



# DEESME

National schemes for energy efficiency in SMEs

## Deliverable 2.3

Requirement-based report on best-practice for policies on energy audits, energy management and multiple-benefits

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**DEESME**

National schemes for energy efficiency in SMEs

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## About

Improving energy efficiency is the most cost-effective way to reduce energy-related emissions, improve economic competitiveness and increase energy security. In the European Union, several pieces of legislation aimed at guiding states and companies, regardless of their size, on ways to improve their energy efficiency: one of them is the Energy Efficiency Directive, establishing a common framework of measures and requirements with the goal to remove market barriers and promote a more efficient use of energy in supply and demand. Article 8 of the Directive offers ways to achieve this, requiring Member States to promote and facilitate the implementation of energy audits and energy management systems. The audits are compulsory for large companies and recommended for small and medium enterprises (SMEs). National authorities should encourage both to implement the resulting recommendations.

Member States have all chosen different approaches to transpose the requirements into national laws and to support companies (trainings, websites, helplines and funding support schemes). SMEs have less workforce, technical and financial capacity to perform energy audits, and therefore rarely do so: making them aware of the multiple benefits that can derive from improving their energy efficiency and accompany them in the energy transition, with knowledge and funding from both the public and private sectors, is key. That is what DEESME, a Horizon 2020-funded project (September 2020 – September 2023), aims at.

DEESME enables companies, especially SMEs to manage the energy transition by taking profit of multiple benefits from energy management and audit approaches and provides national authorities with guidelines and recommendations to empower their schemes under article 8, using the multiple benefits' approach.

The project identifies and shares good 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 assists 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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## Executive Summary / Foreword / Summary of findings

This report seeks to lay the ground for developing proposals on how to respond to the identified challenges regarding the uptake and implementation of energy audits and/or management systems within companies. Based on the previous work, ten generalized challenges were derived to enable the analysis of current practices in the MS.

For each challenge, a thorough analysis was conducted to identify current practises in EU-27 MS. The analysis included both desk research and direct contact with the NAs when needed.

The first six challenges target non-SMEs. Different practises were identified that MS use to enhance the implementation of energy audits in non-SMEs. To overcome limited resources of NAs (Challenge #01), digital submission systems were implemented by several MS to reduce ongoing administrative expenses, and detailed FAQ sections on the website are used to clarify regulations and duties for enterprises. For the identification of obligated companies (Challenge #02), building on existing national company registers showed to be an efficient way to identify obliged companies. Furthermore, using energy thresholds to allow companies to carry out a simplified audit can ease the burden for smaller enterprises with low energy consumption. To ensure compliance with the audit obligation (Challenge #03), most MS can potentially impose fines on non-compliant companies. The challenge of guaranteeing high quality audits (Challenge #04) is met by several MS by enforcing regular trainings on auditors or limiting auditor accreditation in time. Furthermore, step-by-step guidelines on the audit and submission process are used to ease the process for enterprises. The number of quality checks showed to vary across the MS. Regarding the compromise between reporting effort for enterprises and the monitoring effort of the NA (Challenge #05) the content and form of the submission showed to be critical factors. To facilitate the processing of data and ease the monitoring, several MS started to require certain key information to be submitted instead or in addition to the full audit report. Furthermore, a few MS allow the auditor instead of the enterprise to submit the information to alleviate burden on the company. To enhance the uptake of measures (Challenge #06) most MS use financial incentives in the form of tax cuts or subsidies, and information instruments like interactive websites to raise awareness. A few MS furthermore started to enforce the uptake of certain measures.

The four last challenges target SMEs, and here too, different approaches could be identified. To create support mechanisms (Challenge #07), many MS implement financial support systems specifically targeted at SMEs, either to incentivise the conduction of voluntary energy audits, or to support the implementation of energy efficiency measures. Furthermore, dedicated events are used to raise awareness on the benefits of energy efficiency. Limited available resources (Challenge #08) are faced by providing easy access to information through websites, or increasing outreach by working on a regional level. SMEs can be guided to increased participation (Challenge #09) by installing peer-to-peer networks such as energy efficiency networks. Elements to help raising awareness on opportunities (Challenge #10) were among others found in sharing best practises.

Based on the identified challenges, a multi-criteria screening of current practices for overcoming the challenges in the target MS was carried out, to prioritize available areas for subsequent work towards best-practice guidelines.



## 1. Enhancing the uptake and implementation of energy audits and management systems in DEESME

The DEESME projects aims to enable the national authorities (NAs) of selected Member States (MS) of the European Union or their national implementing bodies (IBs) to enhance the uptake and implementation of energy audits and/or management systems within companies according to Article 8 of the European Energy Efficiency Directive (EED). An overview of this process is given in Figure 1.



*Figure 1. Overview of the steps to support NAs to enhance the implementation of Article 8*

This report is the second document in a series of four elaborated in DEESME. It builds on a previous **document that provides an inventory of needs and requirements of NAs/IBs**. In this previous report, the current implementation of the requirements of Article 8 was investigated in detail. The core result from this consultation of available documentation and a direct exchange with targeted NAs/IBs was a list of needs and challenges relating to the implementation of Article 8 in the individual MS. This investigation also covered the role of non-energy benefits in the implementation process. The analysis showed, among others, that a common issue concerning non-SMEs for the NAs/IBs under Article 8 are related to the identification of obligated companies whereas SMEs especially lack awareness and interest in improving energy efficiency.

Based on this list of such needs and challenges, this **second document seeks to lay the ground for developing proposals on how to respond to the identified challenges**. For this purpose, current practices in the MS and suggestions from the previous phase concerning these challenges are investigated. This review shall serve to establish a repository of practices for overcoming the challenges. As the MS are quite diverse, e.g. in terms of size, industrial structure or institutional setup, a “practice-to-best-fit-them-all” is unlikely to be found. Therefore, the identified areas of practices will be



evaluated against a set of criteria for the targeted NAs/IBs. For this purpose, a set of qualitative criteria was proposed and considering it, prioritized areas of solutions are identified. By doing so, a focus on specific areas to overcome current challenges will be identified for the subsequent report.

The following **third document will concern the development of a generic guideline that sorts the various best practice blocks and suggests a structure** for tailor-made support material for the NAs/IBs. This report will also include a sample for one of the targeted national institutions. This document will suggest changes compared to the implemented system, i.e. it will adapt generic suggestions to the national context. The focus is on how companies can better engage to carry out audits or implement energy management systems including energy efficiency measures. They will also touch on how NAs/IBs could improve the perceived value of energy efficiency measures by promoting multiple benefits of energy efficiency and the opportunities from energy management systems.

The **final fourth set of documents will contain a compilation of the ten support documents** in local language for the targeted MS.



## 2. Background, aim and methodology

### 2.1. Background & aim

The European Energy Efficiency Directive (EED, Directive 2012/27/EU) establishes a common framework for improving energy efficiency in the Member States (MS) of the European Union. Its Article 8 deals with enhancing the use of energy audits and energy management systems (see Annex C: Excerpt of the Energy Efficiency Directive (2012/27/EU) for the original text of the Directive).

According to Article 8, the European MS shall promote the availability of independent cost-effective high quality energy audits to all final customers. A focus of Article 8 is on energy audits in companies. All non-SMEs in the MS shall be subject to energy audits (Article 8(4)) fulfilling certain minimum criteria (Annex VI) to be carried out every four years. As an alternative, the non-SMEs may introduce energy management systems that include energy audits (Article 8(6)). Furthermore, the MS shall develop programmes for SMEs to encourage them to carry out energy audits and to implement recommendations from these audits (Article 8(2)).

The transposition of the EED in the MS was required mid 2014 with the first round of audits to be carried out until December 5<sup>th</sup>, 2015. Even if not all MS met the initial deadline for transposition in 2014, several years have passed since the initial transposition. Since then, all the MS have gained experience with the national transposition of the requirements. The national implementations vary in the countries since the EED as a Directive only sets the framework and minimum requirements for the actual transposition. The specific implementation and implementation details vary from country to country and the MS are still facing challenges with regard to particular aspects of Article 8.

The underlying idea of this report is that some MS may already have developed solutions that may help to overcome common challenges. Based on this idea, this report has the following objective:

**To prepare the ground for developing proposals on how to overcome specific challenges faced by National Authorities and their Implementing Bodies in ten chosen Member States of the European Union who are concerned with enhancing the implementation of energy audits and energy management systems based on the requirements of Article 8 of the European Energy Efficiency Directive.**

### 2.2. Methodology

#### 2.2.1. Step 1: Identification of generalized challenges

The previous report on needs and requirement (D2.1) addressed current implementation challenges within selected MS of the European Union. The list of the targeted MS contains Austria, Bulgaria, Croatia, Cyprus, Finland, Greece, Ireland, Italy, Poland, and Slovenia. For each of these MS, a questionnaire on implementation challenges was designed and filled in based on a combination of desk research and direct exchange with the representatives of the NAs/IBs in the countries. The summary



of the results from the questionnaires yielded a set of approximately 70 detailed challenges and 20 needs. In that sense, challenges typically describe issues that impede an optimal transposition of the requirements of Article 8. Needs on the other hand can usually be considered as a response to a perceived challenge, e.g. a specific solution or suggestion for change.

The analysis in this report starts from the identified detailed challenges. A review of these shows reoccurring topics in the mentioned items. Some items, for example point at a “lack of the list of obligated companies” while others hint at problems with the “identification of associated and subsidiaries of obligated companies”. Both issues related to a more general challenge from the implementation of Article 8 that is related to the “identification of obligated companies”.

With the aim of analysing current practice relating to the challenges in other MS, an aggregation of the specific challenges was therefore carried out first. The resulting aggregated challenges were then mapped to an updated version of the policy implementation cycles (see Appendix Annex A: Implementation cycle concerning non-SMEs and Annex B: Implementation cycle concerning SMEs) used in the previous analysis in D2.1.

### **2.2.2. Step 2: Preparation of a guidance document**

The second step for addressing the generalized challenges was the preparation of a guidance document for identifying current practice that could response to the challenges in the MS. For this purpose, each challenge was attributed a set with up to eight guiding questions. These questions were, among others, derived from the list of detailed challenges to ensure that - despite the aggregation - the analysis covered all points that relate to the specific challenges in the targeted MS.

These questions were processed for the MS of the European Union. To obtain a uniform result across the MS, these questions were transferred to a general guideline for each generalized challenge, i.e. ten current practice documents were prepared. Each guideline contained an overview and characterization of the challenges, a set of instructions for the involved project partners and the analysis of results per country.

### **2.2.3. Step 3: Analysis of current implementation**

Using the guidance document, the questions related to the challenges were to be processed for all Member States. This analysis was focused on desk research, drawing on available documents. Where needed, it was completed by directly contacting the NAs in the concerned MS. Current practices across the MS are quite diverse, yet there are reoccurring elements in the implementations. After the conclusion of identifying current practices, the results were reviewed and aggregated by areas of similar action as described in the following results section of this report.

### **2.2.4. Step 4: Review of practices and determination of focus areas**

Following the analysis of current practices, a multi-criteria screening of these practices grouped by topics was carried. The aim of this screening was to prioritize available areas of solution that will be dealt with in the forthcoming documents. The screening does not seek to yield a statement on the quality of any practices or areas, but to point out the relevance of the areas for the targeted MS based



on previously collected information. The areas of actions were summarized in the form of "how-to" questions. For each questions and target country, the questions were attributed with a priority to reflect their relevance of the targeted MS.

- “High”: Area is of high relevance for the targeted MS.
- “Medium”: Area is interesting for the MS, but others are more relevant.
- “Low”: Area is of little or no interest to the targeted MS.

