JRC SCIENCE FOR POLICY REPORT

Analysis on the practices to collect, store and assess information arising from Energy Audits in the EU-28

EED Article 8 provisions on Energy Audits' information management, monitoring and verification

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JRC109382

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Contents

Abstract

This report has been conducted by the European Commission's Joint Research Centre on behalf of the European Commission's Directorate General for Energy with the objective to evaluate the practices in place in the different EU Member States regarding the provisions to collect, store and assess the information arising from Energy Audits and how these are being used to track performance. The report is also looking into how Member States are assuring the monitoring and verification in the period after the realisation of the mandatory energy audits. The report gives an overview of the different practices in place by the Member and an outline of the barriers identified by Member States both when collecting the information of Audits and in the monitoring and verification stages.

This report was put together by sending a survey sent to energy efficiency experts in the Member States (ranging from Energy Agencies, Ministries responsible for the implementation and regulation of energy policies, academia to ESCO representatives) during the period from June to October 2017. It was possible to gather contributions from contact points from the great majority of the EU 28 Member States except from the cases of Luxembourg and Poland.

The main findings of the report are that, overall, Member States are, in their majority, collecting and storing the information from audits in databases, being through web templates or functional mailboxes, receiving the totality of the audits reports. Some of the barriers being pointed out by experts are the difficulty to evaluate the great amount of data from audits and the lack of dedicated templates for companies to fill out with audits information. There are already several Member States performing verification and monitoring activities built on the first audits received.

1 Introduction

The Energy Efficiency Directive[1] (EED) was created to help achieve the EU's Climate and Energy package in order to improve the EU energy efficiency provides a legal basis for Member States to implement its provisions. Article 8 of the EED addresses energy audits and places the following obligations on Member States with respect to the promotion of energy audits in their jurisdictions. Member States are required to promote the availability of high quality energy audits to all final energy customers. They must establish mandatory energy audits for non-SMEs that must be carried out at regular intervals and must ensure that that the minimum criteria for energy audits detailed in Annex VI of the Directive are upheld. Organisations that are implementing energy or environmental management systems are exempt from this requirement provided that the systems incorporate regular energy audits that meet the minimum criteria given in Annex VI.

Article 8 of the EED has established the deadline of the 5th of December 2015 for non-SMEs to carry out energy audits in an independent and cost-effective manner by qualified and/or accredited experts or implemented and supervised by independent authorities under national legislation and at least four years from the date of the previous energy audit.

Annex VI of the EED defines a minimum criteria for energy audits o be carried out, which should follow specific guidelines regarding data quality and proportionality. Energy audits shall allow detailed and validated calculations for the proposed measures so as to provide clear information on potential savings and the data used in energy audits shall be storable for historical analysis.

While there is an evident focus of the EED regarding the requirements for companies to comply with, there is a very important role to be played by the national bodies which is to collect, monitor and validate the results of the energy audits being realised under the EED requirements.

In order for the audit recommendation to be implemented, the monitoring and verification processes being developed by Member States authorities play a crucial role. The amount of potential data arising from energy audits is of great value and should allow for Member States to devise solid energy efficiency policies directed to large companies, in order to harvest the highest potential from the energy efficient measures outlined in the energy audits.

The main objective of this report was to evaluate the practices in place, at national level, to collect, store and assess the information made available through energy audits and how Member States are looking into the monitoring and verification processes in the time between mandatory energy audits.

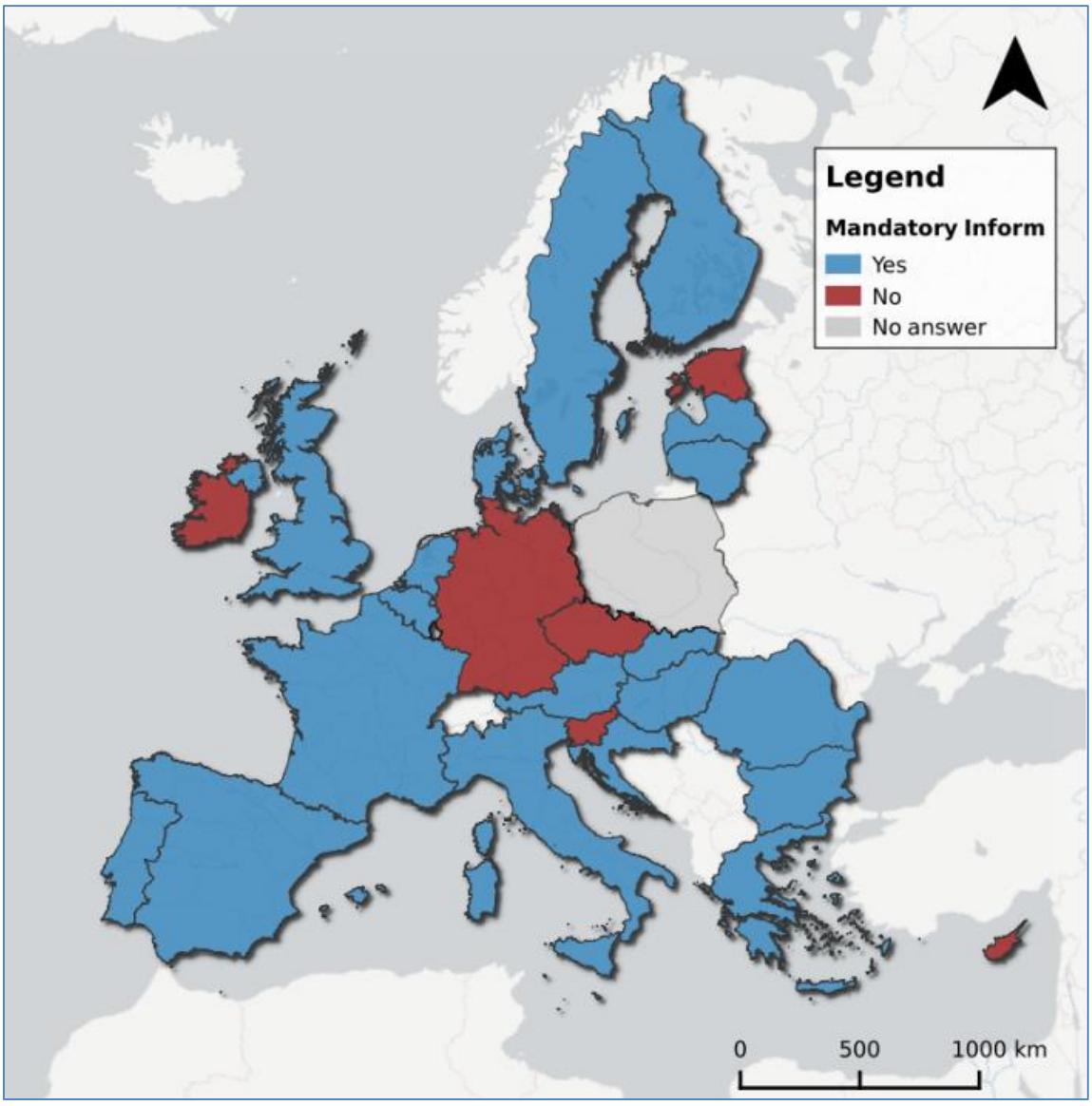
[1] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0027

2 Survey Results - Information on Member States Article 8 provisions

This section of the report presents a summary of the replies given by the Member States' experts. The objective of such analysis was to obtain an overview of the development of platforms and systems to collect and assess the information arising from Energy Audits and how Member States are performing monitoring and verification activities from such information.

On the question "Is there a mandatory requirement for companies subject to Energy Audits to inform the national authority about the audits results?" the great majority of the Member States that have responded to the survey have replied positively. From the 26 replies received, only 6 have replied negatively. In the Czech Republic, Cyprus, Estonia, Ireland, Germany and Slovenia do not oblige non-SMEs to inform the responsible authorities on the execution of mandatory energy audits. More specifically, in the case of the **Czech Republic**, this obligation falls into the auditor, instead of the company itself. For **Cyprus**, the results are not to be sent to the responsible authority, only an information on the timeline to complete the audits and general audit information. **Estonia** is still in the process of the transposition of Article 8 of the EED and for this, companies are not yet obliged to inform the authorities on the mandatory audits results. **Germany** has no central system to record the information arising from Energy Audits. Nevertheless, the federal agency BAFA, is actively collecting information on the proposed measures in the Audit.

Figure 1 – Is there a mandatory requirement to inform the Authority on Audits results?



2.1 Member States practices on the collection, storage and assessment of information arising from Energy Audits

When asked to generally describe the process in place to collect and store the information and data related to the mandatory energy audits, **Austria** has replied to having established, through its Energy Agency, two levels of submissions for the information arising from the Energy Audits. First of all, the aggregated energy consumption and energy savings data are sent to the National Energy Efficiency Monitoring Agency[2], which has been established at the Austrian Energy Agency, via the web application. Secondly, a more detailed report with specific audit information is also uploaded via the web application[3] upon request (Figure 2).

Figure 2 - Templates for Energy Audits Summary and Full Audit Report

monitoringstelle energieeffizienz

Zusammenfassung des Energieaudits gemäß § 9 EEffG
Meldung an die Monitoringstelle Energieeffizienz

Zusammenfassung des Energieaudits gemäß § 9 EEffG
Name des auditierten Unternehmens

Version: 30. November 2015

Hinweis!
Die Inhalte dieser Zusammenfassung sind in einem Dokument darzustellen, vom federführenden Energieauditor zu unterzeichnen und als Nachweis der Erfüllung der Verpflichtung gemäß § 9 EEffG fristgerecht in der Anwendung zum Energieeffizienzgesetz im Unternehmensserviceportal (USP) hochzuladen (pdf-Format). Der Energieauditbericht muss im ersten Schritt nicht hochgeladen werden. Auf Verlangen ist dieser der Monitoringstelle zu übermitteln.

Die Angaben dieser Zusammenfassung dienen in erster Linie zur Plausibilisierung der Energieaudits durch die Monitoringstelle Energieeffizienz. Die angegebenen Energieeffizienzmaßnahmen sind nicht verpflichtend umzusetzen.

Auditiertes Unternehmen	Text
Straße, Nr.	Text
PLZ, Ort	Text
Tätigkeit (ÖNACE 2008)	Text

Beschreibung des Unternehmens
Hier sind die wirtschaftlichen Tätigkeiten des Unternehmens zu beschreiben.
Text

Audit-Team

Führende/r Auditor/in:	Name | Unternehmen
Zweite/r Auditor/in:	Name | Unternehmen
Dritte/r Auditor/in:	Name | Unternehmen

Vom Audit erfasste Unternehmen und Standorte
Es sind alle im Audit erfassten Unternehmen sowie ihre zugehörigen Standorte anzuführen. Werden Unternehmen sowie ihre zugehörigen Standorte ausgenommen, ist dies aufzuzeigen und zu begründen.
Text

Datum der (ersten) Begehung:	

1

Monitoringstelle Energieeffizienz
Österreichische Energieagentur - Austrian Energy Agency
01 - 20 52 20 | office@monitoringstelle.at | www.monitoringstelle.at

Energieauditbericht
gemäß § 18 bzw. Anhang III des Bundes-Energieeffizienzgesetzes (EEffG)

UNTERNEHMEN
ANSCHRIFT
PLZ, ORT
Auditierte Bereiche:
Gebäude, Prozesse, Transporte

Führender Energieauditor/Führende Energieauditorin:
NAME
BERATUNGSUNTERNEHMEN
ADRESSE, PLZ, ORT
TEL, E-MAIL
WWW

am
XX.XX.20XX

DISCLAIMER

Diese Vorlage für einen Energieauditbericht dient als Hilfestellung zur Durchführung eines gesetzeskonformen Energieaudits sowie zur einheitlichen Meldung der durch das Energieeffizienzgesetz (EEffG) vorgeschriebenen Audits bei großen Unternehmen. Die Verwendung dieser Vorlage für einen Energieauditbericht ist nicht verpflichtend; die Vorlage ist auch nicht als Formatvorlage vorgesehen, sondern als Serviceleistung der Monitoringstelle für die inhaltliche Ausgestaltung von Energieaudits gemäß § 18 EEffG (bzw. gemäß Anhang III EEffG).

