presented below.

Table 8 Summary of challenges for the generation - encouragement for SME to carry the energy audit and implement energy efficiency measures

Challenge identified	Countries surveyed	External sources
Raising SMEs awareness of energy consumption being relevant cost factor	challenge <ul style="list-style-type: none"> • significant: Austria, Finland, Spain • moderate: Belgium, Italy, Ireland, Poland • small: Bulgaria 	
Creating support mechanisms to overcome SMEs limited financial capacity	challenge <ul style="list-style-type: none"> • significant: Ireland • moderate: Austria, Bulgaria, Croatia, Finland, Greece, Italy, Poland, Spain • small: Belgium 	
Creating support mechanisms to overcome SMEs limited personnel resources	challenge <ul style="list-style-type: none"> • significant: Ireland, Poland • moderate: Austria, Belgium, Bulgaria, Croatia • small: Italy, Spain 	
Creating support mechanisms to overcome SMEs limited know-how	challenge <ul style="list-style-type: none"> • significant: Italy, Spain • moderate: Austria, Belgium, Finland, Ireland, Poland • small: Bulgaria, Croatia, Greece 	
Creating support mechanisms to help SMEs in decision making process	challenge <ul style="list-style-type: none"> • significant: Poland, Spain • moderate: Austria • small: Belgium, Croatia, Greece, Italy, Ireland 	
Creating support mechanisms to help create in SMEs position of employee responsible of energy issues	challenge <ul style="list-style-type: none"> • significant: Austria, Italy, Poland, Spain • moderate: Belgium, Croatia, Ireland, • small: Greece 	
Raising SMEs awareness of energy efficiency being economically feasible	challenge <ul style="list-style-type: none"> • significant: Bulgaria, Greece • moderate: Austria, Italy, Ireland, Poland, Spain • small: Belgium 	

Raising SMEs awareness of benefits of modernizing a running systems	challenge <ul style="list-style-type: none"> • significant: - • moderate: Italy, Ireland • small: Belgium, Poland, Spain 	
Voluntary agreements not getting significant results	Bulgaria	
Lack financial and human resources to administer the support mechanisms	Ireland	
Other sources		
Establishing support programmes specifically targeting SMEs	Austria, Belgium (Brussels region), Denmark, Estonia, Greece, Latvia, Poland, Slovenia, Spain	(European Commission, 2016)
Establishing support schemes to help implement management systems	Austria, Belgium, Estonia, Finland, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovenia	(European Commission, 2016)

3.2. Dissemination

Dissemination is a second pillar of SME encouragement cycle. It assumes getting insight into implementation of measures introduced in previous section – how are SMEs informed about encouragement mechanism

3.2.1. Survey results

Due to (European Commission, 2016) the main challenge regarding dissemination in 2016 was establishing mechanism helping to exchange information with SMEs. In **Bulgaria, Greece Lithuania and Spain** mechanisms providing exchange of information had not been established in 2016. In **Estonia and Italy** no dedicated instruments for raising awareness among SMEs or structures major information exchange mechanism were available, but various minor information activities (web portal, seminars etc.) were being executed. Similarly in **Cyprus** no specific networks had been established, however the Cyprus Employers Federation had delivered a number of seminars, presentations and events in order to raise awareness among SMEs. In **Slovakia** SMEs could access information on website and conferences with industrial participation, but there was no specific organisations that represented SMEs in energy efficiency matters. In **Latvia** as set out in Strategy 2030, it was intended that information will be exchanged through industry associations.

Now creating and maintaining communication with SMEs is still the most typical challenge related to dissemination – it is noticed by **Greece, Ireland, Poland, Belgium**. Other challenges are country specific. **Austria** claims that insufficient resources to participate in all events and talks with experts is a challenge. **Finland** reports a need of digitalization of energy audits. It is noticed there that energy audit is not a familiar tool. SMEs in **Finland and Belgium** are considered not interested enough in energy efficiency. To convince them about the added value of energy efficiency and RES it is important to improve communication and find the right balance between perceived costs & benefits of the audit & follow-up with audit recommendations. According to **Italian** National Authority there is a lack of the appropriate training and information program. **Spain** claims the information should be easier to understand. Often there are too much information to understand and analyse, so this could discourage

companies to apply for that mechanism. It is also difficult to find information for companies and organizations in general.