Before choosing a priority from this list, a set of qualitative screening criteria along with supporting questions was taken under consideration (Table 1).

Criterion	Supporting questions
<b>Compatibility:</b> Match with the conditions found in the target MS	<p>Does the practice fit to the current policy regime in the country? e.g.:</p> <ul style="list-style-type: none"> <li>• Is the number of target companies similar in both countries?</li> <li>• Is the practice similar to others already used in the MS?</li> </ul> <p>Does the practice seem feasible from an institutional point of view? e.g.:</p> <ul style="list-style-type: none"> <li>• Would the target NAs/IBs have sufficient resources to implement this practice?</li> <li>• Are crucial institutions (e.g. trade associations) missing in the target MS?</li> </ul> <p>Does the practice seem accepted in the target country? e.g.</p> <ul style="list-style-type: none"> <li>• Are there any crucial actors that might oppose the practice?</li> </ul>
<b>Effort:</b> Effort to implement the practice in the target MS	<p>What needs to be changed to what extent for the implementing institutions? e.g.</p> <ul style="list-style-type: none"> <li>• Is there a need to change guidance documents, increase monitoring capacities, conduct more events, etc.?</li> </ul> <p>What one-time and what follow-up effort does this change mean for the NAs/IBs? e.g.</p> <ul style="list-style-type: none"> <li>• How much more documents have to be filled in?</li> <li>• How much more personnel is needed for surveillance?</li> </ul> <p>What one-time and what follow-up effort does this change mean for the targeted companies? e.g.</p> <ul style="list-style-type: none"> <li>• How much more reporting obligations for companies do occur?</li> <li>• How much more events do the companies have to deal with?</li> </ul>



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<p><b>Impact:</b> Expected results from adoption the practice in the target MS</p>	<p>How large is the impact that could be expected from an adoption of the practice in the target MS?</p> <p>e.g.</p> <ul style="list-style-type: none"><li>• To what degree does it improve compliance with requirements of Article 8?</li><li>• What energy savings does it yield?</li><li>• What economic benefits does it yield?</li></ul>
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*Table 1: Overview of criteria along with support questions*



### 3. Results: Generalized challenges

Based on the results of the previous deliverables, a set of 10 generalized challenges was derived from the individual challenges to enable the analysis of current practices in the MS. The challenges and their respective content is summarized below:

- **#01. Limited resources for transposition:** Limitations with regard to the staff and financial resources for an effective implementation, enforcement, monitoring and verification of the energy-audit obligation, also in view of the difficult identification of non-SME, are a challenge.
- **#02: Identification of obligated companies:** The energy-audit obligation applies to "non-SMEs" only. The distinction between SMEs and non-SMEs is clear from a theoretical perspective. However, the challenge is that in practice, determining the actual values of criteria that determine the status of particular companies is challenging due to unavailable and/or distributed information.
- **#03: Ensuring compliance:** All non-SMEs are required to carry out energy audits or to implement energy management systems. However, also due to lacking information on company status, a challenge concerning the implementation of Article 8 is that there are companies that do not comply with the audit requirement or that only fulfil the requirement late.
- **#04: Quality of audits:** While the EED requires high quality energy-auditors and energy audits, a practical challenge is that there remain many audit reports with low quality and that auditors tend to focus on areas they know well.
- **#05: Compromise between reporting effort and monitoring:** Finding a good balance between ensuring compliance and a follow up on the implementation of measure while limiting the additional burden for companies is a practical challenge in the monitoring process concerning non-SMEs.
- **#06: Enhancing the uptake of measures:** Energy audits and energy management systems help companies to understand potential energy efficiency measures. However, a practical challenge is that the implementation of the recommended measures could be enhanced.
- **#07: Creation of support mechanisms:** Creating support mechanisms to carry out energy audits and to implement their recommendations is required from the MS. However, a practical challenge is to find out how best overcome burdens that hinder SMEs to implement audits and energy efficiency measures.
- **#08: Limited available resources:** Staying in touch with SMEs is considered as helpful to encourage them towards energy audits and efficiency measures. Yet creating and maintaining communication with SMEs, and participating in all events and talks with experts is a challenge.



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- **#09: Guiding SMEs to participation:** Even if SMEs are aware of the potential benefits from more strongly engaging in energy efficiency, a challenge is their reluctance to participate in activities, e.g. due to a fear of administrative burdens, a lack of experience in participation and the difficulty to analyse the associated costs and benefits.
- **#10: Raising awareness on opportunities:** A major challenge to encourage SMEs for energy audits is their missing awareness on opportunities from energy efficiency and their limited capacity to implement it.

An overview of these generalized challenges, their attribution to the policy cycle and their relevance of the targeted Member States is given in Table 2.

Concerning the most often mentioned challenges for the obligation for non-SMEs, many of the targeted NAs see challenges in identifying the obligated companies, in ensuring the compliance with the requirements and in establishing high quality energy audits. For the SMEs, the development of support mechanism and raising awareness on opportunities among SMEs are the most often mentioned challenges.

Regarding the policy cycles, more of the items relating to non-SMEs address the identification and enforcement of the requirements. For SMEs, on the contrary, issues tend to be related to an earlier step in the cycle, especially the design of suitable measures.



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General challenge	Policy cycle	Austria	Bulgaria	Croatia	Cyprus*	Finland	Greece	Ireland	Italy	Poland	Slovenia
<b>Non-SMEs</b>											
#01: Limited resources for transposition	Step 1: National transposition									x	
#02: Identification of obligated companies	Step 3: Identification	x	x				x	x	x	x	
#03: Ensuring compliance	Step 4: Enforcement	x	x	x				x	x		x
#04: Quality of audits	Step 4: Enforcement					x		x	x	x	
#05: Compromise between reporting effort and monitoring	Step 5: Monitoring	x							x		
#06: Enhancing the uptake of measures	Step 6: Evaluation	x						x		x	x
<b>SMEs</b>											
#07: Creation of support mechanisms	Step 1: Design	x	x	x		x	x	x	x	x	
#08: Limited available resources	Step 1: Design	x						x			
#09: Guiding SMEs to participation	Step 2: Implementation		x				x				
#10: Raising awareness on opportunities	Step 3: Dissemination	x	x			x	x	x	x	x	x

*Table 2: Overview of generalized challenges, their position in the implementation cycle and target countries concerned (\*Cyprus was originally chosen as a target country, but could not be covered for the analysis of challenges)*



## 4. Results: Practices related to the challenges in the MS

Based on the previously mentioned challenges, a set of guiding questions for analysing current practices in the Member States was elaborated. Based on detailed results for the Member States, an aggregating summary of practices was prepared which is given in this section of the report. As pointed out earlier, the aim is to identify “families” or “areas” of similar action.

To illustrate these areas, summaries on implementation examples from selected Member States are provided in the text. The selection of these examples has been made purely to improve understanding and to underline current action.

### 4.1. Practices related to Non-SMEs

The first part of analysis relates to practices for Non-SMEs, i.e. for large companies that fall under the audit obligation. The requirements from Article 8 EED for this specific group of companies is more detailed than for the SMEs and thus, the specific aspects detailed in the current practice section are more targeted as well.

#### 4.1.1. Challenge #01: Limited resources for transposition

The amount of resources required by NAs for the transposition of Article 8 of the Directive depends on several factors, i.e. the number of obligated companies, the design of the submission process, and the frequency of quality checks. In general, costs are composed of up front **one-time costs** and **reoccurring costs**.

#### What kind of one-time costs are required for the effective implementation, enforcement, monitoring, and verification of the obligation for non-SMEs?

One-time costs usually occur up front and include any resources needed for producing documents and interfaces related to the audit obligation, such as guidelines, templates, or FAQ documents. They might also include costs for setting up a company register or adapt lists from existing sources. An important factor with regard to one-time costs can also be the implementation of a digital infrastructure, especially for the submission and information management process.

Strategies to minimize the one-time costs of online systems can be based on extending existing interfaces and on pooling such systems. In the Netherlands, for example, companies subject to the EED energy audit used to submit their reports to their municipality or environmental department. This has changed on 1 July 2019. Since then, companies must submit their EED audit report via the electronic platform "eLoket" on the websites of the national agency. This reduces the operating costs for the local authorities.<sup>1</sup> Concerning the minimization of costs for producing information material, it should be noted that various NAs have developed information materials and guidelines for companies (see Challenge #04). Since the basic requirements of Article 8, energy audits and energy management

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<sup>1</sup> RVO Energy efficiency notification obligation. Online: <https://english.rvo.nl/information/laws-regulations/energy-efficiency-notification-obligation>. Accessed: 21.04.2021.



systems are the same across the MS, larger parts of these materials could be shared among Member States to reduce the individual costs.

### **What kind of reoccurring running costs are required for the effective implementation, enforcement, monitoring, and verification of the obligation for non-SMEs?**

Reoccurring costs are mainly related to day-to-day operation of the energy audit obligations in the NAs. They include those costs related to the administrative implementation of the system, for the follow-up on the audit obligation and the interaction with companies and for the submission process.

Regarding the submission, the implementation of a digital platform for submission seems to be a common practice in many MS. Depending on the collected data, audit information can easily be filtered and aggregated, making processing of data and follow-up easier for the NAs. Submissions where PDF files are sent via E-mail or audit reports that are sent via mail, on the contrary, can require a considerably higher amount of resources for processing the essential information regularly while saving the one-time costs for the submission system.

Regularly occurring quality checks of energy audits can be an important factor of the overall running costs. In the MS, the design of the checks seems to vary. In Germany, for example, the NA internally performs around 2 000 detailed quality checks in a 4-year period, which corresponds to around 4% of the obligated companies<sup>2</sup> whereas Greece checks 5% of the submitted audits<sup>3</sup>, Italy verifies the audits of a minimum of 3% of enterprises<sup>4</sup>. An alternative practice to the internal review is to outsource the process. For example, in Denmark, the NA performs basic validity checks on the audits while detailed quality controls of audit reports are subcontracted<sup>5</sup>.

Further resources are required for updating the company database, adding new non-SMEs and removing companies that fell below the thresholds.

Another frequent cost factor can come in the form of events or workshops organized to raise awareness among companies, or trainings provided for energy auditors. For example, Estonia runs a program aiming at providing support for arranging awareness campaigns of energy and resource management from 2015 to 2020 (see Challenge #06).

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<sup>2</sup> BAFA. Personal Communication: Interview regarding Implementation of Article 8 EED. Date: 02.03.2021.

<sup>3</sup> Personal Communication with National Authority – CRES. Date: 02.03.2021.

<sup>4</sup> National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) (2020). Personal Communication: Survey regarding Implementation of Article 8 EED.

<sup>5</sup> Danish Energy Agency (DEA) (2021) Personal Communication: Interview regarding Implementation of Article 8 EED. Date: 23.03.2021.



#### 4.1.2. Challenge #02: Identification of obligated companies

The identification of obligated companies is generally based on the EU Commission recommendation of 6 May 2003 concerning the definition of micro, small, and medium-sized enterprises (2003/361/EC). Despite this definition, the practical identification of non-SMEs, which are obliged to perform energy audits, can be challenging, due to for example multinational companies with complex corporate structures. The number of obliged companies varies widely across MS. Some MS actively identify the obligated companies, for this purpose **existing (public or non-public) or self-established databases** are used. Few countries rely solely on **self-declarations** of companies. **Energy thresholds** are used by several MS to alleviate the effort for non-SMEs with a low energy consumption, or reversely to include SMEs with a particularly high-energy consumption.