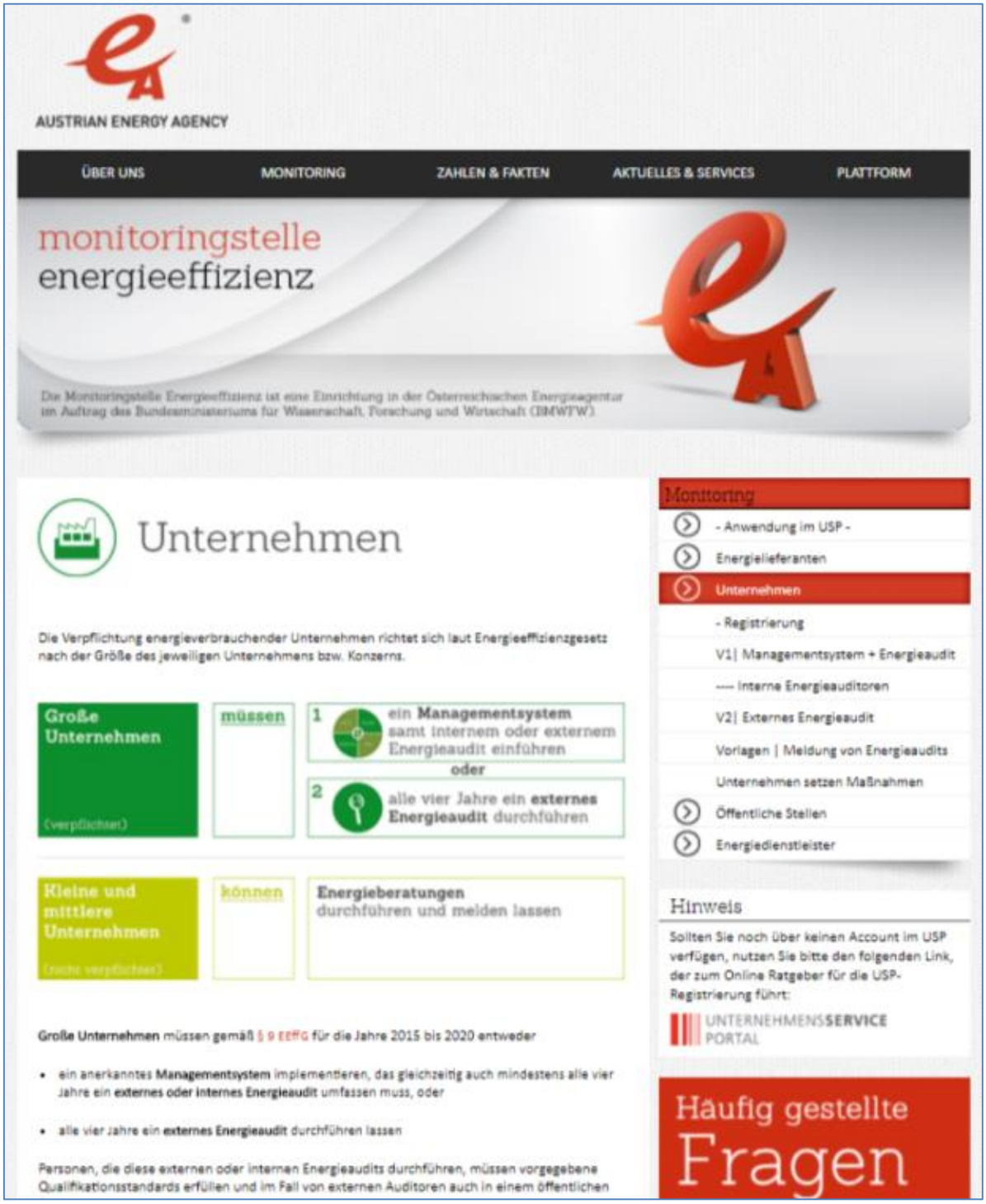
Die Österreichische Energieagentur übernimmt keine Haftung für die Vollständigkeit des Inhalts dieser Berichtsvorlage.

Stand 11. August 2015

In this detailed reporting scheme, information about each energy carrier, energy consuming appliances and systems, as well as energy measures arising from the audit report have to be uploaded via the online application. The Austrian authorities have developed a walkthrough guide for companies to comply with the mandatory energy audits programme[4], whether if complying through the implementation of an Energy or Environmental Management System (EMAS, ISO 14001 or ISO 50001, national energy/environmental recognised management system), or through an external auditor which needs to comply with the quality requirements from EN-16247 Part 1 and other criteria described in the Austrian Energy Efficiency Act. Energy audits must include analysis of energy consumption as well as detailed and validated calculations for proposed actions and provide information on potential savings. Three main areas are to be audited in order to fulfil the requirements – Buildings, Processes and Transport. Energy Auditors are usually responsible for sending the information on the energy audits and the prerequisite for sending the notifications to the monitoring centre is for companies to have access to the Corporate Services Portal (USP) of the Federal Ministry of Finance. The monitoring body carries out evaluations and analyses whether the notified management systems are recognised and certified, and the energy audits meet the requirements of the Energy Efficiency Act and have been carried out by accredited or qualified energy auditors.

[2] https://www.monitoringstelle.at/fileadmin/i_m_at/Vorlagen/Zusammenfassung_des_Energieaudits_30-11-2015.docx
[3] https://www.monitoringstelle.at/fileadmin/i_m_at/Vorlagen/Vorlage_fuer_einen_Energieauditbericht.docx
[4] https://www.monitoringstelle.at/index.php?id=585

Figure 3- Austrian Energy Agency website dedicated to Energy Audits.

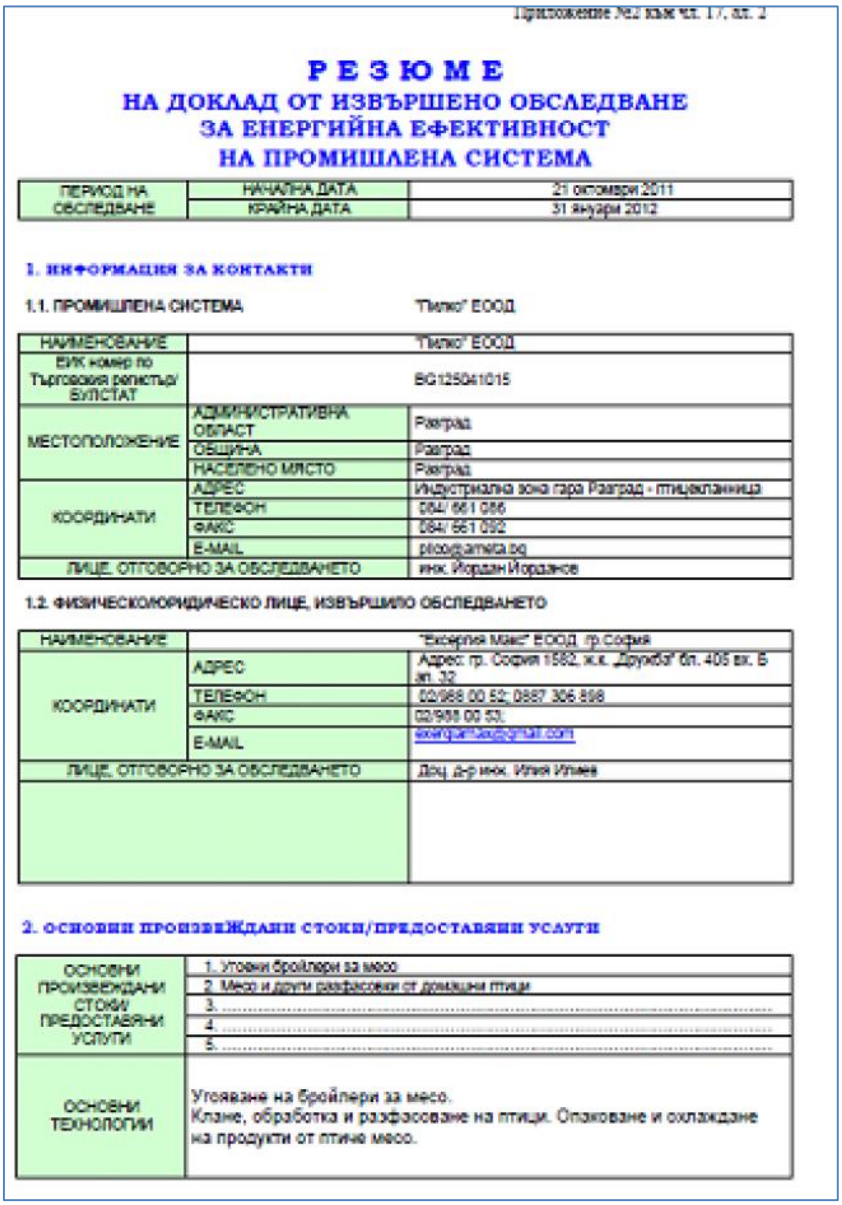


Source: https://www.monitoringstelle.at/

In **Belgium Flanders**, the energy auditor is responsible to upload the information of the energy audits performed via a web application and database of the Flemish Energy Agency, gathering information of the company, with detailed information performance of the company, divided by type of facilities and uses, providing information of individual energy savings, measure by measure.

Bulgaria, through SEDA[5], the Sustainable Energy Development Agency, has established a national information system database, with the obligation for non-SMEs (as defined in the EED) and SMEs (with energy consumptions over 3000 MWh/year) to upload the information arising from the energy audits into such database. This information is being collected and compiled through a predefined template (Figure 4) that encompasses general information from the actual company and detailed energy performance information of the company, divided by type of facilities and uses. Within 14 days from the acceptance of the energy audit report, the owner of the company is required to submit to SEDA a certified copy of the audit summary (in a printed and electronic format), a certified copy of the protocol of acceptance and a statement by the auditing company. On its side, SEDA performs the documentation control where it checks the information in the Energy Audit Summary and the completeness of all the required documents. The Data is inputted in the National Information Energy Efficiency System. If a company does not fulfil their obligation for mandatory audits, a fine from EUR 5,000 to EUR 50,000 may be applied.

Figure 4 - Bulgarian Energy Audit Summary.



Приложение №2 към чл. 17, ал. 2

Р Е З Ю М Е

НА ДОКЛАД ОТ ИЗВЪРШЕНО ОБСЛЕДВАНЕ ЗА ЕНЕРГИЙНА ЕФЕКТИВНОСТ НА ПРОМИШЛЕНА СИСТЕМА

ПЕРИОД НА ОБСЛЕДВАНЕ	НАЧАЛНА ДАТА	21 октомври 2011
	КРАЙНА ДАТА	31 януари 2012

1. ИНФОРМАЦИЯ ЗА КОНТАКТИ

1.1. ПРОМИШЛЕНА СИСТЕМА "Пилко" ЕООД

НАИМЕНОВАНИЕ		"Пилко" ЕООД
ЕИК номер по Търговския регистър/ БУЛСТАТ		BG125041015
МЕСТОПОЛОЖЕНИЕ	АДМИНИСТРАТИВНА ОБЛАСТ	Разград
	ОБЩИНА	Разград
	НАСЕЛЕНО МЯСТО	Разград
КООРДИНАТИ	АДРЕС	Индустриална зона гара Разград - птицекланница
	ТЕЛЕФОН	084/ 661 086
	ФАКС	084/ 661 092
	E-MAIL	prod@ameta.bg
ЛИЦЕ, ОТГОВОРНО ЗА ОБСЛЕДВАНЕТО		инж. Йордан Йорданов

1.2. ФИЗИЧЕСКО/ЮРИДИЧЕСКО ЛИЦЕ, ИЗВЪРШИЛО ОБСЛЕДВАНЕТО

НАИМЕНОВАНИЕ		"Екоерлия Мис" ЕООД гр.София
КООРДИНАТИ	АДРЕС	Адрес: гр. София 1582, ж.к. „Дружба" бл. 405 вх. Б ап. 32
	ТЕЛЕФОН	02/968 00 52; 0887 306 898
	ФАКС	02/968 00 53;
	E-MAIL	[redacted]
ЛИЦЕ, ОТГОВОРНО ЗА ОБСЛЕДВАНЕТО		Доц. д-р инж. Илия Илиев

2. ОСНОВНИ ПРОИЗВЕЖДАНИ СТОКИ/ПРЕДОСТАВЯНИ УСЛУГИ

ОСНОВНИ ПРОИЗВЕЖДАНИ СТОКИ/ ПРЕДОСТАВЯНИ УСЛУГИ	1. Угояви бройлери за месо 2. Месо и други разфасовки от домашни птици 3. ..... 4. ..... 5. .....
ОСНОВНИ ТЕХНОЛОГИИ	Угояване на бройлери за месо. Клане, обработка и разфасоване на птици. Опаковане и охлаждане на продукти от птиче месо.

Source: http://www.seea.government.bg/

[5] http://www.seea.government.bg/

In **Croatia**, the process of collecting and storage of the audits information starts with the auditor that needs to be certified by the authorities and registered in the Ministry site[6], to send a copy of the complete energy audit, by mail to the Ministry of Environment and Energy. All the files are being stored connected with a central datasheet.