In **Bulgaria** and **Croatia** no specific challenges were identified.

3.2.2. Summary of challenges for the dissemination

All needs and challenges regarding dissemination are presented below.

Table 9 Summary of challenges for the dissemination - encouragement for SME to carry the energy audit and implement energy efficiency measures

Need identified	Countries surveyed	External sources
Need of digitalization of energy audits	Finland	
Challenge identified	Countries surveyed	External sources
Lack of time to participate in events and talks with experts	Austria	
SMEs not being interested in energy efficiency	Finland, Belgium	
Energy audits not being a familiar tool for SMEs	Finland, Spain	
Whole process is too complicated for SME to understand	Spain	
Lack of appropriate training and information program	Italy	
Creating communication channel with SMEs, being engaged in SMEs networks	Greece, Ireland, Poland, Belgium	
Other sources		
Establishing information exchange mechanisms	Bulgaria, Cyprus, Estonia, Greece, Italy, Latvia, Lithuania, Slovakia, Spain	(European Commission, 2016)

3.3. Implementation

Implementation itself is a third part of SMEs encouragement implementation cycle. This part covers such topics as technical assistance provided for SMEs to be able to participate in the established earlier programmes.

3.3.1. Survey results

Bulgaria and **Greece** find the entire process of implementation rather complicated. For instance, number of indicators for proving projects implementation and reports from implementation is too high which makes detailed evaluation of the whole support mechanism results not as targeted as certain needs

require. Main challenge in **Bulgaria** are also complex procedures for project evaluation and lack of specific implementation requirements. Rest of challenges are country specific. In **Austria** SMEs do not apply for financial support schemes due to their fear of administrative burden. Lack of trust to the energy auditors is main challenge in **Poland**. **Belgium** claims that finding balance between perceived costs and benefits of the audit and follow up is problematic. In **Greece** SMEs lack of experience in drafting required application form and gradual repayment of financial resources used to implement measures are considered as issues.

Energy thresholds in available support schemes are one of the challenges regarding implementation. In Poland 10 toe threshold in white certificate scheme is difficult to achieve by SMEs. In Belgium (Flanders) voluntary agreements in energy intensive industry have annual energy consumption threshold 0,1 PJ which excludes majority of SMEs (The Polish National Energy Conservation Agency, 2020).

In Poland main challenges regarding implementation are lack of financial support schemes for ESCO and insufficient financial resources to provide help for SMEs in implementing energy efficiency projects (The Polish National Energy Conservation Agency, 2020).

Some of the SMEs do not own their facilities; therefore, renting premises might hinder energy-efficient measures. One of the SMEs participating in a case study of a Local Energy Program in Sweden had to change facilities in order to lower energy costs, since the owner was not interested in upgrading for energy efficiency (Backman, 2017).

3.3.2. Summary of challenges for the implementation

All needs and challenges regarding implementation are presented below.

Table 10 Summary of challenges for the implementation - encouragement for SME to carry the energy audit and implement energy efficiency measures

Challenge identified	Countries surveyed	External sources
SMEs not applying for financial support schemes due to their fear of administrative burden	Austria	
Complex procedures for projects' evaluation	Bulgaria	
Too many indicators/reports for proving projects implementation (administrative burden for SME)	Bulgaria, Greece	
SMEs lack of experience in drafting the required application (cost of outsourcing to a consulting firm)	Greece	
Lack of trust to the energy auditors and energy service providers	Poland	
Finding balance between perceived costs and benefits of the audit and follow up	Belgium	