##### How many companies are "obligated companies" in the MS?

The number of obliged companies varies widely, ranging from fewer than 100 enterprises in Malta<sup>6</sup> to approximately 50 000 enterprises in Germany<sup>7</sup>. The large differences are on one hand due to the varying sizes of countries and structure of the economies, but on the other hand also dependent on how the enterprises are identified and where boundaries are drawn.

##### What does the process for identifying the obligated companies in the MS look like?

The identification of obligated companies is based on different approaches in the MS. One group of countries (e.g. Bulgaria, Ireland, Slovakia and Luxembourg) relies on self-declarations to identify non-SMEs. Other countries make use of various existing databases. These databases can be partly or fully purchased from external sources (e.g. Germany acquires databases from external service providers<sup>8</sup>), or rely on existing governmental sources as a starting point to filter down from there. Several MS declared that they make use of existing and often governmental databases. For example, Croatia uses a database of the Chamber of Commerce, Latvia uses a database of the Ministry of Economy, and Italy uses data from the Ministry of Economic Development and complements it with a list of energy-intensive companies produced by the Fund for Energy and Environmental Services (CSEA). While the approach of using existing databases can often be resource-efficient, it is dependent on the availability of such databases.

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<sup>6</sup> NEEAP 2018, Online: [https://ec.europa.eu/energy/sites/ener/files/documents/mt\\_neeap\\_2017\\_en.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/mt_neeap_2017_en.pdf).

<sup>7</sup> Federal Office of Economics and Export Control (BAFA) (2021): Personal Communication: Interview regarding Implementation of Article 8 EED. Date: 02.03.2021.

<sup>8</sup> Federal Office of Economics and Export Control (BAFA) (2021): Personal Communication: Interview regarding Implementation of Article 8 EED. Date: 02.03.2021.



### In particular, how are 'partner enterprises' and 'linked enterprises' identified?

A partner enterprise is defined in 2003/361/EC as one enterprise holding 25% or more of the capital or voting right of another enterprise. Linked enterprises are following a similar definition, but with a share of at least 50%. The difficulty of identifying such companies can be partly alleviated when using existing databases. To identify obliged companies, France relies on its national statistical code. Every French business is registered by the National Institute of Statistics and Economic Studies (INSEE) with a unique SIREN code, a 9-digit numerical identifier. If the business is a larger legal unit with different facilities or subgroups, each of the geographical locations is given a specific NIC number<sup>9</sup>. To evaluate the non-SME status, all the entities on SIREN level are considered, independent from the enterprises group structure. Thus, all separately registered companies potentially fall under the energy audit obligation, as long as they exceed the employee and revenue thresholds.

### In particular, how are 'multi-nationals' identified?

For global enterprises that operate throughout the EU, the identification process can pose challenges. When relying mainly on national databases, often only company data on national territory is considered, which makes it more difficult to identify large multinational companies with smaller offices in the respective country. While some countries rely on self-declarations of those companies, other countries such as Austria explicitly state that only those parts of corporations that are located inside the national territory must be counted when determining the non-SME status<sup>10</sup>.

### Is there any difference for the identification of public and private companies?

Obligations for public authorities or enterprises carrying out sovereign operations differ across the MS. Several countries made special regulations, for example Denmark, where public enterprises and institutions (such as public hospitals) are exempted from the audit obligation, unless they are selling a product or service in competition with others (e.g. municipal district heating companies)<sup>11</sup>. Germany is another example, where enterprises predominantly engaged in statutory activities can be exempted from the energy audit obligation<sup>12</sup>.

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<sup>9</sup> Study on the implementation of Article 8 EED: Report on the fulfilment of obligations upon large enterprises, the encouragement of small- and medium-sized companies and on good-practice. Online: [https://ec.europa.eu/energy/sites/ener/files/documents/EED-Art8-Implementation-Study\\_Task12\\_Report\\_FINAL-approved.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/EED-Art8-Implementation-Study_Task12_Report_FINAL-approved.pdf).

<sup>10</sup> Austrian Energy Agency (AEA) (2021). Unternehmensdefinition. Online: <https://www.monitoringstelle.at/index.php?id=585>. Accessed: 05.03.2021.

<sup>11</sup> Danish Energy Agency (DEA) (2020). Energy audit guideline: Energisyn - En vejledning. Online: [https://ens.dk/sites/ens.dk/files/Energibesparelser/energisyn\\_-\\_en\\_vejledning.pdf](https://ens.dk/sites/ens.dk/files/Energibesparelser/energisyn_-_en_vejledning.pdf).

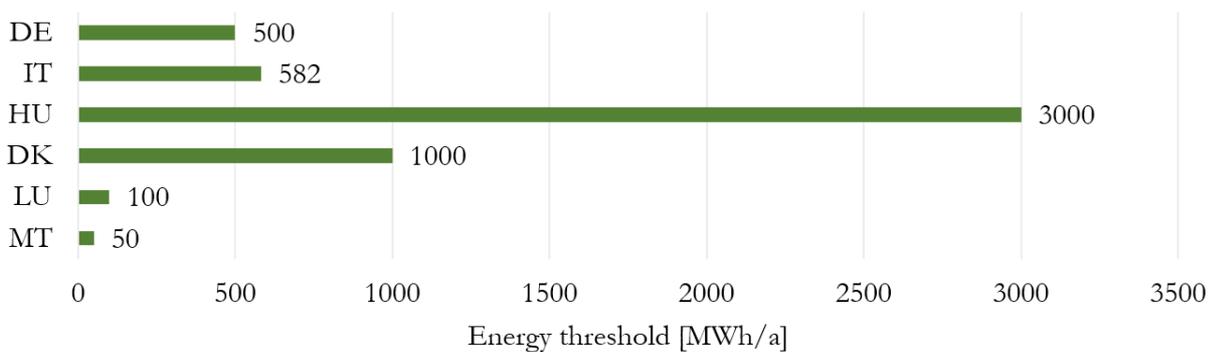
<sup>12</sup> Federal Office of Economics and Export Control (BAFA ) (2020): Merkblatt für Energieaudits. Online: [https://www.bafa.de/SharedDocs/Downloads/DE/Energie/ea\\_merkblatt.pdf;jsessionid=DA0F7](https://www.bafa.de/SharedDocs/Downloads/DE/Energie/ea_merkblatt.pdf;jsessionid=DA0F7)



Countries who rely on governmental business registers to identify companies where found to draw the boundary between private and public enterprises along the lines of the register. Whoever is included in the available list is obliged to perform an energy audit, if revenue and employee thresholds are passed (for example in the Netherlands).

### Does the MS have any additional criteria beyond Article 8 requirements for inclusion?

To alleviate the effort for companies with a low energy consumption, several MS implemented energy thresholds. Enterprises, who have an annual energy consumption below the threshold, can perform a simplified energy audit. The threshold varies from 50 MWh/a in Malta<sup>13</sup> to 3 000 MWh/a in Hungary<sup>14</sup> (Figure 2).



*Figure 2. Energy thresholds for simplified energy audits in a sample of EU countries.*

In contrast to this practice, some countries use reverse energy thresholds, to demand SMEs with a particularly high-energy consumption who do not fall under the obligation, to nevertheless conduct energy audits. For example, in Bulgaria this includes industrial systems<sup>15</sup> exceeding 3 000 MWh/a<sup>16</sup>,

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E113CEFC211B87B8CB00F1E7F69.1\_cid390?\_\_blob=publicationFile&v=14 . Accessed: 11.02.2021.

<sup>13</sup> 2019 Journal of Energy Policy: Transposing the Requirements of the Energy Efficiency Directive on Mandatory Energy Audits for Large Companies: A Policy-Cycle-based review of the National Implementation in the EU-28 Member States. Lisa Nabitz, Simon Hirzel.

<sup>14</sup> Information provided by the National Authority - Hungarian Energy and Public Utility Regulatory Authority. Date: 05.03.2021.

<sup>15</sup> "Industrial system" shall be a stand-alone set of manufacturing buildings, facilities, technological equipment and auxiliary yards, within the boundaries of which the enterprise carries out an activity for manufacture of goods or for rendering of services (Article 1 (25) of the Bulgarian Energy Efficiency Act).

<sup>16</sup> Article 57 of the Bulgarian Energy Efficiency Act. Online: [https://seea.government.bg/documents/EE\\_Act\\_2018\\_ENG.pdf](https://seea.government.bg/documents/EE_Act_2018_ENG.pdf).



and the Netherlands requires companies who annually consume more than 50 MWh of electricity or 25 000 m<sup>3</sup> of natural gas (or equivalents) to implement energy efficiency measures<sup>17</sup>.

#### 4.1.3. Challenge #03: Ensuring compliance

Ensuring compliance can be analysed along three dimensions. The first dimension is about ensuring that **all obligated companies carry out an energy audit**. The second dimension relates to verifying that **submitted audits meet the requirements**. The third dimension concerns **sanctions in case of non-compliance**. To date, most MS follow an active submission process where enterprises have to submit compliance information after concluding the energy audit.

##### How does the MS ensure compliance with the energy audit obligation?

The large majority of MS require companies to actively submit compliance documents after the energy audit is completed. The time for submission varies. For instance, in Bulgaria, companies have to submit documents latest 14 days after the audit was completed<sup>18</sup>, while in Spain<sup>19</sup> and Finland<sup>20</sup>, audits can be submitted up to three months after completion.

To support the submission process, countries offer FAQs, templates for submission, or provide a detailed step-by-step guideline to facilitate the compliance of enterprises. The submission process itself is different from MS to MS, and so is the quality control (more details on this are provided in Challenge #04).

##### What does the process look like if non-compliant companies come to the attention of the NA in the MS?

If non-compliant companies come to the attention of the NA, many MS first send a reminder before imposing fines. The size of the fines varies and could achieve substantial amounts if fully applied. For example, Slovenia imposes maximum fines of up to 125 000 Euro on legal entities who fail to comply with the audit requirement, as defined in Article 16 of the national Act on Energy Efficiency (Uradni list RS, št. 158/20). Additionally, a fine between 2 000 Euro and 10 000 Euro can be imposed on the

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<sup>17</sup> Netherlands Enterprise Agency: Energy Efficiency Notification Obligation. Online: <https://english.rvo.nl/information/laws-regulations/energy-efficiency-notification-obligation>.

<sup>18</sup> ORDINANCE № E-PA-04-05/08.09.2016 for determining the energy consumption indicators, energy characteristics of enterprises, industrial systems and systems for outdoor artificial lighting, as well as for determining the conditions and procedure for conducting energy efficiency audits and preparation of an assessment of energy saving. Online: <https://seea.government.bg/documents/Naredba%20ERD0405.pdf>.

<sup>19</sup> Article 6 No. 3 Draft Royal Decree. Information based on own survey regarding Implementation of Article 8 EED.

<sup>20</sup> National Agency Finland (2020). Personal Communication: Survey regarding Implementation of Article 8 EED.



responsible person of the legal entity (e.g. director of the company). In theory, the penalty can even go as far as prison in some countries, such as Luxembourg, where the law stipulates a prison sentence of 8 days to 2 months and/or a fine of 251 to 25 000 euros.<sup>21</sup> Several MS cap the maximum fine based on the company revenue. In Poland, this it is capped to up to 5% of the company's revenue from the last fiscal period. However, when deciding the penalty officials are encouraged to consider the scope and reoccurrence of the violation, as well as the financial capabilities of the companies. In case the violation is deemed as insignificant and the company fulfilled the obligation before the violation was identified the officials can decide not to apply the penalty.<sup>22</sup>

#### 4.1.4. Challenge #04: Quality of audits

In general, three main mechanisms are in place in the MS to help ensuring high quality energy audits: namely, the **education and experience of energy auditors**, requirements on the **content and structure of the energy audits** and regular **quality checks** of the submitted audits.