In the case of **Cyprus**, non-SMEs are obliged inform the Ministry of Energy[7] on their timeline to complete the energy audit. After this, they inform the Ministry of its completion along with the registration number of the licensed professional who performed the audit. Information of the audit is sent by the companies to the Ministry via a predefined template and the ministry can request to receive the full energy audit report from the energy auditor, for quality control purposes.

In the **Czech Republic**, the energy auditor is responsible to upload the energy audit and the data arising from it into the national database. This database is a web application accessible only to the auditor and the Ministry of Industry and Trade[8] which can use this database to monitor potential energy savings.

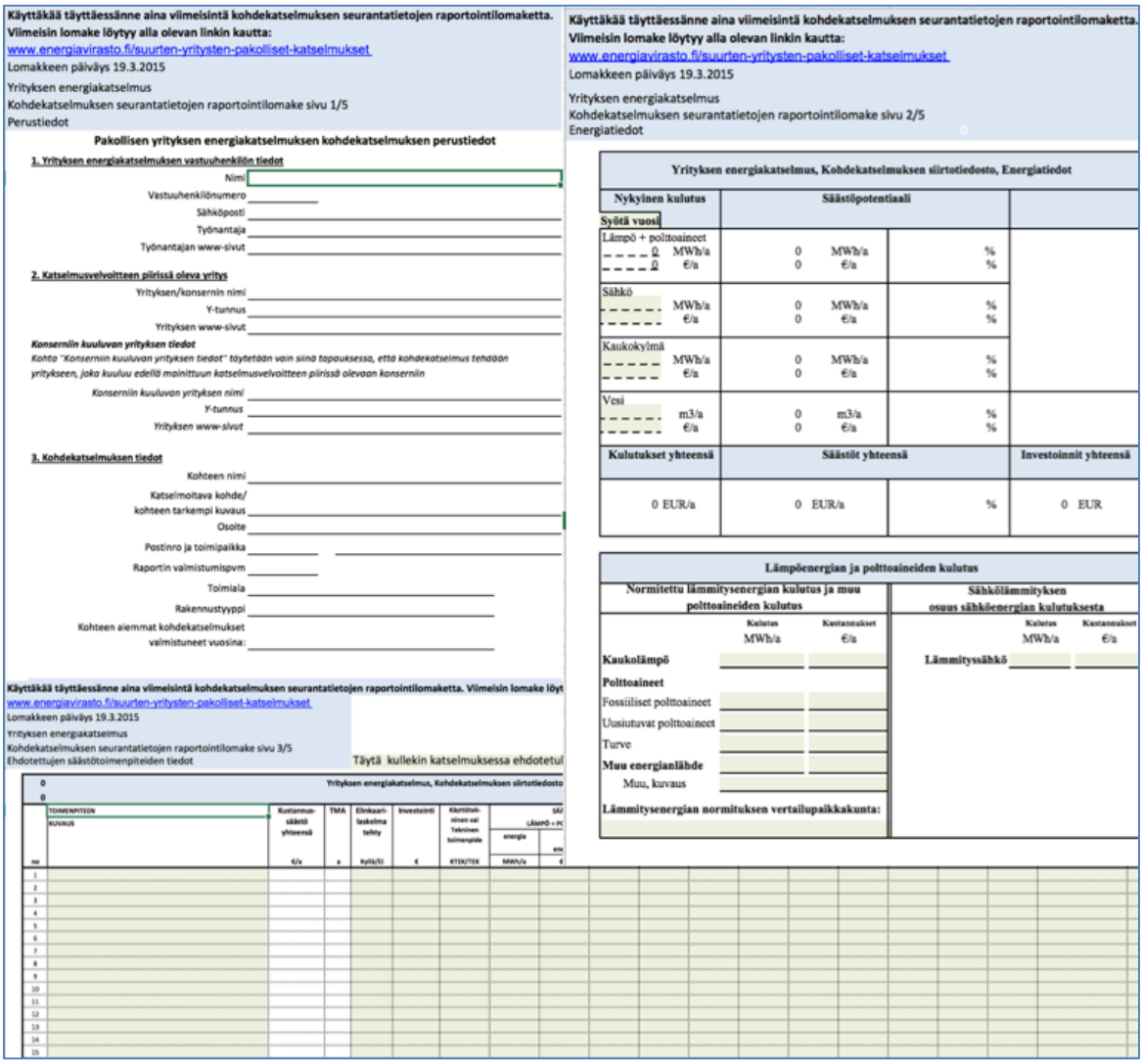
In **Denmark**, the companies obliged to perform energy audits, which are identified in a public list in the Danish Energy Agency site[9], send in directly, via a functional mailbox, the results of their audit to the agency[10], which then collects the audits reports and proceeds to approve them. In order to be compliant, the energy audits need to comply with Section 4.4.3. of ISO 50001 or the Energy audit standard DS / EN 16247 – sections 1 to 4. The audit reports are stored in the Energy Agency filing system, although at the present time no data is being treated as the audit reports are being delivered.

The **Estonian** expert has mentioned that Estonia has transposed Article 8 of the EED in July 2016 with only its first simplified audits being completed by April 2017. This implies that Estonia is still developing its system to collect and manage the information arising from all audits. Nevertheless, it was referred that obliged companies need to store the records of energy audits for at least 7 years and provide these records to the technical authority upon their request.

Finland has two different procedures regarding the collection of audits information. In the case of mandatory audits, a summary of the audit must be sent, by the companies via an excel template, to the Energy Authority[11], whereas for voluntary audits, this summary must be sent to Motiva Oy, the state owned company responsible for managing the voluntary audits programme, through a web application for quality control and monitoring purposes. The type of information delivered ranges from basic info, to the energy usage and detailed information on the energy saving measures identified in the Audit. With a long standing tradition in the promotion of voluntary energy audits, Motiva Oy manages a national database of data collected in the energy audits.

[6] http://www.mgipu.hr/doc/Graditeljstvo/Registar_certifikatora.htm
[7] http://www.mcit.gov.cy/
[8] https://www.mpo.cz/
[9] https://ens.dk/sites/ens.dk/files/Energibesparelser/positivlisten.pdf
[10] https://ens.dk
[11] https://www.energiavirasto.fi/documents/10191/0/Siirtotiedosto/8289d920-7999-41eb-8522-1b8c7080f5e5

Figure 5 –Sample of the Energy Audit Summary to be filled by Finnish non-SMEs.



Käyttäkää täyttäessänne aina viimeisintä kohdekatselmuksen seurantatietojen raportointilomaketta.
Viimeisin lomake löytyy alla olevan linkin kautta:
www.energiavirasto.fi/suurten-yritysten-pakolliset-katselmukset
Lomakkeen päiväys 19.3.2015
Yrityksen energiakatselmus
Kohdekatselmuksen seurantatietojen raportointilomake sivu 1/5
Perustiedot

Pakollisen yrityksen energiakatselmuksen kohdekatselmuksen perustiedot

1. Yrityksen energiakatselmuksen vastuuhenkilön tiedot
Nimi
Vastuuhenkilönumero
Sähköposti
Työnantaja
Työnantajan www-sivut

2. Katselmusvelvoitteen piirissä oleva yritys
Yrityksen/konsernin nimi
Y-tunnus
Yrityksen www-sivut

Konserniin kuuluvan yrityksen tiedot
Kohta "Konserniin kuuluvan yrityksen tiedot" täytetään vain siinä tapauksessa, että kohdekatselmus tehdään yritykseen, joka kuuluu edellä mainittuun katselmusvelvoitteen piirissä olevaan konserniin
Konserniin kuuluvan yrityksen nimi
Y-tunnus
Yrityksen www-sivut

3. Kohdekatselmuksen tiedot
Kohteen nimi
Katselmoitava kohde/ kohteen tarkempi kuvaus
Osoite
Postinro ja toimipaikka
Raportin valmistumispvm
Toimiala
Rakennustyyppi
Kohteen aiemmat kohdekatselmukset valmistuneet vuosina:

Käyttäkää täyttäessänne aina viimeisintä kohdekatselmuksen seurantatietojen raportointilomaketta. Viimeisin lomake löyt
www.energiavirasto.fi/suurten-yritysten-pakolliset-katselmukset
Lomakkeen päiväys 19.3.2015
Yrityksen energiakatselmus
Kohdekatselmuksen seurantatietojen raportointilomake sivu 3/5
Ehdotettujen säästötoimenpiteiden tiedot
Täytä kullekin katselmuksessa ehdotetul

Yrityksen energiakatselmus, Kohdekatselmuksen siirtotiedosto

no	TOIMENPITEEN KUVAUS	Kustannus-säästö yhteensä	TMA	Elinkaari-laskelma tehty	Investointi	Kiinteis-tönen vai Teknisen toimenpide	SÄ LÄMPÖ + PO
		€/a	a	kyllä/EI	€	KTEK/TEK	energia MWh/a
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Käyttäkää täyttäessänne aina viimeisintä kohdekatselmuksen seurantatietojen raportointilomaketta.
Viimeisin lomake löytyy alla olevan linkin kautta:
www.energiavirasto.fi/suurten-yritysten-pakolliset-katselmukset
Lomakkeen päiväys 19.3.2015
Yrityksen energiakatselmus
Kohdekatselmuksen seurantatietojen raportointilomake sivu 2/5
Energiatiedot

Yrityksen energiakatselmus, Kohdekatselmuksen siirtotiedosto, Energiatiedot

Nykyinen kulutus		Säästöpotentiaali			
Syötä vuosi					
Lämpö + polttoaineet	MWh/a	0	MWh/a	%	
	€/a	0	€/a	%	
Sähkö	MWh/a	0	MWh/a	%	
	€/a	0	€/a	%	
Kaukokylmä	MWh/a	0	MWh/a	%	
	€/a	0	€/a	%	
Vesi	m3/a	0	m3/a	%	
	€/a	0	€/a	%	
Kulutukset yhteensä		**Säästöt yhteensä**			**Investoinnit yhteensä**
0 EUR/a		0 EUR/a		%	0 EUR

Lämpöenergian ja polttoaineiden kulutus

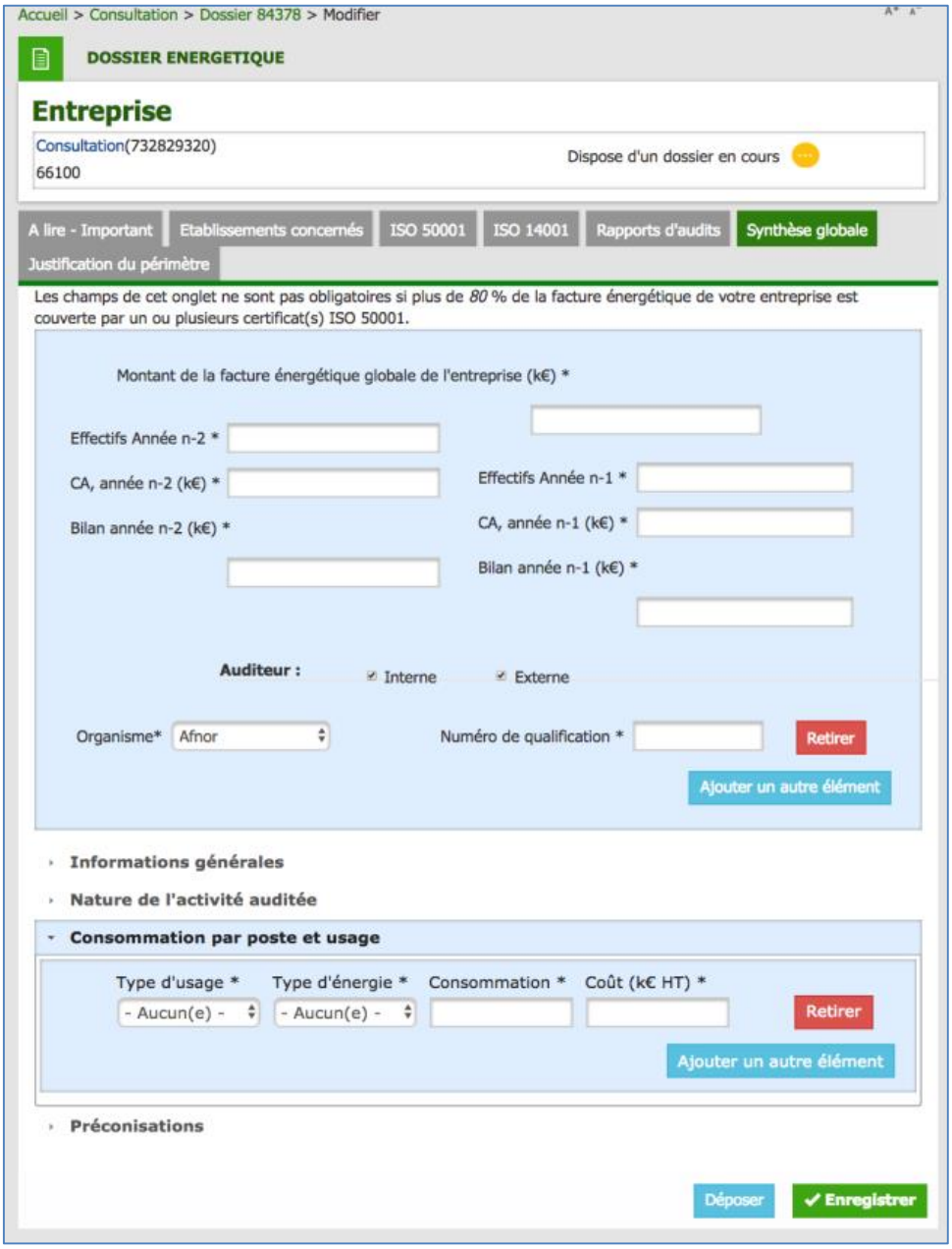
Normitettu lämmitysenergian kulutus ja muu polttoaineiden kulutus	Kulutus MWh/a	Kustannukset €/a	Sähkölämmityksen osuus sähköenergian kulutuksesta	Kulutus MWh/a	Kustannukset €/a
Kaukolämpö			**Lämmityssähkö**		
Polttoaineet					
Fossiiliset polttoaineet					
Uusiutuvat polttoaineet					
Turve					
Muu energianlähde					
Muu, kuvaus					
Lämmitysenergian normituksen vertailupaikkakunta:					