Gradual repayment of financial resources used to implement measures	Greece	
Other sources		
Energy thresholds in support schemes	Poland, Belgium	(The Polish National Energy Conservation Agency, 2020)
Lack of financial support schemes for ESCO	Poland	(The Polish National Energy Conservation Agency, 2020)
Insufficient financial resources	Poland	(The Polish National Energy Conservation Agency, 2020)
Split incentives in SMEs	Sweden	(Backman, 2017)

3.4. Monitoring

The last part of Art. 8 EED implementation in case of SMEs encouragement cycle is monitoring. It contains all gathered information on audit, tools used by SMEs and standards.

3.4.1. Survey results

All challenges noticed are country specific. Belgium needs are simplifying the system and developing agreements with tertiary sector. In Poland main challenges are poor quality of energy audits and coordination of support mechanism provided by different institutions. Arranging dedicated funds for energy efficiency measures identified during energy audit is problematic in Italy. Greece needs to improve the monitoring and evaluation system. Bulgaria lacks requirements and the follow up for implementing energy management systems in SMEs. In Ireland availability of guidance document on minimum criteria for SMEs is considered as challenge. In Austria, there is a problem with establishing contact with smaller companies.

In some of the Member States support programmes for implementation of energy efficiency projects are aimed at both large enterprises and SMEs – Energy Auditing Programme (EAP) in Finland, Investments to Improve Energy Efficiency in Food Processing Enterprises in Latvia, support for new energy and climate technology in industry in Norway (The Polish National Energy Conservation Agency, 2020). In these cases assessing the results of projects strictly for SMEs are difficult.

3.4.2. Summary of challenges for the monitoring

All needs and challenges regarding monitoring are presented below.

Table 11 Summary of challenges for the monitoring - encouragement for SME to carry the energy audit and implement energy efficiency measures

Need identified	Countries surveyed	External sources
Arranging dedicated funds for energy efficiency measures identified in the energy audit	Italy	
Simplifying the system	Belgium	
Improving the monitoring and evaluation system for energy efficiency	Greece	
Challenge identified	Countries surveyed	External sources
Creating and implementing national standards about monitoring is difficult and time-consuming	Poland	
Lack of requirement and follow up for implementing energy management system	Bulgaria	
Availability of guidance document on minimum criteria for SME energy audits	Ireland	
Coordinating support mechanisms provided by different institutions	Poland	
Poor quality of energy audits (noneconomic recommendations for SMEs)	Poland	
Developing agreements with tertiary sector	Belgium	
Other sources		
Assessing the results of projects' implementation for SMEs	Finland, Latvia, Norway	(The Polish National Energy Conservation Agency, 2020)

3.5. Summary

In conclusion, DEESME partners identified many needs and challenges related to Art. 8 EED in case of SME's encouragement. One of most crucial issues is lack of SMEs awareness and interest in energy efficiency – it is not clear, that it is in fact financially feasible. Support and education mechanism to overcome SMEs limited resources and know-how are needed. Creating and maintaining communication with SMEs is a challenge as well. Additionally, some minor (individual) issues were identified, such as overall complexity of implementation process or general quality of audits.

4. Non-Energy Benefits

After the two parts related to policy cycles Non-Energy Benefits (NEB) concept was looked into. The recognition and implementation of the NEB concept in the support mechanisms covered in the last part of the survey.

4.1. Survey results

Even though most MS were aware of the NEB concept only 5 out of 9 MS considered the NEBs when setting up support mechanisms. Those are Austria, Bulgaria, Croatia and Greece. They have been actively considered in 3 types of mechanisms: funding mechanisms, training and education, voluntary agreements. In the programmes themselves there are no processes that examine if a NEB were the reason for undergoing an energy audit or implementation of an energy management system.