#### What does the process for ensuring and checking on the quality of energy auditors/in-house experts look like in the MS?

Most MS publish official requirements for the certification of auditors or auditing companies. In most cases, those requirements include minimum standards for both educational background and work experience in the field of energy efficiency. In Austria, for example, minimum quality standards for energy auditors are defined in Article 17 of the EEffG<sup>23</sup>, and include a completed education or vocational training and a minimum of 3-year work experience in the field of energy efficiency. In some MS, auditors are only accredited after passing an official exam. In Czechia, for instance, auditor candidates are invited by the State Energy Inspectorate to pass a professional examination pursuant to Section 10a of Act No. 406/2000<sup>24</sup>. In Sweden, for achieving certifications, auditors have to prove their competence based on certain training and/or demonstrated experience, a written examination and a practical test<sup>25</sup>.

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<sup>21</sup> Online: <https://guichet.public.lu/fr/entreprises/urbanisme-environnement/energie/energie/obligation-audit-energetique.html>. Accessed: 27.04.2021.

<sup>22</sup> Energy Efficiency Act (Dz. U. 2016 poz. 831); date: 20 may 2016. Draft Act amending the Energy Efficiency Act and several other Acts; Online: [\l "12767359](https://legislacja.rcl.gov.pl/projekt/12343752/katalog/12767359). Last accessed: 22.02.2021.

<sup>23</sup> Bundes-Energieeffizienzgesetz – EEffG. Online: <https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20008914>.

<sup>24</sup> Ministry of Industry and Trade. Online: <https://www.mpo.cz/cz/energetika/energeticka-ucinnost/odborne-cinnosti/jak-se-stat-energetickym-specialistou---36333/>. Accessed: 20.04.2021.

<sup>25</sup> Swedish law on energy audits (STEMFS 2014:2, 9 §).



A few countries (e.g. Slovenia, Netherlands) take a different approach and do not use a certification system for the auditor, but focus on quality checks of the final energy audits. For example, in Slovenia there is no certification for the person performing the energy audit, but the audit itself and the report must be in accordance with the standard SIST EN 16247-5, as specified in Article 7 of the Regulation on energy audits.

For those MS certifying their auditors, it is usually a common practice to publish a list of certified auditors on the website of the NA, to make it easy for companies to find a suitable candidate. In addition to nationally accredited auditors, some MS accept auditors who are accredited in neighbouring countries to perform audits, as well. This is the case for Denmark, for example, which publishes links to certified auditors from Sweden, Germany and the UK on its website<sup>26</sup>.

To encourage auditors to stay highly qualified, several countries have put regulations in place to ensure the qualification of auditors over time. In Germany, requirements were recently updated, and auditors are now obligated to participate in regular trainings, on which they have to inform the national agency BAFA (EDL-G Article 8). It is expected that auditors will have to complete 16 units of training (each 45 minutes) with relevance to energy audits every 2 years<sup>27</sup>.

A variety of countries take a different approach and only grant auditors accreditations limited in time. In Hungary, energy auditors and energy consultants must undergo mandatory in-service training every year and a renewal professional examination every four years. In addition, the Hungarian agency strives to select at least one audit of new energy auditors for verification to gain experience of the quality of the energy audits they performed.<sup>28</sup> Croatia defined the accreditation system in Article 9 of its Rulebook on Energy Inspection for Large Enterprises as follows: “The authorized person shall conduct energy audits on the basis of the authorization given by the Ministry by a decision, for a period of seven years, with the possibility of re-issuing the decision in accordance with the conditions specified in the provisions of this Ordinance.”<sup>29</sup>

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<sup>26</sup> Danish Energy Agency (DEA) (2017). Energy audits for large enterprises: Links to approved consultants. Online: <https://ens.dk/en/our-responsibilities/energy-savings/energy-audits-large-enterprises>. Accessed: 16.03.2021.

<sup>27</sup> German Federal Government 2019: Gesetzentwurf zur Änderung des Gesetzes über Energiedienstleistungen und andere Energieeffizienzmaßnahmen. Online: [https://www.bmwi.de/Redaktion/DE/Downloads/P-R/gesetzentwurf-edl-g.pdf?\\_\\_blob=publicationFile&v=3](https://www.bmwi.de/Redaktion/DE/Downloads/P-R/gesetzentwurf-edl-g.pdf?__blob=publicationFile&v=3). Accessed: 02.03.2021.

<sup>28</sup> Personal communication with National Authority - Hungarian Energy and Public Utility Regulatory Authority. Date: 05.03.2021.

<sup>29</sup> Ministry of the Economy Czechia: Rulebook on Energy Inspection for Large Enterprises. Online: <http://www.propisi.hr/print.php?id=13946>. Accessed: 20.04.2021



To guarantee broad knowledge of auditors and avoid one-sided specializations in certain technological areas, Austria divided its audit into three areas Building, Processes, and Transport, and requires auditors to separately qualify for each of these areas.<sup>30,31</sup>

### What specific requirements to energy audit reports from the MS are in place?

Several countries offer detailed guideline documents that specify how the audit should be conducted and what criteria must be met. The German NA published for example a 71-page guideline<sup>32</sup> on the requirements of energy audits on its website. The document contains the required structure of the energy audit and provides details on the mandatory points that must be included, such as the energy analysis and the overview of energy saving potentials. Similarly, Ireland created an elaborate step-by-step guide on energy audits that covers the important aspects that should be considered when conducting an energy audit<sup>33</sup>. Another practice is to publish an energy audit template that can be filled by the auditor (example Netherlands<sup>34</sup>).

Regarding specific requirements on what to include in the audit, several variations exist between the MS. The minimum coverage, i.e. the percentage of total energy consumption that the energy audit covers, varies. A rather common value seems to be 90% (e.g. Denmark, Greece, and Germany). France sets its requirement at 80% of energy costs<sup>35</sup> and Italy makes its requirements dependent on the energy consumption of the company, ranging from 40% coverage for companies with a very low energy consumption to 85% coverage for companies with a very high-energy consumption<sup>36</sup>.

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<sup>30</sup> Their publicly available list (as of December 2020) includes 608 approved auditors, whereas only 110 of those are qualified for all three areas (523 for buildings, 383 for processes, 153 for transport)

<sup>31</sup> Austrian Energy Agency (AEA). Register der qualifizierten Energiedienstleister - Nationale Energieeffizienz-Monitoringstelle - [www.monitoringstelle.at](http://www.monitoringstelle.at). Online: <https://www.monitoringstelle.at/monitoring/energiedienstleister/register-der-qualifizierten-energiedienstleister>. Accessed: 08.03.2021.

<sup>32</sup> Federal Office of Economics and Export Control (BAFA) (2020): Leitfaden zur Erstellung von Energieauditberichten nach den Vorgaben der DIN EN 16247-1 und den Festlegungen des Bundesamtes für Wirtschaft und Ausfuhrkontrolle (BAFA). Online: [https://www.bafa.de/SharedDocs/Downloads/DE/Energie/ea\\_leitfaden.html](https://www.bafa.de/SharedDocs/Downloads/DE/Energie/ea_leitfaden.html). Accessed: 15.02.2021.

<sup>33</sup> SEAI. Online: [www.seai.ie/publications/SEAI-Energy-Audit-Handbook.pdf](http://www.seai.ie/publications/SEAI-Energy-Audit-Handbook.pdf). Accessed: 19.04.2021.

<sup>34</sup> Netherlands Enterprise Agency: Energy-audits. Online: <https://www.rvo.nl/onderwerpen/duurzaam-ondernemen/energie-besparen/europese-energie-efficiency-richtlijn-eed/energie-audit-eed>. Accessed 20.04.2021.

<sup>35</sup> France Ministry of Ecological Transition: <https://www.ecologie.gouv.fr/audit-energetique-des-grandes-entreprises#e3>. Accessed: 20.04.2021.

<sup>36</sup> ENEA (2021). Guidelines for Energy Audits in Small and Medium Enterprises. Online: <https://www.ufficienzaenergetica.enea.it/component/jdownloads/?task=download.send&id=438&catid=42&Itemid=101>.



A common practice in many countries is to allow sampling of similar processes or locations to facilitate the auditing process for enterprises.

### How and how often is the quality of the audits reports verified by the MS?

A common practice is to perform basic validity checks on all collected energy audits, and in-depth quality checks on a smaller sample on spot check basis. The quantity of the quality checks varies. Germany performs around 2 000 detailed quality checks in a 4-year period, which corresponds to around 4% of the obligated companies<sup>37</sup>. Portugal covers part of its monitoring with the existing SGCIE scheme, which obliges all companies with an energy consumption of more than 500 toe to be monitored<sup>38</sup>. While many NAs perform the quality checks themselves, some MS also **subcontract** the quality checks to external institutions (e.g. Malta, Hungary, and Denmark) or mainly rely on the quality of the energy auditors, when the market is not large and the reputation is an important criterion.

#### 4.1.5. Challenge #05: Compromise between reporting effort and monitoring

The effort for companies to show their compliance and the monitoring effort for the NAs seem to be impacted by three influencing factors. First, the **content of the submission**, second, the **form of the audit submission**, and third, the kind of **submission support** that is provided by the MS.

### What information is collected from the non-SME for ensuring compliance?

The content of the active submission that is practiced in the large majority of MS varies and ranges from requiring companies to send the full audit report to a summary of the report, or asking for specific information from the energy audit. In Italy, for instance, enterprises must upload the full audit report in PDF format and a summary file in Excel format on an online platform created by the national agency ENEA<sup>39</sup>. Bulgaria, for example, requires enterprises to submit a summary of the audit report<sup>40</sup>. This summary should contain information on the company, a short analysis on the energy consumption and both implemented and recommended energy efficiency measures, and it should be submitted to the national agency within 14 days after the submission of the energy audit's results. In Austria, a summary of the report is submitted. In addition, an online form must be filled in with specific details on the results of the energy audit, such as total energy consumption, and potential energy and cost savings based on the proposed measures. Similar key information is for example also collected in Finland, Germany and Slovakia. A combination of some sort of written report and some key data seems to be an often-used approach. In the Brussels Region, both the whole energy audit and selected

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<sup>37</sup> BAFA. Personal Communication: Interview regarding Implementation of Article 8 EED. Date: 02.03.2021.

<sup>38</sup> Decreto-Lei n.º 71/2008. Online: <https://dre.pt/pesquisa/-/search/249821/details/maximized>.

<sup>39</sup> National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) (2020). Personal Communication: Survey regarding Implementation of Article 8 EED.

<sup>40</sup> A template is provided in the Annex to the ORDINANCE № E-PA-04-05/08.09.2016.



information are collected<sup>41</sup>. In some MS (for example Austria, Czechia, and Italy), energy auditors are allowed to submit the data instead of their clients. In general, the online submission facilitates the data processing from the NA but increases the burden for the enterprises.

Different kinds of support mechanisms are used to facilitate the submission process for companies. The support mechanisms for example come in the form of step-by-step guidance documents that provide details on all aspects of audit conduction and submission. Examples are found in several MS, for example Ireland<sup>42</sup> and Denmark<sup>43</sup>. Another common practice is providing templates for the energy audit report, as seen among others in the Netherlands<sup>44</sup> and Austria<sup>45</sup>.

### Does the MS monitor the uptake of measures generated from the obligation of Article 8 in non-SMEs? If yes, how?

To monitor the uptake of measures, several MS ask companies whether they have implemented measures that were identified in the previous auditing cycle. In Estonia, for example, enterprises are asked to submit information on both energy efficiency measures identified for the next 4 years, as well as on energy efficiency measures implemented during the last 4 years<sup>46</sup>. Similarly, in Hungary non-SMEs report on the energy saving measures they have implemented, and furthermore indicate whether the measures were identified by the previous energy audit or not<sup>47</sup>.