Source: http://www.energiavirasto.fi/

France is also a country with a long standing tradition on the promotion of energy audits in companies and has a dedicated online platform that was developed to collect the information from mandatory energy audits. The platform works under the management of ADEME, the French Environment and Energy Management Agency under the dedicated site for Energy Audits[12]. In this platform it is mandatory for companies to declare all the facilities identified by the enterprise number and justify the scope of the audit and the sampling procedure. The audits reports need to be uploaded in the audit reports tab or in the case of the implementation of an Environmental/ Energy Management System, the certificates need to be presented.

[12] http://www.audit-energie.ademe.fr/

Figure 6 - Example of the French Audit reporting platform at ADEME dedicated portal.

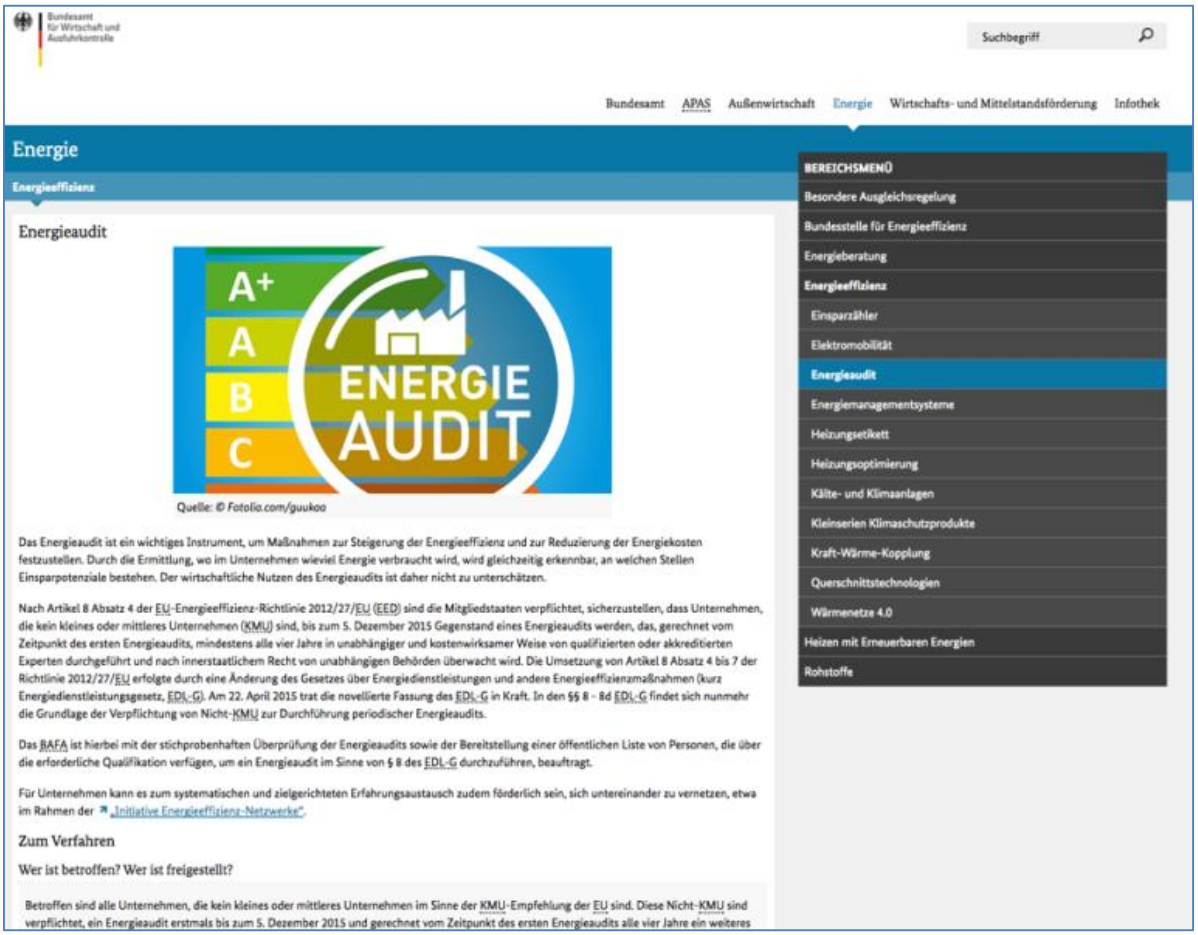


Source: http://audit-energie.ademe.fr/

In **Germany**, the federal agency BAFA is collecting data regarding energy audits, namely the concrete measures being proposed in the audit. Since there is no mandatory requirement for companies to send their energy audits results, there isn't a central system to record the results of mandatory energy audits. However, BAFA has the responsibility to perform spot checks on large companies by asking these companies for the whole energy audit report or parts of it. [13] BAFA has developed a dedicated website (Figure 7) to aid companies on the compliance of the mandatory requirements for SMEs.

[13] http://www.bafa.de/DE/Energie/Energieeffizienz/Energieaudit/energieaudit_node.html

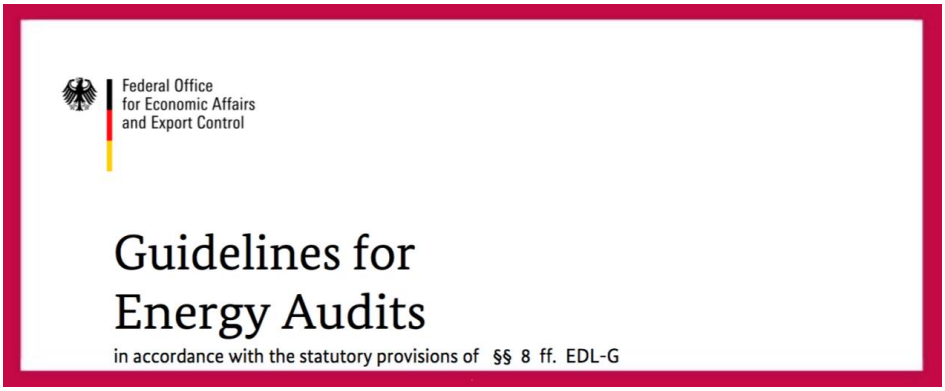
Figure 7 - BAFA's dedicated Energy Audit website.



Source: http://www.bafa.de

It has also developed a document with Guidelines for Energy Audits (Figure 8) [14] with all the prerequisites for companies to comply with, guidelines on how to perform the audits, specific guidelines on companies' different eligibility scenarios, energy auditors' qualification requirements and the procedures for the sample check to be performed by BAFA. Fines of up to 50.000 € are foreseen in the case of a company not complying with the mandatory energy audits legislation.

Figure 8 - BAFA's Guidelines for Energy Audits in Germany.

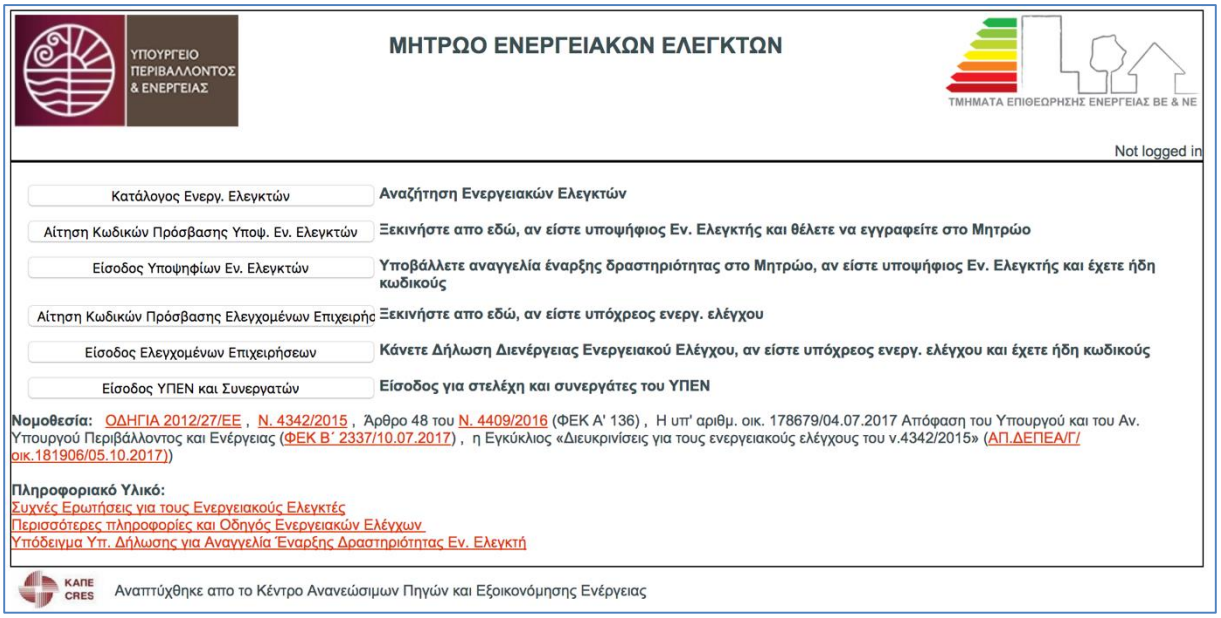


Source: http://www.bafa.de

[14] http://www.bafa.de/SharedDocs/Downloads/EN/Energy/ea_guidelines.pdf?__blob=publicationFile&v=2

In **Greece**, non-SMEs are obliged to submit an announcement of the first Energy Audit or the implementation of an Energy Management System within one year of the publication of the law transposing Article 8 of the EED from July 2017. Within the same timeframe, a report of the results of the Energy Audit must be submitted by the Energy Auditors in the electronic Archive of Energy Audits (Figure 9**Error! Reference source not found.**). This dedicated platform[15] presents several features which may help companies to comply with the legislation. This platform lodges the Energy Auditors list, it allows for Auditors to register and be included in such list and allows for companies to enrol in the system and upload their energy audits results. Other information like the applicable legislation or the Energy Audits guide may also be found[16].

Figure 9 - Greek Archive on Energy Auditors and Energy Audits



In **Hungary**, Energy Auditors and Auditing companies have to supply data of each audit performed to the Hungarian Energy and Public Utility Regulatory Authority[17] (HEA) via an electronic format and submit a report of their general auditing activity as well. Non-SMEs are obliged to register and provide data of their annual energy consumption and energy savings to the HEA by the 30th of June each year. The data is stored in a database maintained by the HEA that checks the registrations based on a catalogue of large enterprises, provided by the National Tax and Customs Administration and the submitted data provided by self-registered obligated enterprises. The HEA performs quality control of reported energy audits by selecting a statistically relevant number of audits which then energy auditors are asked to submit the selected audit reports in full length. HEA has prepared a checklist for the quality requirements of the audits, according to which compliance will be controlled. There may be the case of on-site checks for the HEA to verify "suspicious audits" which has not started yet but is foreseen. As the EED was transposed into Hungarian law in 2015 and many derived regulations related to Art 8 appeared only in 2016 and 2017, the law-compliance of obligated companies so far is not very high. The actual quality control process has just begun.