Table 12 Active consideration of NEB concept in energy efficiency support mechanisms in 5 MS

Country	Funding mechanisms (loans, grants etc.)	Training and education	Voluntary agreements
Austria		✓	✓
Belgium			✓
Bulgaria	✓		
Croatia	✓	✓	
Greece	✓		
Spain	✓		

In **Austria** NEB are considered in the klimaaktiv programm through awarding measures for “climate neutrality”. Within the klimaaktiv programme CO₂ emission reduction must be reported related to the implemented measures. In the change of a lighting system to LED less maintenance work, better light quality is considered to increase of occupational health and safety. The NEBs are advertised through klimaaktive website and in klimaaktiv guideline for energy efficient companies to resource efficiency.

In **Bulgaria** NEB are considered in the Operational Program “Innovation and Competitiveness” (OPIC). Those include competitiveness, entrepreneurship, innovations, community-led local development. The OPIC’s management body evaluates specific indicators (i.e. number of innovative technologies introduced, evaluation of improved effectiveness per unit of production, etc.). The evaluated data are published on annual bases on the OPIC’s webpage. NEBs are also advertised among others through media advertisements and online publications.

In **Belgium** NEB are considered in specific action in small shops for lighting, where improving the lighting enhances the product value.

In **Croatia** NEB are considered in EU funding as these are among “horizontal principles”. Among other they are included in ESI funds for energy efficiency projects in industry. The NEB include sustainable development, regional development, employability etc. They are advertised through large campaigns in TV, social media and web portals.

In **Greece** NEB are considered in Operational Programme for Competitiveness Entrepreneurship Innovation EPIAνEK. They are important criteria for eligibility, through specific indicators, of the proposals submitted to the support mechanisms. The NEB include the employment, income, health issues, environmental indexes. All NEB are advertised through social media, press and other publications as well as the official sites of the programmes.

In **Spain** NEB are considered as loans for Energy Services Companies in order to fight energy poverty.

4.2. Summary

Most MS are aware of the Non-Energy Benefits (NEB) concept, however only some implement them in the energy efficiency support mechanisms. Most commonly the considered NEB are related to environmental factors, health and safety and local/regional development and employment. When the NEB are a part of the scheme they are also advertised to encourage the participation of companies.

Conclusion

In conclusion, after analysis of surveys results and desk research, following major issues regarding obligated enterprises were identified:

- Legal framework needs to be simplified and more transparent.
- Self-declaration is insufficient tool. There are issues with tracking of obligated enterprises. Identification of new obligated companies is difficult as well. A list of all obligated companies is often reported need.
- Energy consumption threshold should be added to the criteria for the energy audit obligation.
- Overall quality of energy audits and obligated companies' awareness should improve.
- Representative sampling, clustering, coverage of buildings in audits and qualification criteria for energy auditors should be developed
- IT related issues were identified. Data storage and web application design should be developed.

In case of SMEs encouragement two major issues were identified:

- SMEs awareness and interest in energy efficiency is crucial issue and should be improved. Support and education programmes to overcome barriers should be developed.
- Creating and maintaining communication with SMEs is another widely mentioned issue.

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Annexes

Annex I – questionnaire



Introduction

The aim of the survey is to identify the state of the implementation of Art. 8 EED in chosen countries, challenges concerning the mechanisms in force and the needs and requirements from the policy makers in that field. This identification of needs and requirements is intended as a preparation of identifying solutions suited for each surveyed National Authority.

The survey covers 3 main topics:

- Obligatory energy audit mechanisms for large enterprises
- Encouragement mechanisms for SMEs to undergo energy audits
- Non-Energy-Benefits (NEB)

For each topic, a policy cycle with a set of questions has been prepared. The first 33 questions are related to energy audit obligation for non-SMEs. The second part (questions 34-56) is focused on the encouragement for SMEs to undergo energy audits.