### How is information on complying with the requirement communicated by the companies?

The form of the submission is different among MS. The audit report or its summary is regularly submitted in PDF format, while specific data can either be transmitted in spreadsheet format (for example Italy<sup>48</sup>) or digitally via various forms of online platforms. Some MS also allow the submission

<sup>41</sup> Belgium National Agency (2020). Personal Communication: Survey regarding Implementation of Article 8 EED.

<sup>42</sup> SEAI Energy Audit Handbook. Online: <https://www.seai.ie/publications/SEAI-Energy-Audit-Handbook.pdf>.

<sup>43</sup> Danish Energy Agency (DEA) (2020). Energy audit guideline: Energisyn - En vejledning. Online: [https://ens.dk/sites/ens.dk/files/Energibesparelser/energisynt\\_-\\_en\\_vejledning.pdf](https://ens.dk/sites/ens.dk/files/Energibesparelser/energisynt_-_en_vejledning.pdf).

<sup>44</sup> RVO Template energy audit (2020). Online: <https://www.rvo.nl/sites/default/files/2020/09/sjabloon-energie-auditverslag-eed-augustus-2020.docx>.

<sup>45</sup> Austrian Energy Agency (AEA). Template for energy audits. Online: <https://www.monitoringstelle.at/index.php?id=709>.

<sup>46</sup> TTJA (2020): Energy audit of a large company electronic reporting guide. Online: [https://www.ttja.ee/sites/default/files/ettevotjale/ettekanded/suuretevotjate\\_elektronilise\\_aruan dluse\\_juhend\\_07.2020.pdf](https://www.ttja.ee/sites/default/files/ettevotjale/ettekanded/suuretevotjate_elektronilise_aruan dluse_juhend_07.2020.pdf). Accessed: 09.03.2021.

<sup>47</sup> Defined in 2/2017. (II. 16.) MEKH decree.

<sup>48</sup> National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) (2020). Personal Communication: Survey regarding Implementation of Article 8 EED.



by mail (for example Bulgaria, and some regions of France). Digital platforms are either build specifically for the purpose of energy audits (as in the example of Germany<sup>49</sup>), or are integrated into existing company platforms (as in the example of Austria's company service portal (USP)<sup>50</sup>).

#### 4.1.6. Challenge #06: Enhancing the uptake of measures

Energy audits and energy management systems help companies to understand potential energy efficiency measures.

MS use different approaches to enhance the uptake of recommended measures from energy audits or from applying energy management systems. Almost all countries use **financial incentives**, e.g. by offering funding, grants or tax reliefs for companies which implement identified energy efficiency measures. Many seek to disseminate **information** about the benefits of implementing energy efficiency measures, e.g. by presentations or workshops directly targeting enterprises. Some MS also make it an **obligation** for enterprises to implement energy efficiency measures.

#### Does the MS encourage non-SMEs to take up recommended measures from the energy audit obligation?

To enhance the uptake of recommended measures, financial incentives are being used in the form of funding, grants, or tax reliefs by different MS.

There is a wide range of funding schemes. Some programmes are part of the European support schemes, such as the tender for "Increasing energy efficiency and the use of renewable energy sources in manufacturing industries" in Croatia (expired 2021), which was part of the European Structural and Investment Funds (ESIF)<sup>51</sup>. Others, for example in Austria, are based on national funding. To follow the example of Austria: Here, financial support is provided to companies of all sizes in the domestic energy support scheme (UFI: Umweltförderung im Inland). It aims to implement ecological friendly projects in a variety of different areas. Actions eligible for support include, among others, connecting buildings to district heating networks, installing heat pumps, or energy-efficient lighting systems. From 2017 to 2019, 16 505 projects were supported in Austria, awarding a total of 254,8 million Euro of funding<sup>52</sup>.

Grants (credit lines) are another element to enable companies to realize the uptake of measures. Bulgaria, for instance, provides low interest loans via the Energy Efficiency and Renewable Sources

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<sup>49</sup> Online form BAFA. Online: <https://fms.bafa.de/BafaFrame/orea>.

<sup>50</sup> Austria company service portal (USP). Online: <https://www.usp.gv.at/>.

<sup>51</sup> ESIF. Online: <https://strukturnifondovi.hr/en/natjecaji/povecanje-energetske-ucinkovitosti-i-koristenja-obnovljivih-izvora-energije-u-proizvodnim-industrijama/>. Accessed: 23.04.2021.

<sup>52</sup> Federal Ministry of Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK). Online: <https://www.bmk.gv.at/en/topics/climate-environment/climate-protection/ufi.html>. Accessed: 23.04.2021.



Fund (EERSF); the same basic concept can be found in Germany where the national development bank offers loans of up to 25 million. Euro for the construction or energy efficient renovation of commercial buildings. Furthermore, if minimum technical requirements for individual measures or certain energy efficiency levels for buildings are met, enterprises can receive a repayment subsidy of up to 27.5% of the grant's sum<sup>53</sup>.

Moreover, tax reliefs are granted for energy efficient investments. Bulgaria, implemented a normative corporate tax relief for energy efficiency investments. Companies there may benefit from a (30 to 50 %) tax relief for the investment and renovation of energy efficiency purposes in the tax year following the commissioning of the investment or renovation - or in the tax year of the investment, renovation at its discretion - and in the following five tax years. An energy audit must be performed (and reported to the national agency) in order to benefit from the tax relief<sup>54</sup>.

### Does the MS use any information measures to address the uptake of recommended measures from the obligation in non-SMEs?

Information instruments can help to make companies aware of available support mechanisms, and about the benefits that implementing energy efficiency measures can have. Websites of NAs can be the first point of contact for enterprises who want to learn e.g. about financial support for energy efficiency measures. Many MS therefore install dedicated sections on the homepage as a form of information hub where all applicable support schemes are listed. On the website of the Maltese Energy and Water Agency, for example, available support schemes in the field of energy efficiency are listed together, each containing an overview, a FAQ section, a guideline on how to apply and links to relevant forms and documents<sup>55</sup>. Further approaches include indicating best practices to underline successful examples of energy efficiency implementations, e.g. in Austria<sup>56</sup>. In addition, personalized support can be given in the form of a telephone hotline, as is the case of Denmark<sup>57</sup>. Another common approach to inform enterprises is by organizing information workshops or events. From 2015 to 2020, Estonia had a programme aiming at providing support for arranging awareness campaigns of energy and resource

<sup>53</sup> Kreditanstalt für Wiederaufbau (KfW) (2021): KfW-Energieeffizienzprogramm - Energieeffizient Bauen und Sanieren. Online: <https://www.kfw.de/inlandsfoerderung/Unternehmen/Energie-Umwelt/F%C3%B6rderprodukte/EE-Bauen-und-Sanieren-Unternehmen-276-277-278/>, updated on 2/12/2021. Assessed: 12.02.2021.

<sup>54</sup> Information provided by the National Authority - Hungarian Energy and Public Utility Regulatory Authority. Date: 05.03.2021.

<sup>55</sup> The Energy and Water Agency Malta. Online: <https://www.energywateragency.gov.mt/schemes/>. Accessed: 23.04.2021.

<sup>56</sup> Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie (BMK) (2021b). Best Practice Beispiele, klimaaktiv. Online: [https://www.klimaaktiv.at/erneuerbare/effiziente\\_heizwerke/bestpractice.html](https://www.klimaaktiv.at/erneuerbare/effiziente_heizwerke/bestpractice.html). Accessed: 22.03.2021.

<sup>57</sup> Danish Energy Agency (DEA) (2021) Personal Communication: Interview regarding Implementation of Article 8 EED. Date: 23.03.2021.



management. The "Support for awareness campaigns of energy and resource management" programme was part of the Operational Programme for Cohesion Policy Funding in frames of the European Commission – Estonia Partnership Agreement for European Structural and Investment Funds 2014 – 2020<sup>58</sup>. Peer to peer information exchange can be fostered by implementing energy efficiency networks. Further information on energy efficiency networks can be found in challenge #09.

A different approach also found to enhance the uptake of measures is voluntary agreements. They are used to stimulate energy efficiency in the industry, as seen in Luxembourg, Netherlands, or Finland. Over the years, a variety of countries used voluntary agreements in one form or another. The participating companies commit to reduce energy consumption and measure improvements commonly by the means of energy audits. In return, they receive financial incentives such as energy tax reductions. Often, also the implementation of an EMS is part of a voluntary agreement<sup>59</sup>.

### Does the MS use any obligations/mandatory requirements to address the uptake of recommended measures from the obligation in non-SMEs?

The review of current practices yielded information on three MS that rely on mandatory requirements to address the uptake of measures. Their mechanisms look as follows:

- **Italy:** Energy-intensive companies are obligated to realize at least one of the proposed measures within four years from the audit<sup>60</sup>.
- **Netherlands:** In the Netherlands, businesses must comply with the energy saving regulations listed in the Activities Decree (Activiteitenbesluit). If the company's annual energy consumption exceeds 50 000 kWh (electricity) or 25 000 m<sup>3</sup> (gas), it must take energy-saving measures with less than 5 years return of investment. Since 2019, obliged companies additionally have to report the implemented energy efficiency measures.<sup>61</sup>
- **Portugal:** Under the Management System of Intensive Energy Consumption (SGCIE), energy intensive enterprises are mandated to implement the efficiency measures that are identified through audits, as long as they are considered cost-effective for the company<sup>62</sup>.

<sup>58</sup> Odyssee-Mure (2021): Online <https://www.measures.odyssee-mure.eu/energy-efficiency-policies-database.html#/measures/1093>. Accessed: 15.02.2021.

<sup>59</sup> Conference paper: History and prospect of voluntary agreements on industrial energy efficiency in Europe. Erwin Cornelis, Landry Grossing, Stéphane Palmaerts. ECEEE Industrial Summer Study Proceedings.

<sup>60</sup> National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) (2020). Personal Communication: Survey regarding Implementation of Article 8 EED.

<sup>61</sup> Government information for entrepreneurs. Online: <https://business.gov.nl/regulation/taking-measures-to-save-energy/>. Accessed: 23.04.2021.

<sup>62</sup> European Commission (2016): A Study on Energy Efficiency in Enterprises: Energy Audits and Energy Management Systems. Report on the fulfilment of obligations upon large enterprises, the encouragement of small and medium-sized companies and on good-practice.



## 4.2. Practice related to SMEs

This second part of the analysis deals with the implementation of practice relating to the encouragement of SMEs to conduct energy audits and to enhance the implementation of energy efficiency measures.

### 4.2.1. Challenge #07: Creation of support mechanisms

As for the non-SMEs, there are various support mechanisms to encourage SMEs to carry out energy audits and to implement energy efficiency measures. In general, there is some overlap with the support mechanisms for non-SMEs mentioned earlier. Both **information measures** and **financial incentives** are mainly used here to encourage SMEs.

#### What kind of support mechanism has the MS put in place to encourage the MS to undergo energy audits in SMEs?

Several countries financially incentivise voluntary energy audits for SMEs. The Finnish Ministry of Economic Affairs and Employment (MEAE), for example, provides support for energy audits that are carried out and reported according to MEAE guidelines, so-called Motiva Energy Audits. The support can cover up to 40% of the audit costs (up to 50% if companies signed a voluntary energy efficiency agreement)<sup>63</sup>. Germany, as another example, covers up to 80% of the audit costs for SMEs<sup>64,65</sup> and Belgium (Brussels region) offers free energy coaching for SMEs as part of their Pack Energie programme<sup>66</sup>.