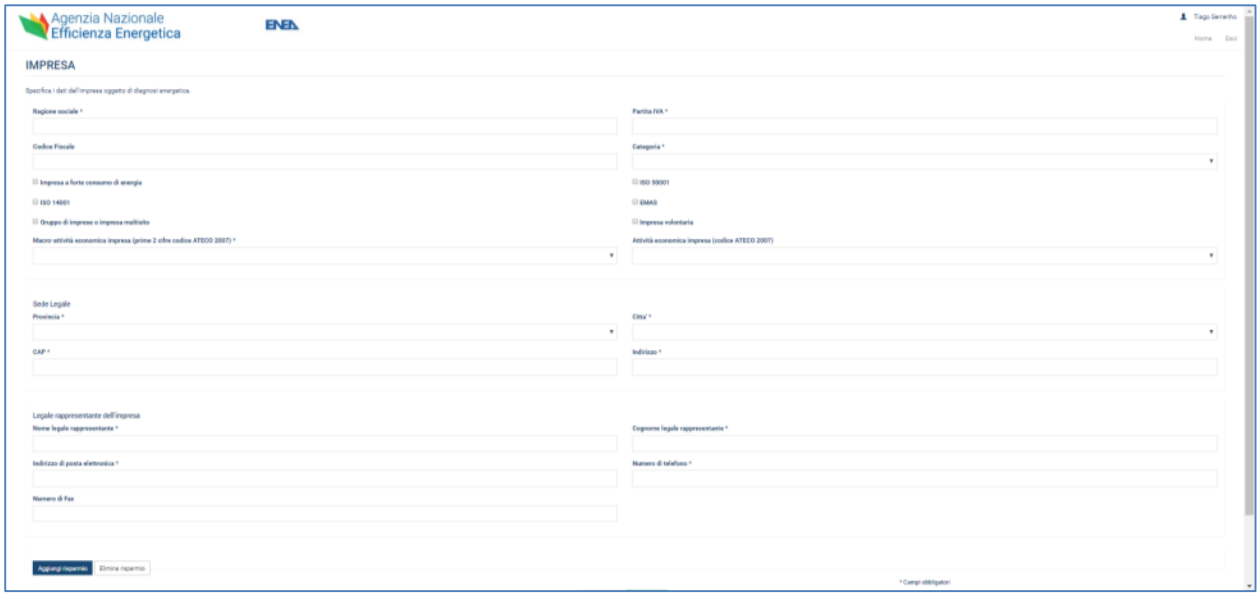
With its Energy Auditing Scheme in place, the Sustainable Energy Authority of **Ireland** (SEAI)[18] asks for companies to register into its website and notify the authority for their compliance. Up to now the companies are not required to submit any documentation, only to maintain a registry of their compliance in case of an inspection. Ireland is developing "systems and processes" to have a stricter control on their energy audits scheme, since until the EED transposition, the audit scheme was a voluntary one. For the moment, an Excel tracking sheet is being used to monitor all the audits. SEAI has developed a comprehensive Energy Audit Handbook[19] with a detailed description of all the steps needed for companies to comply with the legal requirements and perform quality audits.

[15] https://www.buildingcert.gr/enaudits/
[16] http://www.ypeka.gr/Default.aspx?tabid=281&language=el-GR
[17] http://www.mekh.hu/
[18] https://www.seai.ie/
[19] https://www.seai.ie/resources/publications/SEAI-Energy-Audit-Handbook.pdf

Figure 10- Irish Sustainable Energy Authority website dedicated to Energy Auditing Scheme

In **Italy** the companies obliged to perform energy audits are responsible to communicate the results of such audits, via its legal representative, to ENEA[2021], the Italian Energy Efficiency Agency. The same applies for companies implementing an Environmental or Energy Management Systems. Energy Audits need to be completed until December 5th in the first year of entry of the legislation and then every four years after that. Energy Audits need to respect the minimum quality requirements constant in EN 16247. The communication of the audit results is made via email and a portal where companies need to be registered[22]. A manual has been developed to make the companies comply with the Auditing scheme which is hosted in the SEAI portal. This portal hosts a database that will serve to monitor the compliance of companies while ENEA will be responsible for checking at least 3% of the audits being realised each year. In the case of failing to deliver proof of completion of audits results a company may incur into fines ranging from € 4.000 to €40.000 and from €2.000 to 20.000€ in the case of failing to comply with the minimum quality requirements.

Figure 11- Italian Energy Agency Portal Audit 102 dedicated to Energy Audits.

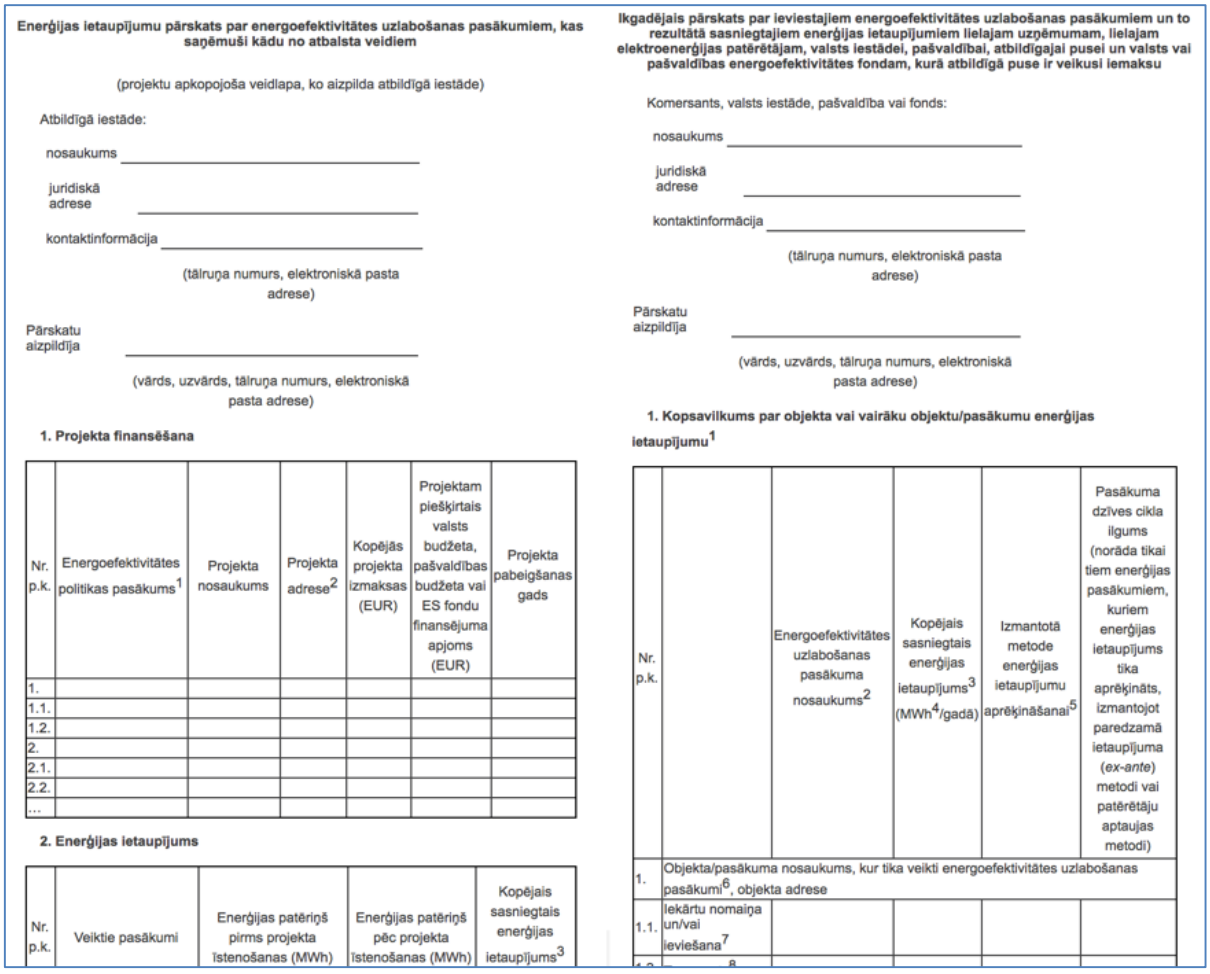


Source: https://audit102.casaccia.enea.it/index.php

[20] http://www.enea.it/it/Ricerca_sviluppo/lenergia/efficienza-energetica
[21] http://www.agenziaefficienzaenergetica.it/per-le-imprese/diagnosi-energetiche
[22] https://audit102.casaccia.enea.it/index.php

The Energy Efficiency Law in **Latvia** states that companies appearing for two years in a row in the list for large companies emitted by the Central Statistics Bureau, shall carry out an energy audit or introduce and certify and energy or environmental management system. The companies shall report to the Ministry of Economics[23], via a template, the realisation of an energy audit or the implementation of an environmental/energy management system with a continuous energy consumption evaluation process and the proposed energy efficiency improvement measures. Each subsequent year, companies must report on the implemented energy efficiency improvement measures and energy savings achieved as a result. The large enterprise shall implement at least three energy efficiency measures with the largest estimated energy savings or economic returns proposed in the energy audit or within the framework of the management system. The Ministry of Economics has developed a template for companies to send the information relating to the execution of the audit, an annual reporting template and a template for the declaration of execution of an Environmental/Energy Management System[24] (Figure 12). The template contains general information of the company and the auditor, energy efficiency measures proposed with potential energy savings, budget and the annual progress in the implementation of the proposed measures.

Figure 12 - Latvian Templates for reporting Energy Audits and Annual Reporting.



Enerģijas ietaupījumu pārskats par energoefektivitātes uzlabošanas pasākumiem, kas saņēmuši kādu no atbalsta veidiem

(projektu apkopojoša veidlapa, ko aizpilda atbildīgā iestāde)

Atbildīgā iestāde:

nosaukums _____

juridiskā adrese _____

kontaktinformācija _____

(tālruņa numurs, elektroniskā pasta adrese)

Pārskatu aizpildīja _____

(vārds, uzvārds, tālruņa numurs, elektroniskā pasta adrese)

1. Projekta finansēšana

Nr. p.k.	Energoefektivitātes politikas pasākums[1]	Projekta nosaukums	Projekta adrese[2]	Kopējās projekta izmaksas (EUR)	Projektam piešķirtais valsts budžeta, pašvaldības budžeta vai ES fondu finansējuma apjoms (EUR)	Projekta pabeigšanas gads
1.						
1.1.						
1.2.						
2.						
2.1.						
2.2.						
...						

2. Enerģijas ietaupījums

Nr. p.k.	Veiktie pasākumi	Enerģijas patēriņš pirms projekta īstenošanas (MWh)	Enerģijas patēriņš pēc projekta īstenošanas (MWh)	Kopējais sasniegtais enerģijas ietaupījums[3]

Ikgadējais pārskats par ieviestajiem energoefektivitātes uzlabošanas pasākumiem un to rezultātā sasniegtajiem enerģijas ietaupījumiem lielajam uzņēmumam, lielajam elektroenerģijas patērētājam, valsts iestādei, pašvaldībai, atbildīgajai pusei un valsts vai pašvaldības energoefektivitātes fondam, kurā atbildīgā puse ir veikusi iemaksu

Komersants, valsts iestāde, pašvaldība vai fonds:

nosaukums _____

juridiskā adrese _____

kontaktinformācija _____

(tālruņa numurs, elektroniskā pasta adrese)

Pārskatu aizpildīja _____

(vārds, uzvārds, tālruņa numurs, elektroniskā pasta adrese)

1. Kopsavilkums par objekta vai vairāku objektu/pasākumu enerģijas ietaupījumu[1]

Nr. p.k.		Energoefektivitātes uzlabošanas pasākuma nosaukums[2]	Kopējais sasniegtais enerģijas ietaupījums[3] (MWh[4]/gadā)	Izmantotā metode enerģijas ietaupījumu aprēķināšanai[5]	Pasākuma dzīves cikla ilgums (norāda tikai tiem enerģijas pasākumiem, kuriem enerģijas ietaupījums tika aprēķināts, izmantojot paredzamā ietaupījuma (*ex-ante*) metodi vai patērētāju aptaujas metodi)
1.	Objekta/pasākuma nosaukums, kur tika veikti energoefektivitātes uzlabošanas pasākumi[6], objekta adrese				
1.1.	Iekārtu nomaiņa un/vai ieviešana[7]				

In **Lithuania**, the Energy Agency is the entity responsible to manage the mandatory energy audits provisions. Non-SMEs were obliged to send information about the energy audits realised to the Energy Agency by the first time until July 2017. These audits need to be performed by auditors that are qualified and/or certified auditors in Lithuania or other Member States of the European Union for at least four years. The Energy Agency is responsible to collect, store and assess the information and data arising from the mandatory energy audits. There is a written procedure for companies to send the audits, what type of information needs to be collected and a description of the quality inspection that can be made, by the Ministry of Energy. The

[23] https://www.em.gov.lv/lv/nozares_politika/energoefektivitate_un_siltumapgade/energoefektivitate/lielie_uznemumi_un_lielie_elektroenergijas_pateretaji/

[24] http://likumi.lv/doc.php?id=285878#piel5

digital copy of the full audit report should be sent by the company to the Energy Agency via email. The responsibilities of the Lithuanian Energy Agency are to collect and systematise the information of the audits, annually perform a quality assessment to 5 to 20% of the submitted audit report and provide consulting services to the companies subject to mandatory audits. At least once a year, the Energy Agency provides the Ministry of Energy with information about the Audits carried in non-SMEs and by the end of the year informs the companies of their responsibility to perform an energy audit in the following year by cross checking the non-SME requisites with the tax authority. Penalties of up to 0.5% of the total annual income are foreseen in the case of companies falling to comply with the mandatory obligation to perform the regular energy audit.