1. To fill in the information follow the steps below: The questions marked with * should be prefilled by partners before contacting the NA separately for each country assigned in T2.1. (by 15.11.2020 the latest)
2. Contact NA to verify the collected information, gather comments and identify challenges through the open questions. (For each question there is a comment section which should be used for further clarification) (by 6.12.2020 the latest)
3. Upload the document to the project folder T2.1 Mobilising National Authorities named “countryname_DEESME_survey_Art8” (by 6.12.2020 the latest)

Materials that can support you before the meetings with NA:

Guidance note on Art.8 (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52013SC0447>)

Study on implementation of Art. 8 (https://ec.europa.eu/energy/sites/ener/files/documents/eed-art8-study_on_minimum_criteria_for_energy_audits-wp3-final-clean.pdf)

(https://ec.europa.eu/energy/sites/ener/files/documents/EED-Art8-Implementation-Study_Task12_Report_FINAL-approved.pdf)

CAEED materials on Art. 8 (<https://www.ca-eed.eu/Expert-areas/Articles/Energy-audits-and-management-Art.-8>)

Part 1: Energy audit obligation for large enterprises

Basic information about mandatory energy audit for non-SMEs mechanism

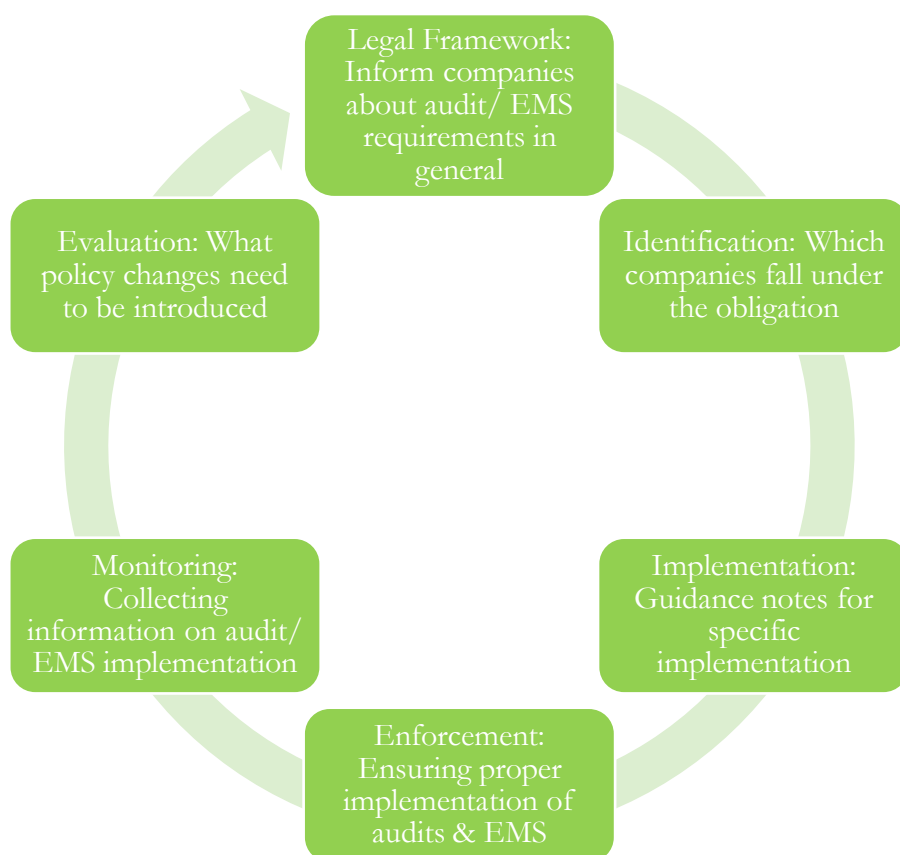
***Country:** _____

***Up to date national regulations introducing the mechanism and other national implementation documents – please provide links (e.g. FAQs, guidelines etc.):** _____

***Monitoring body:** _____

***Dates of previous the current cycle of obligation:**

- from DD-MM-YYYY to DD-MM-YYYY
- from DD-MM-YYYY to DD-MM-YYYY



Legal Framework

1. *How are/were the enterprises informed about the obligation? (please describe, also with links to sources)