#### What kind of support mechanism has the MS put in place to encourage SMEs to implement audit recommendations?

A majority of countries provide some kind of financial support to implement energy efficiency measures in SMEs. However, the form of support and the field of application varies. Sometimes funding schemes are tailored towards specific topics or technologies (such as the support scheme for renewable heat in Ireland<sup>67</sup>). The form of support ranges from tax breaks to grants or funding schemes.

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<sup>63</sup> MEAE (2020). Personal Communication: Survey regarding Implementation of Article 8 EED.

<sup>64</sup> as part of Module 1 of the federal funding for energy advice for non-residential buildings, installations, and systems.

<sup>65</sup> Federal Office of Economics and Export Control (BAFA ) (2021a): Allgemeine Hinweise zum Antrags- und Verwendungsnachweisverfahren. Bundesförderung Energieberatung für Nichtwohngebäude, Anlagen und Systeme (EBN). Online: [https://www.bafa.de/SharedDocs/Downloads/DE/Energie/ebn\\_allgemeine\\_hinweise\\_foerderverfahren.pdf?\\_\\_blob=publicationFile&v=5](https://www.bafa.de/SharedDocs/Downloads/DE/Energie/ebn_allgemeine_hinweise_foerderverfahren.pdf?__blob=publicationFile&v=5). Assessed: 18.02.2021.

<sup>66</sup> Environment.Brussels. Online: <https://environnement.brussels/thematiques/batiment-et-energie/accompagnements-gratuits/pack-energie-pour-pme-non-marchand>. Accessed: 23.04.2021.

<sup>67</sup> SEAI. Online: <https://www.seai.ie/business-and-public-sector/business-grants-and-supports/support-scheme-renewable-heat/>. Accessed: 23.04.2021.



Many programmes seem to have expired in 2020 and it remains to be seen if and how they will be replaced. It is interesting to note that some countries also link funding schemes for implementing energy efficiency measures with a precondition to conduct an energy audit. For example in the OPIC scheme in Bulgaria, or in Hungary. There, the energy audit is a precondition for claiming tax reliefs for energy efficiency investments<sup>68</sup>.

Information measures to promote audits or the implementation of measures are implemented in many MS. However, they are often targeted at all companies independently of their size. Measures range from organizing events or seminars, installing helpdesks or hotlines providing individual support to installing learning platforms. Ireland, for example, implemented the SEAI Energy Academy, an online learning platform where free trainings are offered on all areas of energy efficiency and management, specifically targeted at businesses to save energy and lower costs<sup>69</sup>. Further information on different information measures can also be found in Challenge #06.

Indirect support can be given to SMEs through the initiation of energy efficiency networks, which supports peer-to-peer knowledge exchange among companies on a regional level. More information on these networks can be found in Challenge #09.

#### 4.2.2. Challenge #08: Limited available resources

The number of SMEs varies widely, from over 3 million in Germany and France to only 3 to 5 thousand in Luxembourg. Accordingly, the exchange between the NAs and SMEs differs, but can be sorted into three groups. First, NAs **work together with regional institutions** or initiatives who are well connected to local SMEs. Second, by **providing SMEs with easy access to information**. Third, **dedicated events** such as workshops or seminars can be a way to interact and reach SMEs easily.

#### Is there any substantial forum for exchange between the NAs and SMEs in the MS (also addressing energy audits/energy efficiency?)

To stay in touch with SMEs and encourage them to carry out energy audits and implement energy efficiency measures in a cost-effective way, several MS work on the regional level and use existing connections between local institutions and SMEs. For example, in Belgium (Brussels region), disseminates of information on energy efficiency to SMEs is carried out via sector associations, local authorities and regional associations of companies. Local authorities are informed about projects through different channels, in this case whaler (chat for local authorities and Brussels Environment)<sup>70</sup>. In Croatia, as another example, the 4<sup>th</sup> National Energy Efficiency plan includes as a measure Industrial Energy Efficiency Networks (IEEN). Some of the key elements of IEEN are to educate experts

<sup>68</sup> Information provided by the National Authority - Hungarian Energy and Public Utility Regulatory Authority. Date: 05.03.2021.

<sup>69</sup> SEAI Energy Academy. Online: <https://www.seai.ie/energyacademy/>. Accessed: 23.04.2021.

<sup>70</sup> Brussels Environment (2020). Personal Communication: Survey regarding Implementation of Article 8 EED.



competent in the field of energy efficiency in the commercial sector and promote best practise projects<sup>71</sup>. Such energy efficiency networks implement channels on a peer-to-peer basis and can be effective instruments to engage companies in energy efficiency. However, there is normally no direct channel between the NA and the SME (more information on energy efficiency networks can be found in Challenge #09).

Most MS provide easy access to information by publishing detailed information on their websites, and several furthermore installed direct channels for contact, in the form of helpdesks (Italy) or hotlines (for example Denmark, Austria). In Austria, a forum for exchange between NAs, SMEs and non-SMEs is also provided by the klimaaktiv programme. Companies can receive information on the website, as well as by press releases or the social media channel, and furthermore klimaaktiv organizes regular events on the topic of energy efficiency<sup>72</sup>. Several other MS also organize dedicated events to engage SMEs. SEAI, the NA in Ireland, organises, for instance, business briefings and workshops for SMEs<sup>73</sup>. The Brussels Green Network in Belgium, an initiative by the Chamber of Commerce and the Union of Brussels Enterprises, organizes thematic networking events under the name of Green After Work<sup>74</sup>, as another example for such practices.

#### 4.2.3. Challenge #09: Guiding SMEs to participation

To guide SMEs into participating in voluntary audits or energy efficiency measures in general, different approaches could be found across the MS identified. The application process to funding schemes can be supported by **passive facilitation** such as offering detailed guidelines on the application process or by ensuring lean application process with a high level of digitalisation. Some countries offer additional **active facilitation**, particularly via various individual consultancy services for SMEs, where questions about possible programs can be asked and guidance sought. A third group of approaches is **peer networks**. Here, SMEs interested in a programme can develop interest in energy efficiency by learning about the experiences of peers.

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<sup>71</sup> Croatian Ministry for protection of the environment and energy (2017). Fourth national energy efficiency action plan for the period from 2017 to 2019. Online: [https://ec.europa.eu/energy/sites/ener/files/hr\\_neeap\\_2017\\_en.pdf](https://ec.europa.eu/energy/sites/ener/files/hr_neeap_2017_en.pdf).

<sup>72</sup> Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie (BMK) (2020). klimaaktiv Jahresbericht 2020. Online: <https://www.klimaaktiv.at/service/publikationen/klimaaktiv/jahresbericht2020.html>. Accessed: 08.03.2021.

<sup>73</sup> Sustainable Energy Authority of Ireland (2020): workshop communication and online materials. <https://www.gov.pl/web/audytywmsp/miedzynarodowy-warsztat-online--czesc-2> Date: 22.06.2020.

<sup>74</sup> <https://www.brusselsgreennetwork.be>



### Are there any activities (mainly) focusing on overcoming the inertia of SMEs to apply for support schemes (if any)?

Elements of passive facilitation can be found in many countries. Some offer guidelines on the application process for available funding schemes. In Bulgaria, for example, the management body of the funding grant Operational Program “Innovation and Competitiveness” (OPIC) (2014-2020) offers rules and conditions for applying, as well as guidance notes for applicants, and standardised application forms to support the SMEs during the project development process<sup>75</sup>. Slovenia provides guidelines and video-instructions on the website of the Slovenian Environmental Public Fund (Ekosklad)<sup>76</sup>. The application process itself can be facilitated through a high level of digitalisation, as seen in Estonia, where many administrative formalities can be completed online. In Germany, the NA implemented an online funding finder to help visitor deal with the large number of funding opportunities (Förderwegweiser Energieeffizienz). The guide is interactive and filters the available funding schemes to the specific requirements of the user.

Active facilitation is based on individual support by the NAs. Some countries provide individual consultancy services. In Bulgaria, for example, the Energy Efficiency and Renewable Sources Fund (EERSF) offers initial project screening for SMEs by own experts or by using external consultancy company<sup>77</sup>. In Croatia, the Department for EU Affairs, Funds and Programs offers, for example, individual consultations, educational workshops and seminars on topics related to EU policies<sup>78</sup>. As another example, in Poland, the Regional Funds for Environmental Protection and Water Management support regional energy advisors. Those advisors provide individual support to all kinds of recipients (private persons, SMEs and non-SMEs, public institutions etc.)<sup>79</sup>. Slovenia installed a database of advisors for helping every group of consumers interested in funding schemes, including SMEs<sup>80</sup>. And Denmark is running a hotline, where companies can receive information directly from the responsible NA<sup>81</sup>.

### Are there any activities (mainly) focusing on helping SMEs in applying for schemes?

A successful approach to engage especially SMEs in energy efficiency on a peer-to-peer basis can be found in the form of energy efficiency networks. Different enterprises form a network and use it to share information and best practices on energy efficiency measures. The idea for energy efficiency

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<sup>75</sup> Operational Programme "Innovation and Competitiveness" 2014-2020 (OPIC). Online: <https://en.opic.bg/opik/opic>.

<sup>76</sup> Ekosklad. Online: <https://www.ekosklad.si/english>.

<sup>77</sup> Energy Efficiency and Renewable Sources Fund. Online: <https://www.bgeef.com/en/about-us/>.

<sup>78</sup> Croatian Chamber of Commerce.

<sup>79</sup> Polish Sustainable Energy Financing Facility. Online: <http://www.polsekff.org/en>. Accessed: 01.01.2021.

<sup>80</sup> Ekosklad. Online: <https://www.ekosklad.si/prebivalstvo/ensvet/svetovalec>.

<sup>81</sup> Austrian Energy Agency (AEA) (2021) Personal Communication. 22.03.2021.



networks originated in Switzerland, where companies can form networks since 1987. In Germany, the Energy Efficiency Networks Initiative was started in 2014, and grew to 300 registered networks in April 2021, involving 2 669 companies<sup>82</sup>. A similar approach is taken in Austria, where the klimaaktiv programme together with the federal provinces and chambers of commerce, support regional and sectoral efficiency networks to enable knowledge transfer among different stakeholders<sup>83</sup>.

Further research is evaluating the use of automated suggestions for funding programmes. In Germany a tool is currently being developed to recommend measures and funding schemes based on submitted energy data<sup>84</sup>. While this measure is targeting mainly enterprises obliged to submit energy audit data, it could also incentivise SMEs to submit basic energy consumption data to receive suggestions.

#### 4.2.4. Challenge #10: Raising awareness on opportunities

Several approaches in the MS deal with raising the awareness of SMEs on opportunities from energy efficiency and help them overcome their limited capacity to implement it. These are based on providing **individualized insights**, sharing **success stories** of SMEs who already implemented energy efficiency measures, and **minimizing the research effort** for SMEs by having clarity in funding opportunities and conditions.

#### What kind of processes has the MS put in place for raising the awareness of SME on energy-efficiency?

MS can provide individualized insights in various forms. As mentioned in Challenge #07, Ireland implemented the SEAI e-learning platform Energy Academy. It provides information and training to individuals who then can carry the knowledge inside the enterprises and foster the implementation of energy efficiency measures. Similarly, Poland also offers e-learning courses. Personalized support can be given in the form of a telephone hotline (as seen for example in Denmark) (see Challenge #06).

The effort for SMEs to learn about funding schemes and potential measures is reduced by having clarity in funding opportunities and via information hubs. As mentioned in Challenge #09, Germany implemented an online fund finder to help visitor deal with the large number of funding opportunities (Förderwegweiser Energieeffizienz). Malta lists the available support schemes in the field of energy efficiency, each containing an overview, a FAQ section, a guideline on how to apply and links to relevant forms and documents (see Challenge #06).