Although not having been possible to get a reply to our survey from the **Luxembourg** experts, it was possible to apprehend that Article 8 of the EED has been transposed by a legal diploma of the 5th July 2016 and the first mandatory energy audits for non-SMEs had to be realised by 10th December 2016. The Economy Ministry is currently developing a procedure to control the mandatory energy audits. It was also possible to realise that the Luxembourgish legislation regarding energy audits does not require non-SMEs to notify the Ministry of the Economy. It may occur that the Ministry may ask for a copy of the energy audit for quality control purposes.

In **Malta** the energy audit reports are sent by electronic post or hand delivered to the Energy and Water Agency. The Agency collects and stores the Energy Audits. The collection of other relevant information is also being studied. Being a small market (around 50 non-SMEs), the Maltese government tries to contact directly the majority of companies, especially the most energy-intensive ones.

Local authorities, in the **Netherlands**, are the ones responsible for receiving, collecting and archiving the results of all energy audits from non-SMEs within four weeks of completion, which then report the general results to the Netherlands Enterprise Agency (RvO)[25]. As the collection of audits is the responsibility of the local authorities, also the monitoring of the quality of audits and the issuing of potential penalties fall into their responsibility. The local authorities assess the quality of each audit report which must include all the energy flows in the organisation and a description of cost effective energy efficiency measures to be implemented over the next four years. The Enterprise Agency has developed an audits guidance document[26] and also reporting templates[27] and a checklist[28] for companies to use if they wish when performing their energy audit.

Before the entering in force of the EED, **Portugal** had already in place a mandatory energy audit scheme for energy intensive companies, the SGCIE[29], which is continuing at the same time with the new mandatory regime for non-SMEs. Companies not entering the SGCIE or the Regulation for Energy Management in the Transport Sector (RGCE-ST) shall register all their installations in the Directorate for Energy (DGEG) website[30] and upload the periodical energy audits and the foreseen energy savings of the identified measures. Every year, companies are asked to upload their energy consumptions in the same platform. Penalties are foreseen for the non-realisation of the audits. Despite the fact that energy audits are conducted by external independent experts qualified by the DGEG, there isn't a template or explicit guidelines on the content of an audit which would allow administration to seek and collect the relevant data for statistical analysis required. The Portuguese experts have mentioned a slight delay in the implementation of the system to collect the data from companies not entering the SGCIE, so the monitoring and verification phases are not implemented yet. With already existing different mandatory regulations for Industry, Transport and Buildings with their own web platforms a connection between these platforms and the general non-SMEs one is foreseen.

Romania has had a long tradition in mandatory energy audits programmes already before the EED. Every company with an energy consumption over 1000 toe had to do a yearly energy assessment, have a certified energy manager and answer an energy analysis questionnaire. This means that for the most part, the requirements to control the outcomes of energy audits have been already in place for the most part of the EED's requirements, with only minor adjustments needing to be made due to the change from an energy consumption criterion to a size/economic one. The process to collect, store and assess the information and data related to these mandatory energy audits is described in the energy efficiency law, which states that Energy auditors are to send, on a yearly basis, to the Romanian Energy Regulatory Authority (ANRE)[31], the annual report regarding energy audits elaborated in the previous year. The report consists in a predefined

[25] https://www.rvo.nl/
[26] https://www.rvo.nl/sites/default/files/2016/02/Rapportage%20EED%20-%20adviesdocument%2025%20oktober%202016.pdf
[27] https://www.rvo.nl/sites/default/files/2016/01/Rapportage-format%20EED%20januari%202016.pdf
[28] https://www.rvo.nl/sites/default/files/2016/01/Checklist%20EED%20rapportage%20januari2016.pdf
[29] http://sgcie.publico.adene.pt/
[30] http://www.dgeg.gov.pt/
[31] http://www.anre.ro/

template including information such as the beneficiary of the energy audit, the activity sector of beneficiary, the energy audit scope, energy efficiency measures recommended, estimated savings per measure and an estimated cost of implementation per each measure. This report is to be sent both on an electronic and printed format.

Slovakia has set basic rules regarding mandatory energy audits in its Energy Efficiency Act. Energy Auditors belonging to the Slovak list of Auditors have to report the number of energy audits performed in the previous year[32]. Along with the reporting requirement for auditors, also large companies have to report the audits performed in a given year with the type of information to be reported being set by legislation. All companies have to submit a summary report. Selected companies may be requested to deliver the full written audit report. Companies failing to deliver the audit report to the Energy Efficiency Monitoring System managed by the Slovak Innovation and Energy Agency may incur into a fine that may go from €5000 to €30000.

The **Slovenian** experts have declared that in Slovenia, the system for the collection of the mandatory energy audits information is still in development and not fully operational.

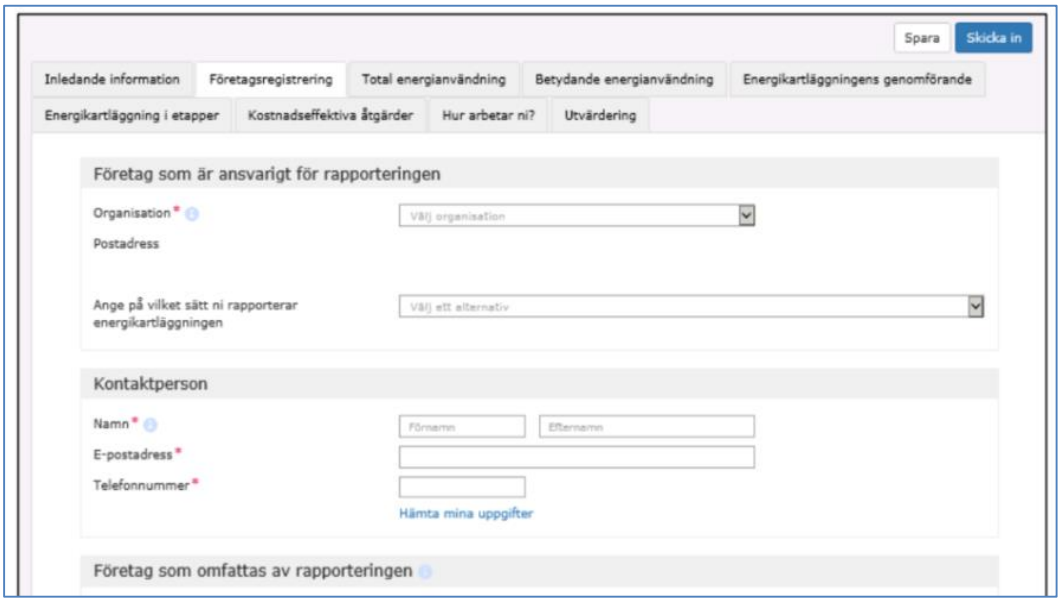
As for the Netherlands, also in **Spain**, the regional authorities are the ones responsible for the collection of the information regarding mandatory energy audits. Each region then sends the information collected to the Spanish Energy Ministry which has a central register in the form of a database. This "Administrative Registry for Energy Audits" is hosted by the Ministry along with all the electronic procedures available for citizens and companies, from SME policies or vehicles homologation to tax payments. All these electronic procedures are managed by the competent secretariats of state gathered in a common central electronic system.

Figure 13 – Spanish e-Ministry Website dedicated to the Administrative Registration of Energy Audits

In **Sweden**, there is mandatory reporting web tool structured in a tabbed format (Figure 14), where companies need to upload, in a structured manner the summarised information of the audits, named energy survey. The full audit report should be maintained by the company for seven years from the end of the calendar year to which the data relate. The energy audit report should be made according to an audit standard like the ISO 50002 or EN 16247-1, for example. The Swedish Energy Agency, which collects the audit information, provides an example of an energy survey report and energy audit report. In the case of need, the Energy Agency will contact the company if additional information is needed.

[32] http://www.siea.sk/clanky-legislativa/c-861/zakon-c-476-2008-z-z-energeticky-audit/

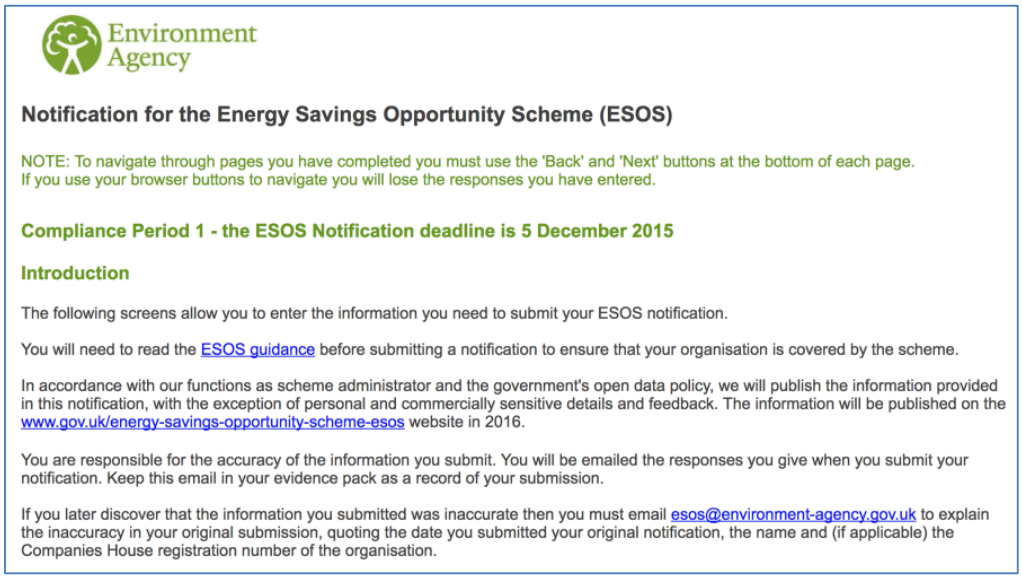
Figure 14- Swedish Energy Agency dedicated web tool for uploading Energy Audits information



An electronic copy of the submitted energy survey reports is kept in the web tool. When all the reports regarding a single company are complete, the Energy Agency initiates its supervisory work and will contact the companies covered by the law which but have not completed an account.

The **United Kingdom**'s Government has developed the Energy Saving Opportunity Scheme (ESOS)[33] in which the mandatory energy audits fall. ESOS participants must complete an ESOS Assessment in each compliance phase, by the compliance date. An ESOS Assessment includes three main requirements: Firstly, participants must measure all their energy use for a continuous twelve-month period. Secondly, the participant must undertake audits covering all their main areas of energy consumption. Thirdly, the participant must report their compliance to the Environment Agency, as the scheme administrator, by the compliance date. Participants must also maintain an ESOS Evidence Pack providing a full record of ESOS compliance. Participants that have in place an energy management system (certified to ISO 50001 standard) are considered to have complied with the audit requirement for all areas of energy use which it covers. Participants are required to notify[34] the Environment Agency of their compliance at the end of each compliance period.

Figure 15 – UK ESOS notification portal.



[33] https://www.gov.uk/guidance/energy-savings-opportunity-scheme-esos
[34] https://en0044a.snapsurveys.com/s.asp?k=143567006556&vno=v1_2

2.2 Information Collection

In order to provide an overview of the situation in the EU-28, the following sections of the report summarise the replies from the experts in Energy Audits in terms of how the information from audits is being collected, which entities are responsible for this collection and management of the data, what type of information and what kind of barriers have the Member States found in the collection of the mandatory energy audits' data. The monitoring and verification of the audits, the follow-up of the entities with the obliged companies and what Member States are doing with the information collected is also given a consideration.

2.2.1 How information from energy audits is being collected

First of all, the Member States' experts were asked on how the information arising from mandatory energy audits is being collected by the different Member States. As was already outlined in the previous chapter, there are two main tools currently being used (Table 1). First of all, the use of web applications developed specifically for the mandatory energy audits programme it is to be noted. This type of tool allows for a homogeneous collection of data, where companies need to input different levels of information, from general information of the company, to a detailed description of measure by measure as can be seen in Table 2- What type of information is being collected by the entities? further down. The use of a web application will, in theory, facilitate the work of the Member States' authorities in the monitoring and verification activities. These verification activities should become easier due to a further systematisation in the form of indicators or statistical evaluation of the extracted information that can be made with the information collected.