2. *How is the deadline for audit implementation defined? (please describe)

3. *How much energy needs to be covered by the mandatory audits? (please describe)

4. *How are those issues covered within the audit? (please describe)

a) Multi-national companies (what should be covered in the audit)

- b) Multi-site companies (should the audit cover all sites, is sampling allowed, is the sampling process standardised)
- c) Cross-border transportation
- d) Multi-sector companies (e.g. real estate and manufacturing. Should the audit cover all sectors)
- e) Virtual sites (e.g. transportation companies)

5. What are the main challenges regarding the legal framework?

Identification

6. *How are the enterprises obligated defined?

- a) Direct transposition of non-SME from the directive (≥ 250 employees or > 50 mln EUR annual turnover and > 43 mln EUR annual balance sheet)
- b) Other definition (please describe)
- c) No precise definition

Comments: -----

7. *Does the mandatory energy audit mechanism include SMEs in any way?

- Yes (please describe how?)
- No

Comments: -----

8. *Are there any exemptions from the obligation?

- Yes (please describe them)
- No

Comments: -----

9. *Does the NA have a list of all obligated enterprises (e.g. Company Register)? If yes, is it publicly available?

- Yes (please describe what is it based on and how often is it updated)
- No (please describe if there are any difficulties in identifying the obligated companies)

Comments: -----

10. *Does the NA collaborate with other entities/associations in order to identify all the obliged companies?

11. What are the main challenges regarding the identification of companies?

Implementation

12. *Is the implementation process different for companies that introduce energy or environmental management system to fulfil the obligation (including deadlines, reporting, etc.)?

- Yes (please describe)
- No

Comments: -----

13. *What is the share of companies that fulfilled the obligation by implementing energy or environmental management system in last period?

14. *What certification standards are accepted?

- ISO 50001
- Other (Which?)
- None

Comments: -----

15. *Can the energy audit be a part of a broader environmental audit?

- Yes
- No

Comments: -----

16. *Were there any issues with companies not meeting the deadline?

- Yes (please describe)
- No

Comments: -----

17. *What support schemes for large enterprises that cover costs of an energy audit?

18. What are the main challenges regarding the implementation of the obligation?

Enforcement

19. *Who carries out the energy audits for non-SMEs? (multiple answers possible)

- a. Independent auditors/ experts
- b. In-house consultants
- c. energy service companies (ESCOs)
- d. Dedicated authority
- e. Other (please describe)

Comments: -----

20. *Is there an obligatory accreditation mechanism for energy auditors and/or in-house consultants in place?

- Yes (please describe)
- No

Comments: -----

21. *Does the NA monitor the implementation of measures from the obligatory audit?

- Yes
- No

Comments: _____

22. *Does the NA promote and incentivise the implementation of measures from the obligatory audit?

Yes (please describe how)

No

Comments: _____

23. *What types of penalties for non-compliance are in place?

Financial

Other (please describe)

None

Comments: _____

24. *Have the penalties been used so far?

Yes (please describe which and how often)

No

Comments: _____

25. What are the main challenges regarding the enforcement of the obligation?

Monitoring

26. *What information from the audit is collected by the managing body?

Whole audits

Selected information (please describe)

None

Comments: _____

27. *How is the information from the audit collected by the managing body?

Online through dedicated template

On paper through dedicated template

On paper without dedicated templates

Other (please describe)

Comments: _____

28. *Is the collected data stored in digital database?

Yes

No

Comments: _____

29. *Are the audits verified by the managing authority (or other dedicated body)?

All audits are verified

Some audits are verified (please describe how many?)

No audits are verified

Comments: _____

30. * Are the outcomes of the audits (energy consumptions, indicators) and the measures proposed analysed? (e.g. identifying most common measures, average SPBT, total energy savings possible to achieve etc.)

Yes (please describe the scope)

No

Comments: _____

31. * Are the outcomes of the audits (energy consumptions, indicators) and the measures proposed presented publicly?