<sup>82</sup> Initiative Energieeffizienz- und Klimaschutz-Netzwerke. Online: <https://www.oeffizienznetzwerke.org/>. Last accessed: 23.04.2021.

<sup>83</sup> Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie (BMK) (2020). klimaaktiv Jahresbericht 2020. Online: <https://www.klimaaktiv.at/service/publikationen/klimaaktiv/jahresbericht2020.html>. Accessed: 08.03.2021.

<sup>84</sup> BAFA. Personal Communication: Interview regarding Implementation of Article 8 EED. Date: 02.03.2021.



## How is the requirement of the EED to provide “concrete examples of how energy management systems could help [SMEs’] businesses” realized in the MS?

Sharing success stories can be another way to convince SMEs about the merits of energy efficiency measures from enterprises who they can relate to. Several MS have dedicated sections on their websites on best practices, and testimonials of SMEs who successfully implemented energy efficiency measures. This is, for example, the case for the Brussels region<sup>85</sup> and Poland, or in regional initiatives, like the Energy-Atlas Bavaria in Southern Germany, a digital platform where visitors can learn about energy efficiency, with a dedicated section to practical examples<sup>86</sup>.

### 4.3. Enhancement of the perception of Non-Energy Benefits

Non-energy benefits (NEBs) play a particular role in the DEESME project. The focus of the project in this area is on addressing their identification and consideration directly in SMEs. Yet the topic could also be relevant for NAs/IBs as a mean to increase the attention to energy efficiency and in consequence, to take up energy audits and their recommendations. Therefore, non-energy benefits are briefly covered in this section. How to potentially further integrate them into the working practice of the Member States will be discussed in the forthcoming documents.

#### 4.3.1. What are Non-Energy Benefits?

A large share of energy efficiency is not considered cost-effective when the analysis accounts for only energy savings as benefits. The same can be said of climate change mitigation, which can penalize economic growth if it results in increased energy prices. However many co-benefits, ancillary benefits, non-energy benefits accrue as a consequence of energy-efficiency projects. Co-benefits such as reduction of emissions, health and macro and micro-economic benefits can be substantially higher than the cost of energy measures. Besides saving of primary and final energy as well as emissions reductions, other macro-economic impacts were well studied over the last years.<sup>87</sup> The International Energy Agency (IEA) compiled a list of NEBs from energy efficiency improvements (Figure 3). This overview generally shows the various dimensions that Non-Energy Benefits can cover.

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<sup>85</sup> Brussels Environment (2020). Personal Communication: Survey regarding Implementation of Article 8 EED.

<sup>86</sup> Energie-Atlas Bayern. Online: <https://www.energieatlas.bayern.de/energieatlas/praxisbeispiele.html>. Last accessed: 26.04.2021.

<sup>87</sup> Multiple Benefits H2020-project, 2017.

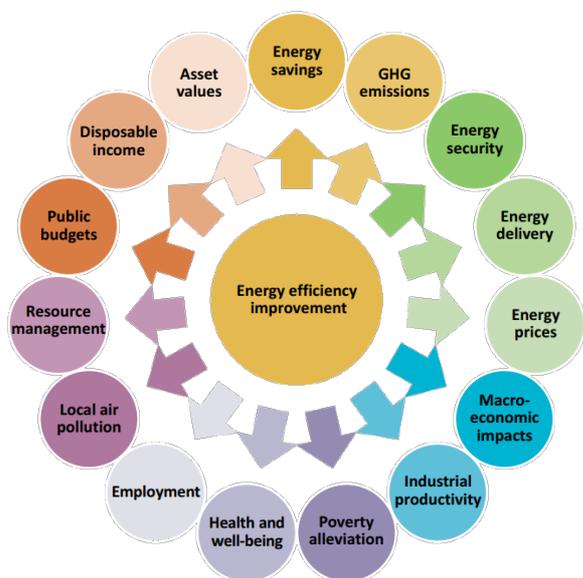


Figure 3. The multiple benefits of energy efficiency improvements (Source: IEA 2014)

#### 4.4. What does this mean for the companies?

When viewed at a company level, NEBs primarily include aspects such as improved product quality, higher flexibility, reduced production time, reduced production loss, and reduced risks.<sup>88</sup> Other observations include reductions of maintenance costs, increases in workplace comfort and safety (for instance, when an old oven is replaced by a new, better insulated one) or increases in industrial productivity (due to lower production time or a reduction of the rejection rate).

To make such benefits more tangible, several improvements for companies have been suggested, including:

- an harmonised approach to include the non-energy benefits in investment decisions;
- an evidence base and know-how on the importance of multiple benefits for companies;
- evaluation, communication and training tools for companies to identify and quantify multiple benefits.

For example, on concept seeks to underline the strategic importance of NEBs by analysing their impact on costs, or risks and on the value proposition (Figure 4). Thereby it seeks to help companies to recognize the broader benefits of energy efficiency improvements. After identifying NEBs in the different areas, a further step can consist in realizing a financial analysis of the benefits from NEBs. Figure 5 shows a corresponding example from such a quantification where the payback time would be turned from a financially unattractive situation when only looking at energy cost savings to a broader NEB perspective.

<sup>88</sup> Multiple Benefits H2020-project, 2017.



### Strategic analysis

(Value-Cost-Risk analysis)

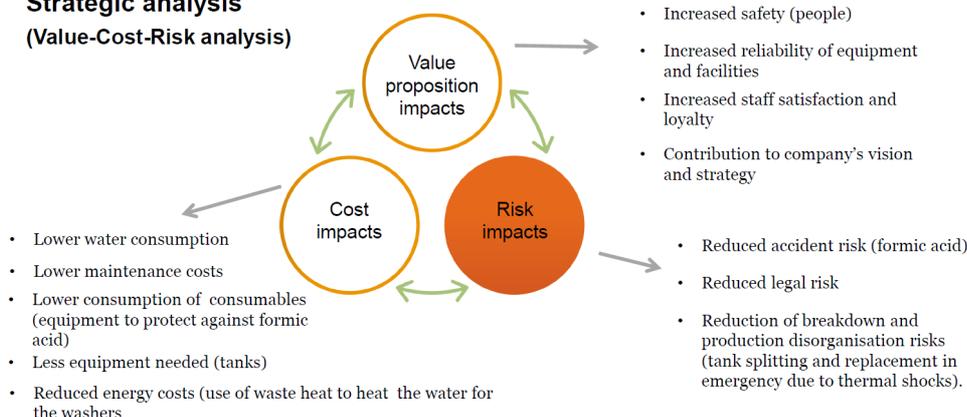


Figure 4: Strategic analysis (M-Benefits, 2017)

### Financial analysis

#### Energy benefits only:

- CAPEX: 30'000 CHF
- Investment income before taxes: 2'415 CHF
- NPV: -11'483 CHF
- IRR: -7.5%
- Simple payback: 13 years

#### All benefits included:

- CAPEX: 30'000 CHF
- Investment income before taxes: 3'998 CHF
- NPV: 5'895 CHF
- IRR: 11.5%
- Simple payback: 4.7 years

Discount rate: 6 %

Investment duration: 8 years (i.e. the number of years taken into account to compute NPV and IRR).

Figure 5: Financial analysis (M-Benefits, 2017)

### 4.5. What does this mean for the NAs?

So far, most MS are aware of the Non-Energy Benefits (NEB) concept, however only some implement them in their energy efficiency support mechanisms (see Deliverable 2.1). To support the uptake of energy efficiency measures in companies, NA could spread the concept of “Multiple benefits approach” in an empowered management framework for companies further. This could include elements such as:

- promotion/dissemination of NEB tools and methodology
- training of experts (energy auditors and/or energy managers)
- communication campaigns and events on NEB
- developing bridges between current instruments and NEB

Due to the potential synergies with the NEBS and the requirements of Article 8 EED, such will be further considered in the forthcoming best practice document as the next deliverable in this series.



## 5. Evaluation of current practice against the background in the countries

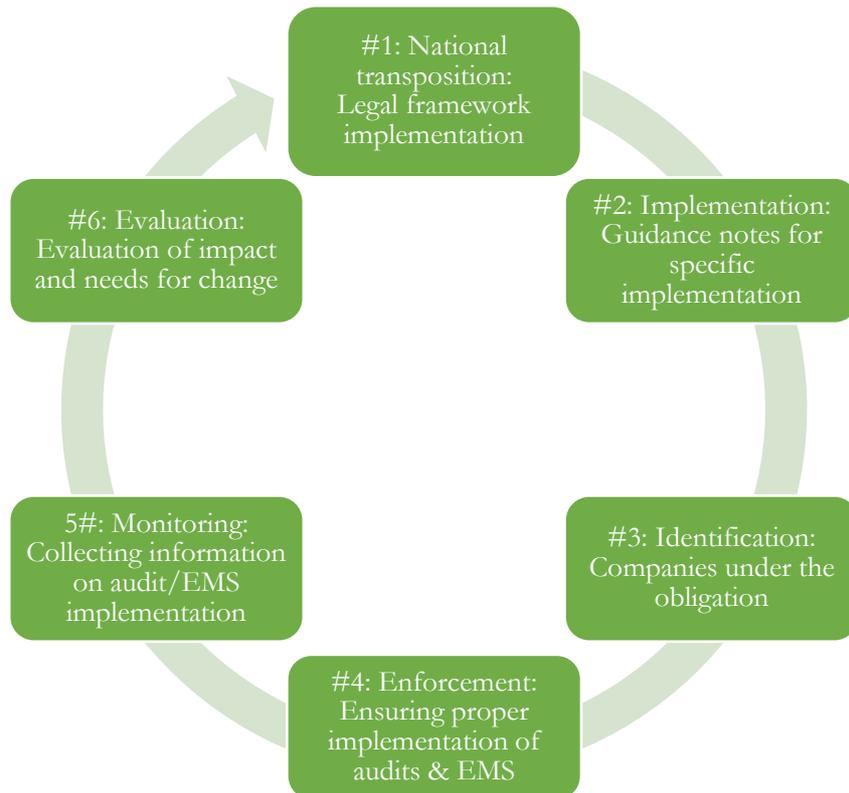
As a conclusive task of this analysis of practices, the identified current practices were prioritized against the requirements in the target MS (Figure 6). The results for the group of non-SMEs underlines, for example, that ensuring that all obligated companies carry out an audit and that identifying the relevant companies is among the priority topics for the further elaboration of best practices. For the SMEs, a focus will be on identifying financial measures to realize audits in SMEs and on how to minimize the search effort for SMEs, for example.

This prioritization will be used to guide the focus of the subsequent best-practice documents, on the one hand for the generic guideline to come, but also for the country reports that will follow on it.