The second most used tool for the collection of the audits information is the functional mailbox, where Member States receive full reports or summary reports of the energy audits. Although this solution may present itself to be an easy way to collect the information of the audits, ultimately the evaluation of the audits results may become an administrative burden highly superior in comparison with the management of the results from a web application.

The Cypriot, Hungarian and Portuguese experts have replied to having a predefined template in place to collect the data arising from audits. This template is a way for experts to have the information in a structured way just like with the web applications.

The Spanish expert has replied having other types of methodology to collect the audits results. Due to the regional authorities being the ones responsible for the collection of the audits information, each entity may define its own procedure for the collection, making the national verification work harder.

Table 1 – How information is being collected in the Member States.

	Functional Mailbox	Web Application	Predefined Template	Other
Austria		X		
Belgium		X		
Bulgaria	X			
Croatia	X			
Cyprus			X	
Czechia		X		
Denmark	X			
Estonia	X			
Finland	X	X		
France		X		
Germany		X		
Greece		X		
Hungary			X	
Ireland	X			
Italy	X	X		
Latvia				
Lithuania	X			
Malta	X			
Netherlands	X			
Portugal		X	X	
Romania				
Slovakia				
Slovenia		X		
Spain				X
Sweden		X		
United Kingdom		X		

2.2.2 Responsible entities for the collection of Energy Audits Information

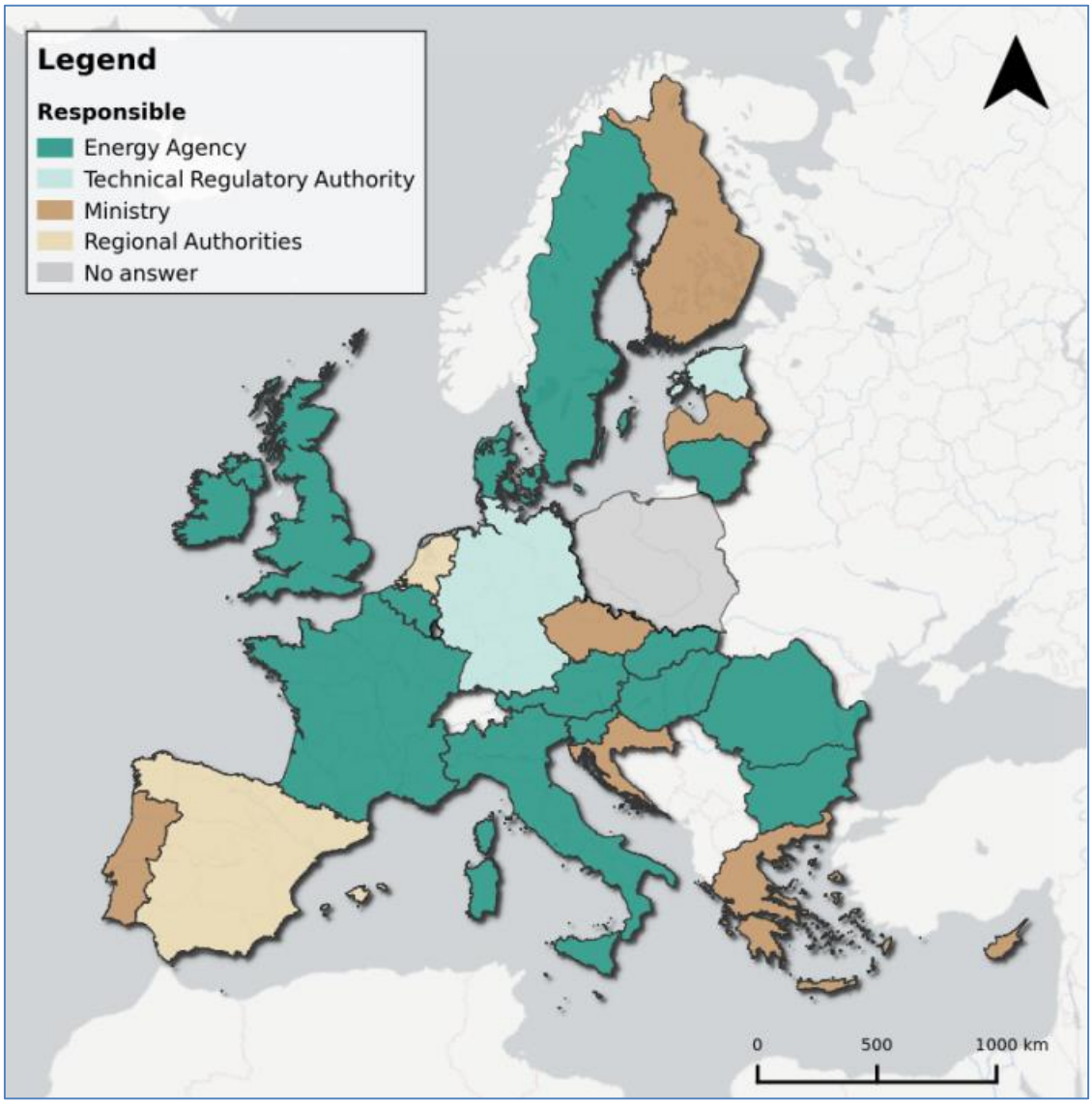
In terms of the entities responsible for the collection of Energy Audits' information, there are four types of entities responsible for the collection and management of the information arising from mandatory energy audits (Figure 16). This of course depends on the distribution of responsibilities within each Member State. The majority of Member States leave it to the Energy Agencies, usually the most operational bodies in energy efficiency administration, to collect and manage the information from Audits (AT, BE, BG, DK, FR, HU, IE, IT, LT, MT, RO, SV, SI, SE, UK).

The Ministry of Energy or equivalent is the second most representative type of entity to collect audits information within the EU-28 (HV, CY, CZ, GR, LV, PT).

Other than the previous examples, there is the Estonian case, where the Technical Regulatory Authority is responsible for the collection and management of audits results, and Germany where BAFA, The Federal Office for Economic Affairs and Export Control is responsible only for the collection of the voluntary audits which are supported by the state.

Finally, there are two Member States (Spain and the Netherlands) that leave it for the local authorities to collect and manage the information from audits operating within their administrative boundaries and then report to the central administration the agglomerated results.

Figure 16 - What type of entity is responsible for the collection of Energy Audits Information?



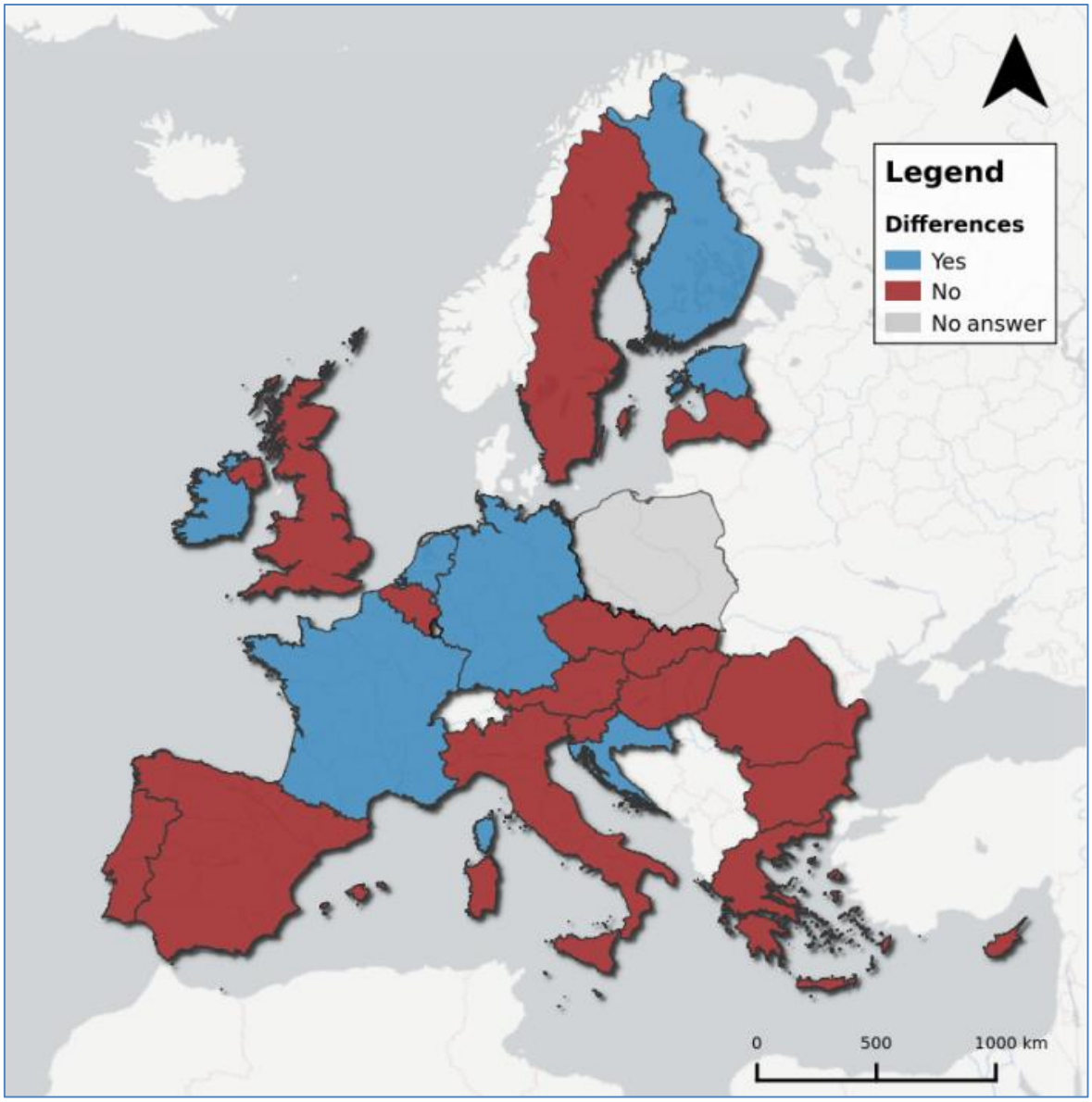
2.2.3 Voluntary and Mandatory Energy Audits data collection procedures

Before the EED has entered in force, several Member States had already in place instruments to promote Energy Audits in enterprises, with voluntary or mandatory schemes. It was found interesting to find out whether these countries would change its structures to accommodate the mandatory character of the EED's provisions. In Figure 17it can be seen whether member States have or not a different procedure in the collection of data from voluntary energy audit schemes. To be noted that in the negative answers also fall the Member States that do not have any voluntary schemes in place. Before the entering in force of the EED, Austria, Belgium, Denmark, Finland, Germany, Ireland, the Netherlands, Sweden and the UK had already voluntary programmes in place for the promotion of energy audits.

From these, Finland, Germany, Ireland and the Netherlands have in place different procedures in the collection of data from audits since that with the introduction of mandatory audits, the collection of data is being managed by different entities. In Ireland the entity (SEAI) is the same but the requirements and objectives are different between schemes. The remainder Member States that had already a voluntary scheme in place treat all audits results the same way.

Other Member States like Croatia, Malta or France do not oblige for companies to send their audits results unless specifically required in the case of the receiving of financial support, for example.

Figure 17 - Is there a difference between companies performing voluntary and mandatory energy audits in terms of data collection?



2.2.4 Type of information being collected

Table 2- What type of information is being collected by the entities? outlines the replies from the Member States when asked about what type of information from audits the authorities are collecting.

On the option on the collection of general information of the company, only Bulgaria, the Czech Republic, Ireland and the United Kingdom have replied not being collecting any information about the company itself. To be noted however, that the Czech Republic and Ireland do not oblige companies to send information on the mandatory energy audits. Ireland, at the moment, is only collecting the numbers of audits conducted by energy auditors. Consideration is being given to establish an online reporting tool that would enable a better overview of the outcomes of energy audits and potential improvements in companies without compromising sensitive corporate information.

On what type of information being collected, the UK has replied "Other", complementing this information with a reference that participants are required to notify the Environment Agency of their compliance at the end of each compliance period. The basic notification details include confirmation of compliance; information on the participant, including the name of the director(s) or equivalent who signed off the report and information on the Lead Assessor, including name and approved qualification (or approved membership of a professional register).

In Romania besides collecting information on the company audit, its general energy performance, information on individual energy savings, measure per measure more complete data on estimated costs of the recommended energy efficiency measures as a market benchmark is also being collected.