Yes (please describe the scope)

No

Comments: _____

32. Is the data gathered from the audits sufficient?

Yes

No (please describe why and what additional information should be gathered)

Comments: _____

Evaluation

33. * Was there an evaluation of the obligation mechanism carried out?

Yes (please describe the scope)

No (please describe why)

Comments: _____

34. What are the 5 most important challenges in terms of energy audit obligation?

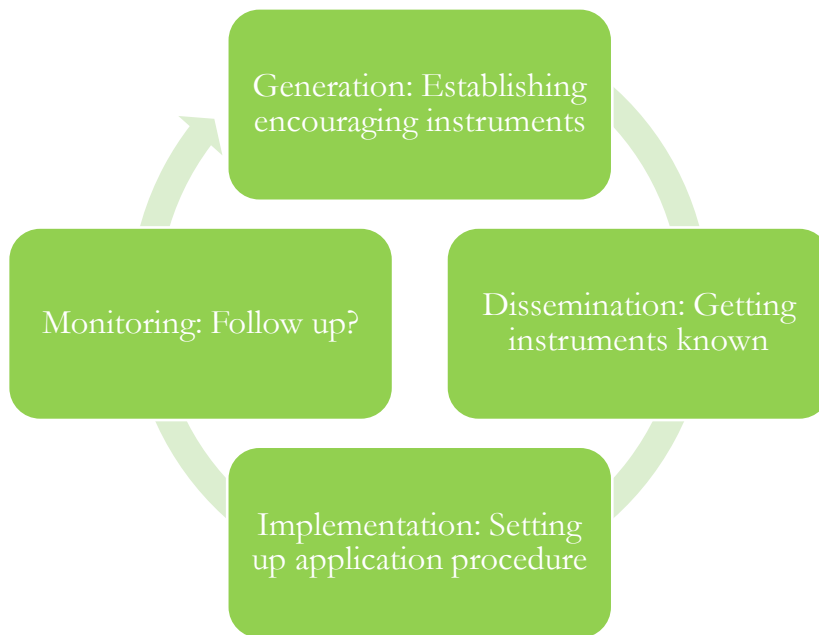
- a) _____
- b) _____
- c) _____
- d) _____
- e) _____

35. What support would be needed from DEESME to overcome most important challenges?

Comments: _____

Part 2: SME encouragement to undergo energy audit

Following questions are related to energy audits in SMEs. For each implementation phase there is a dedicated set of questions.



Generation

36. What types of incentives are in place to encourage SMEs to undergo energy audit and implement energy efficiency measures in your country?

- a) Funding mechanisms (loans, grants etc.)
- b) Fiscal incentives
- c) Training and education
- d) Voluntary agreements
- e) Dedicated tools (IT tools, best practises or case studies etc.)
- f) Regulatory measures (i.e. requirements)
- g) Other

Comments: _____

37. Why did the NA decide to choose the above mentioned types of measures? (please describe)

38. Why did the NA decide not to choose some of the above mentioned types of measures? Would the NA support additional measures, which types? (please describe)

39. At what level is most of the support provided?

- a) EU
- b) National
- c) Regional

d) Local □

Comments: _____

40. What are the 5 most important currently available national support mechanisms to encourage SMEs to undergo energy audit?

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

Comments: _____

41. What are the 3 most important discontinued support mechanisms to encourage SMEs to undergo energy audit?

- a. _____
- b. _____
- c. _____

Comments: _____

42. Do the instruments focus on specific SMEs sectors? (please describe)

43. What are the most important barriers for SMEs to implement energy audits (rate from 1 – not important to 5 - very important):

- | | |
|---|--|
| a) SMEs perceive energy consumption as not relevant (e.g. as a low cost factor) | |
| b) SMEs have limited financial capacity | |
| c) SMEs have limited personnel resources | |
| d) SMEs have limited know-how | |
| e) SMEs face difficulties in decision making process | |
| f) SMEs lack of dedicated person in charge of energy issues | |
| g) SMEs perceive energy efficiency as not economically feasible | |
| h) SMEs are reluctant to modernise a running system | |