Identification of priority areas	Austria	Bulgaria	Croatia	Cyprus*	Finland	Greece	Ireland	Italy	Poland	Slovenia
<b>Non-SMEs: Areas by challenges</b>										
<b>Challenge 1 - Limited resources</b>										
How to minimize of one-time costs?	Low	Low	Medium		Low	Low	Low	Low	High	Medium
How to minimize of re-occurring costs?	Low	Low	Medium		Low	Low	Low	Low	High	Medium
<b>Challenge 2 - Identification of obligated companies</b>										
How to actively identify companies using existing or self-established databases?	High	High	Low		High	Low	High	High	Medium	Low
How to passively identify companies using self-declarations?	Medium	High	Low		Medium	Medium	High	Low	High	Low
How to use energy thresholds to include additional companies in the obligation?	Medium	Low	Low		Low	Low	Low	Low	Medium	Low
How to use energy thresholds to allow simplified audits for particular companies?	Low	Low	Low		Low	Medium	Medium	Medium	High	Low
<b>Challenge 3 - Ensuring compliance</b>										
How to ensure that all obligated companies carry out an audit?	High	High	High		Low	Low	Medium	High	Medium	High
How to verify that submitted audits meet the requirements?	Medium	Low	Medium		Medium	Low	High	Low	Low	Medium
How to establish sanctions in case of non-compliance?	Low	Medium	High		Low	Low	Low	Low	Low	Medium
<b>Challenge 4 - Quality of audits</b>										
How to ensure education and experience of auditors?	Low	Low	Low		High	Low	High	Low	Medium	Medium
How to ensure high-quality energy audits?	Low	Low	Low		High	Low	High	Medium	High	Medium
How to carry out quality checks of energy audits?	Low	Low	Low		Medium	Low	Low	Medium	Low	Medium
<b>Challenge 5 - Compromise reporting and monitoring effort</b>										
How to cover key information in reporting submissions?	Low	Low	Low		Medium	Low	High	Medium	Medium	Low
How to design energy audit submissions?	Medium	Low	Low		Low	Low	Low	Low	Medium	Low
How to implement submission support?	Medium	Low	Low		Low	Low	Medium	Medium	Low	Low
<b>Challenge 6 - Enhancing uptake of measures</b>										
How to use financial measures to enhance the uptake?	Medium	Medium	Medium		Low	Low	Medium	Medium	Low	High
How to use informative measures to enhance the uptake?	Medium	Medium	Medium		Medium	Low	Medium	Low	Medium	Medium
How to use obligations/regulatory measures to enhance the uptake?	Low	Low	Low		Low	Low	High	Low	High	Medium
<b>SMES: Areas by challenges</b>										
<b>Challenge 7 - Creation of support mechanisms</b>										
How to use information measures to make SMEs realize audits and their results?	Medium	Medium	Medium		High	Medium	High	Medium	Medium	Medium
How to use financial measures to make SMEs realize audits and their results?	High	High	Medium		Medium	High	Medium	High	High	Medium
<b>Challenge 8 - Limited available resources</b>										
How to establish cooperation with regional institutions?	Low	Low	Medium		Low	Low	Low	High	High	Low
How to provide SMEs with easy access to information?	Medium	Medium	Medium		Medium	Low	High	Medium	Medium	Low
How to use dedicated events to reach SMEs?	Medium	Low	Low		Medium	Low	Low	Low	Low	Low
<b>Challenge 9 - Guiding SMEs to participation</b>										
How to use passive facilitation (e.g. guidelines, digitalization)?	Low	Low	Medium		High	Medium	High	Medium	Medium	Medium
How to use active facilitation (e.g. consultant services)?	Low	Medium	Medium		Medium	Medium	Low	Low	Medium	Medium
How to use peer networks (e.g. efficiency networks)?	Low	Low	Medium		Medium	Low	High	Medium	Medium	Medium
<b>Challenge 10 - Raising awareness on opportunities</b>										
How to provide SMEs individualized insights (e.g. Excel tools)?	Medium	Low	High		High	Low	High	Medium	High	Medium
How to create and spread success stories for SMEs (e.g. best practice examples)?	Low	Low	High		High	Medium	Low	High	Medium	High
How to minimize the research effort for SMEs (e.g. by pooling information)?	Medium	High	High		High	Medium	Medium	Medium	High	High

Figure 6. Results of the prioritization for the target countries (\*Cyprus: No information available).

## Annex A: Implementation cycle concerning non-SMEs



*Figure 7. Implementation cycle for the energy audit obligation mechanisms*

The cycle for the energy audit obligation for non-SMEs (Figure 7) covers the following steps:

- **#1: National transposition:** The national transposition concerns the general national implementation of the requirement according to Article 8 of the EED in national legislation, i.e. on enforcement details like deadlines, compliance criteria and scoping for non-SMEs in primary national legislation.
- **#2: Implementation:** The implementation concerns setting up specific implementation details for the actual implementations by providing further guidelines (e.g. FAQ, guidance documents) that set up the specific requirements for the implementation of requirements deriving from primary legislation.
- **#3: Identification:** This identification is concerned with finding those enterprises that are obligated to carry out energy audits or implement energy management systems in line with the Directive. This step is mainly concerned with the identification of ownership structures and financial thresholds to determine non-SMEs.

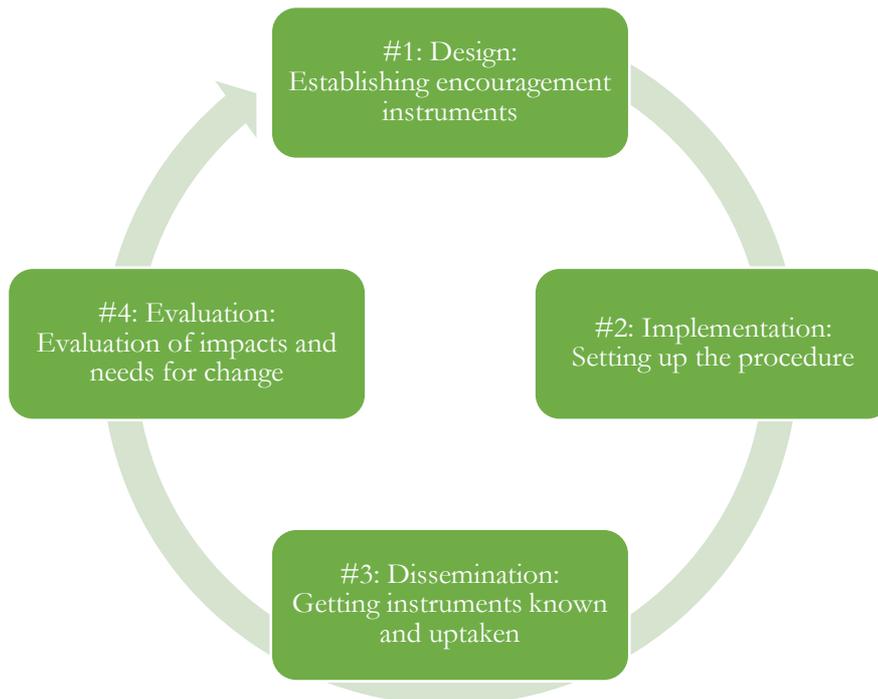


## DEESME

National schemes for energy efficiency in SMEs

- **#4: Enforcement:** The enforcement deals with measures concerning assuring the compliance of obligated companies with the requirements. It covers for example how it is made sure that companies carry out audits/implement energy management systems (e.g. penalties/fines) and by ensuring the qualification of energy audits and auditors (e.g. sampling of audits/qualification programmes).
- **#5: Monitoring:** The monitoring step is about following the compliance with the requirements by gathering information on the implementation of energy audits/energy management systems and their quality.
- **#6: Evaluation:** In the evaluation, the impact of the national implementation is reviewed based on available insights and the achievement of expected results due to the implementation is analysed. Both is aiming at reporting and for improving the existing implementation.

## Annex B: Implementation cycle concerning SMEs



*Figure 8. Implementation cycle for encouragement mechanisms for SMEs.*

The cycle covers for the encouragement of SMEs (Figure 8) covers the following steps:

- **#1: Design:** The generation step concerns what kind of the Member States set up instruments for encouraging SMEs to undergo high-quality energy audits and how the implement them.
- **#2: Implementation:** This implementation deals with setting up the procedures of encouragement, e.g. the establishment of funding programmes or the design of information sites and best practice examples for SMEs.
- **#3: Dissemination:** The dissemination step deals with how these instruments are made known to SMEs and how the SMEs are brought to use them, i.e. what kind of formats are used to spread information on instruments and how these are implemented.
- **#4: Evaluation:** In the evaluation, information on the impact of the measures is collected and analysed both for reporting and future revisions of the design, implementation and dissemination.



## Annex C: Excerpt of the Energy Efficiency Directive (2012/27/EU)

### Article 8

#### Energy audits and energy management systems

1. Member States shall promote the availability to all final customers of high quality energy audits which are cost-effective and:
  - (a) carried out in an independent manner by qualified and/or accredited experts according to qualification criteria; or
  - (b) implemented and supervised by independent authorities under national legislation.

The energy audits referred to in the first subparagraph may be carried out by in-house experts or energy auditors provided that the Member State concerned has put in place a scheme to assure and check their quality, including, if appropriate, an annual random selection of at least a statistically significant percentage of all the energy audits they carry out.

For the purpose of guaranteeing the high quality of the energy audits and energy management systems, Member States shall establish transparent and non-discriminatory minimum criteria for energy audits based on Annex VI.

Energy audits shall not include clauses preventing the findings of the audit from being transferred to any qualified/accredited energy service provider, on condition that the customer does not object.

2. Member States shall develop programmes to encourage SMEs to undergo energy audits and the subsequent implementation of the recommendations from these audits.

On the basis of transparent and non-discriminatory criteria and without prejudice to Union State aid law, Member States may set up support schemes for SMEs, including if they have concluded voluntary agreements, to cover costs of an energy audit and of the implementation of highly cost-effective recommendations from the energy audits, if the proposed measures are implemented.

Member States shall bring to the attention of SMEs, including through their respective representative intermediary organisations, concrete examples of how energy management systems could help their businesses. The Commission shall assist Member States by supporting the exchange of best practices in this domain.

3. Member States shall also develop programmes to raise awareness among households about the benefits of such audits through appropriate advice services.

Member States shall encourage training programmes for the qualification of energy auditors in order to facilitate sufficient availability of experts.

4. Member States shall ensure that enterprises that are not SMEs are subject to an energy audit carried out in an independent and cost-effective manner by qualified and/or accredited experts or implemented and supervised by independent authorities under national legislation by 5 December 2015 and at least every four years from the date of the previous energy audit.
5. Energy audits shall be considered as fulfilling the requirements of paragraph 4 when they are carried out in an independent manner, on the basis of minimum criteria based on Annex VI, and implemented under voluntary agreements concluded between organisations of stakeholders and an appointed body and supervised by the Member State concerned, or other bodies to which the competent authorities have delegated the responsibility concerned, or by the Commission.



National schemes for energy efficiency in SMEs

Access of market participants offering energy services shall be based on transparent and non-discriminatory criteria.

6. Enterprises that are not SMEs and that are implementing an energy or environmental management system - certified by an independent body according to the relevant European or International Standards - shall be exempted from the requirements of paragraph 4, provided that Member States ensure that the management system concerned includes an energy audit on the basis of the minimum criteria based on Annex VI.
7. Energy audits may stand alone or be part of a broader environmental audit. Member States may require that an assessment of the technical and economic feasibility of connection to an existing or planned district heating or cooling network shall be part of the energy audit.

Without prejudice to Union State aid law, Member States may implement incentive and support schemes for the implementation of recommendations from energy audits and similar measures.

#### ANNEX VI

Minimum criteria for energy audits including those carried out as part of energy management systems

The energy audits referred to in Article 8 shall be based on the following guidelines:

- (a) be based on up-to-date, measured, traceable operational data on energy consumption and (for electricity) load profiles;
- (b) comprise a detailed review of the energy consumption profile of buildings or groups of buildings, industrial operations or installations, including transportation;
- (c) build, whenever possible, on life-cycle cost analysis (LCCA) instead of Simple Payback Periods (SPP) in order to take account of long-term savings, residual values of long-term investments and discount rates;
- (d) be proportionate, and sufficiently representative to permit the drawing of a reliable picture of overall energy performance and the reliable identification of the most significant opportunities for improvement.

Energy audits shall allow detailed and validated calculations for the proposed measures so as to provide clear information on potential savings.

The data used in energy audits shall be storable for historical analysis and tracking performance.