44. Are there any other previously not mentioned barriers for SMEs to implement energy audits? (please describe)

45. How successful are NAs in tackling the barriers with existing support mechanisms (rate from 1 – not successful to 5 –very successful):

- a) Companies perceive energy consumption as not relevant (e.g. as a low cost factor)

- b) Companies have limited financial capacity
- c) Companies have limited personnel resources
- d) Companies have limited know-how
- e) Companies face difficulties in decision making process
- f) Companies lack of dedicated person in charge of energy issues
- g) Companies perceive energy efficiency as not economically feasible
- h) Companies are reluctant to modernise a running system
- i) other

46. What would you try to do to help overcome the challenges? (please describe)

Dissemination

47. How are/were the SMEs informed about the mechanisms? (please describe)

48. What types of organisations are included in the dissemination process?

- Banks
- Sector associations
- Local associations
- Energy suppliers
- Local Authorities
- Energy service providers
- Technology providers
- Other (please describe)

Comments:

49. What are the main challenges in reaching the SMEs to inform them about the mechanisms? (please describe)

Implementation

50. How is the technical assistance provided for the SMEs to be able to participate in the programmes (guidance notes, application forms, help-desk etc.)? (please describe)

51. Are there any additional criteria for SMEs to participate? (please describe)

52. How long are the deadlines for the SMEs to apply? (please indicate the usual duration range)

Monitoring

53. Are there specific national standards or guidance about monitoring for institutions managing support mechanisms for SMEs to undergo energy audit and implement energy efficiency measures? (please describe)

54. Would NAs consider development of such standards/guidance helpful? (why/why not please describe)

55. Are the outcomes of the mechanisms publicly available? (e.g. amount of financing granted, number of SMEs addressed, amount of investments supported etc.) (please describe)

56. For the mechanisms supporting SMEs to undergo energy audits – what are the means of monitoring the implementation of measures suggested in the audits? (please describe)

57. In your opinion what are the 5 most important challenges in terms of mechanisms supporting SMEs to undergo energy audit or implement energy management systems?

- a. -----
- b. -----
- c. -----
- d. -----
- e. -----

58. In your opinion what support would be needed from DEESME to overcome most important challenges?

Comments: -----

Part 3: Non-Energy-Benefits (NEB)

General

1. Are the NA aware of the concept of non-energy benefits (NEBs)/co-benefits of energy efficiency as a subject of energy efficiency?

Yes (ask further questions only if yes)

No

Comments: -----

Following questions only if the answer for above is yes:

Generation of programmes/ mechanisms

2. Have NEBs actively been considered when setting up any mechanisms?

Yes

a) Funding mechanisms (loans, grants etc.)

b) Fiscal incentives

- c) Training and education
- d) Voluntary agreements
- e) Dedicated tools (IT tools, best practises or case studies etc.)
- f) Regulatory measures (i.e. requirements)
- g) Other

No

Comments: _____

Implementation

3. Have NEBs actively been considered when setting up any mechanisms?

Yes

a) Please elaborate (which NEBs, how are the reported, considered, etc.?)

b) Any specific NEBs (please provide a comment):

c) Any specific supporting programme (please provide a comment)

No

Comments: _____

Dissemination

4. Are NEBs actively advertised within any programmes?

Yes

a) Any specific NEB (please provide a comment)?

b) How are they advertised (please provide a comment)?

No

Comments: _____

Monitoring

5. Is there a process existing that examines if a NEB was the reason for undergoing an energy audit or implementation of an energy management system

Yes (please elaborate)

No

Comments: _____



The responsibility for the information and the views set out in this press release lies entirely with the authors. The European Commission is not responsible for any use that may be made of the information it contains. The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 892235.