From all the replies, 15 of the Member States are collecting information on the general Energy Performance of the Company (AT, HR, CY, DK, EE, HU, IT, LT, MT, NL, PT, RO, SK, ES, SE), whereas 13 Member States are collecting detailed energy performance of the company, divided for example by type of facilities, specific uses, etc. (BE, BG, CZ, DK, EE, FI, GR, HU, IT, MT, NL, PT, SE). 12 Member States are collecting the overall potential energy savings (AT, CY, DK, GR, HU, IT, LT, MT, NL, PT, SK, ES).

More specifically, BG, FI, GR, HU, LV, LT, MT, NL, PT RO, SI collect information on individual energy savings, measure per measure, increasing the granularity of the collected data. CZ and SK have indicated to collect only general information on the type of energy saving measures, while FR and DE have replied to collect only general information of the company.

Other type of information being collected by Member States relate with the auditors regarding specific information on the professionals and their qualifications.

Table 2- What type of information is being collected by the entities?

	General Information of the company	General energy performance of the company	Detailed energy performance of the company, divided by the type of facilities, uses, etc.	Overall potential energy savings	Only general information on the type of energy saving measures	Information on individual energy savings, measure per measure	Other
Austria	X	X		X			
Belgium	X		X			X	
Bulgaria			X				
Croatia	X	X					
Cyprus	X	X		X			
Czechia			X		X		
Denmark	X	X	X	X			
Estonia	X	X	X				
Finland	X		X			X	
France	X						
Germany	X						
Greece	X		X	X		X	
Hungary	X	X	X	X		X	
Ireland							X
Italy	X	X	X	X			X
Latvia	X					X	
Lithuania	X	X		X		X	
Malta	X	X	X	X		X	
Netherlands	X	X	X	X		X	
Portugal	X	X	X	X		X	
Romania	X	X				X	X
Slovakia	X	X		X	X		
Slovenia	X					X	
Spain	X	X		X			
Sweden	X	X	X				
United Kingdom							X

2.2.5 Barriers on the collection of Energy Audits information

In terms of the barriers identified by the Members States on the collection of the information of Energy Audits, there were different types of barriers identified, which relate to the state of development of the energy audits programmes or the transposition of the EED Article 8 provisions.

Austria has pointed out that the creation of indicators and the evaluation of the information from the audit reports is needed, which does not actually happen presently. The fact that it is needed to digitalise all the information was considered as a major barrier due to the need of a great amount of resources.

The identification of all the non-SMEs and SMEs with an energy consumption over 3000 MWh per year was a barrier identified in **Bulgaria**. **Hungary** has also pointed out being hard to a hold of a complete list of the obligated companies due to having different types of sources identifying the companies that do not necessarily match. **Croatia** has identified the addressing of confidentiality and the absence of an Audit Report template to be a major barrier. Also **Lithuania** has reported to have been finding difficulties into identifying the companies which are obliged to perform energy audits as well the fact that some companies are refusing to send their audits in or some are being sent after the established deadline. **Malta** has also mentioned the difficulty to identify all the non-SMEs operating in its territory and the difficulty to compare savings as different auditors can estimate different savings for the same technology. Finally, **Sweden** has also pointed out its difficulty to identify large companies as the main barrier for the collection of information regarding energy audits.

Cyprus identified the delays and the missing information provided by companies as the main barriers in the collection of audits information, whereas the **Czech Republic** identified the amount of time being wasted by the auditor when filling in the data into the national database, due to the fact that until now, it was not possible to create a uniform import of the data.

The lack of a template and an IT structure has been noted by the **Danish** expert. This leads to the responsible entities not being able to properly assess the data from the reports due to not having enough resources to go through every piece of information in the report. Also **Portugal** has identified the lack of a harmonious template to present the audit results as a barrier. The fact that energy audits are conducted by external independent experts, and there are still no explicit guidelines on the content of an audit, dampens the central administration capacity to seek and collect the relevant data for statistical analysis. The size of the collected information needing proper treatment, which requires a very large team, was pointed out as a major barrier.

Some of the difficulties pointed out by the **Estonian** expert relate with the energy audits performed in international companies, with parent companies being in different countries. The lack of solid information in the audits' reports has also been pointed out as a barrier, due to the fact that audits' information is being delivered over a three-year period.

Both **France** and **Germany** find the Monitoring and Verification stage and difficulty to ensure the consistency of data as barriers to an effective management of the mandatory energy audits provisions.

The fact that the mandatory aspect of energy audits may be seen as only a pro forma and an administrative burden by companies and be executed only to fulfil a legal requirement to avoid penalties has been mentioned by **Latvia** as a potential barrier. With this perception of audits as a burden, companies are reluctant in making public the good practices and benefits acquired from the audits.

The **Netherlands** have identified as barriers the collection of all the right data, the controlling of the quality of the data and the storage of the energy audits as main barriers. Other barriers pointed out were the tight time limits established by the EED and the fact that the mandatory requirement to perform energy audits is based on an economic/size criterion instead of an energy consumption one.

Slovakia has found having problems with collecting information of foreign companies having parts in Slovakia, as well as information on energy audits performed in Slovakia by foreign energy auditors.

The main barriers pointed out in the collection of energy audits data in **Spain** are due to its governmental administration which has 19 regions, each of which is responsible for the information collection of the audits realised at the companies headquartered in its territory. Each region decides the concrete channel for collecting the information, being a web form or by paper. Therefore, companies located in different regions are due to adapt the presentation of the audits results according to the requirements of each competent administration.

The **United Kingdom** has identified its main barriers into a three-fold. Firstly, the low priority given by companies towards energy efficiency and the Energy Savings Opportunity Scheme, leading some companies to start compliance activities little time before the deadlines, often linked to an underestimation of the time required (especially for those unfamiliar with recording energy data). Secondly, Internal complexity factors were identified as some organisations were slow to start their compliance activity whilst they decided internally how to apply flexibility in the scheme to their organisational structure – such as the level of aggregation at which to submit notification. This was mentioned to be particularly the case for large-scale, multi-national organisations with complex parent and legal entity structures and also those near qualification thresholds. Thirdly there were identified External factors, which to a lesser extent affected the timing of compliance activity. Assessors were often described as driving the compliance timetable on behalf of organisations (setting site visit schedules and reporting deadlines).

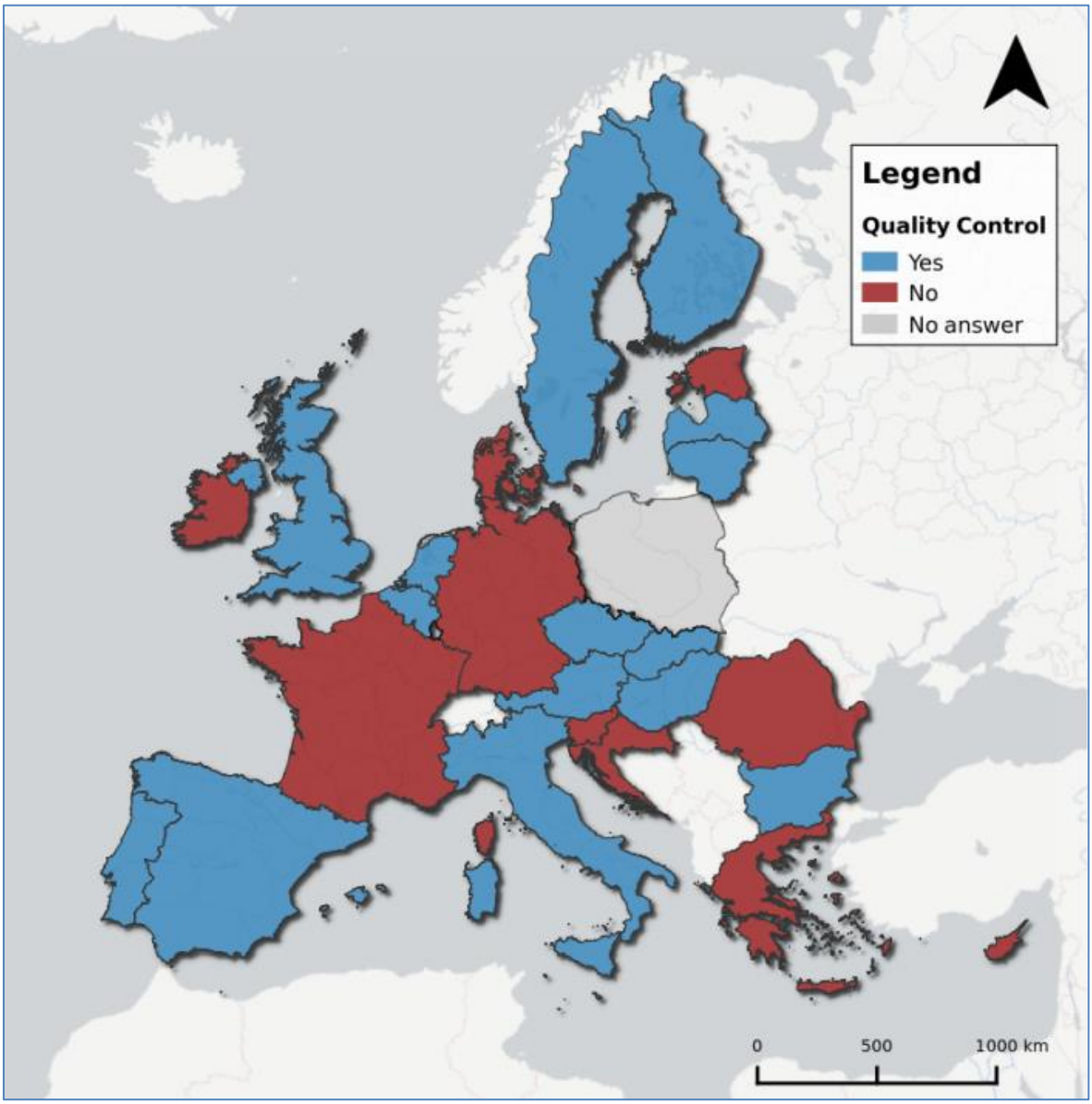
2.3 Member States practices on the monitoring and verification of Energy Audits information

Besides the collection of information arising from the mandatory energy audits, the four-year gap between audits, advises for Member States to perform monitoring and verification activities to follow-up on the findings of the audits, making sure that the measures are being implemented, if it is of their interest, since there is no mandatory requirement to do so. This chapter gives insight on the procedures being implemented in terms of quality control of the data, communication activities between the responsible authorities and companies and how the audits data is being used by these authorities in the meantime between mandatory audits.

2.3.1 Quality control on the data gathered from Energy Audits

When asked whether the Member States had any quality control on the mandatory audits being performed, the majority of the counties that have replied to the survey had a positive response. The type of quality checks and the granularity of these checks vary from country to country. While some member states evaluate all the energy audits reports, others only perform random checks, choosing to go deeper in the analysis in the case of finding incongruences or missing information. More specifically, **Austria** performs plausibility checks as well as spot checks to identify those energy audits that aren't in line with the national legislation. **Belgium Flanders** performs a random check of the content of the audit, while the **Bulgarian** authority checks the documentation presented by companies and verifies the methodology used for the calculation of the energy savings and CO_2 emissions. The **Czech Republic** authority has referred to be performing a data control and quality checks on the audits performed by the auditors.

Figure 18 – Is there a quality control on the data?



In the case of **Finland**, the Finnish Energy Authority is responsible for checking that mandatory audits are completed in accordance with the Energy Efficiency Act. The Authority proceeds to inspect a sample of audits each year to assess its quality. When the Energy Authority requests it, a non-SME must submit the audit report within one month of this request. In the case of not performing the energy audit or making it improperly, the company is subject to a notice from the authority which may lead to receiving a fine.

Hungary performs a control on basic data and the compliance of the audits according with basic quality requirements. The **Italian** authorities execute a control based on the consistency of the data presented by the companies.

Latvia has declared to have a two-step quality control for its mandatory audits in place, considering that the internal quality assurance is being guaranteed due to the audit being performed by legally accredited auditors which should guarantee a minimum quality on the outcome. The second step in terms of monitoring and verification is being carried out by the Ministry of Economics by checking the submitted audit report and annual energy savings reports. When compiling the annual energy saving reports, companies should present documentation supporting the energy saving claims, like heating and electricity bills, project implementation reports, contracts, etc.

As mentioned before, **Lithuania's** State Enterprise Energy agency is performing a sampling quality control with a quality check being made in 5 to 20 percent of the whole energy audits being realised in a given year.

In **Malta** the Energy Audit reports are being verified by a third party independent quality control system, performing this job for the authority itself.

As responsible for the management of the mandatory energy audits requirements in the Netherlands, it falls upon the local authorities to decide what type of quality control is to be carried out, which can vary from one local authority to the other. At the moment there is no quality control of data at a national level. Also in Spain, the control is being made by the regional authorities, with the template to present the audits results having some mandatory fields, but it is the regional authority that may set additional controls.

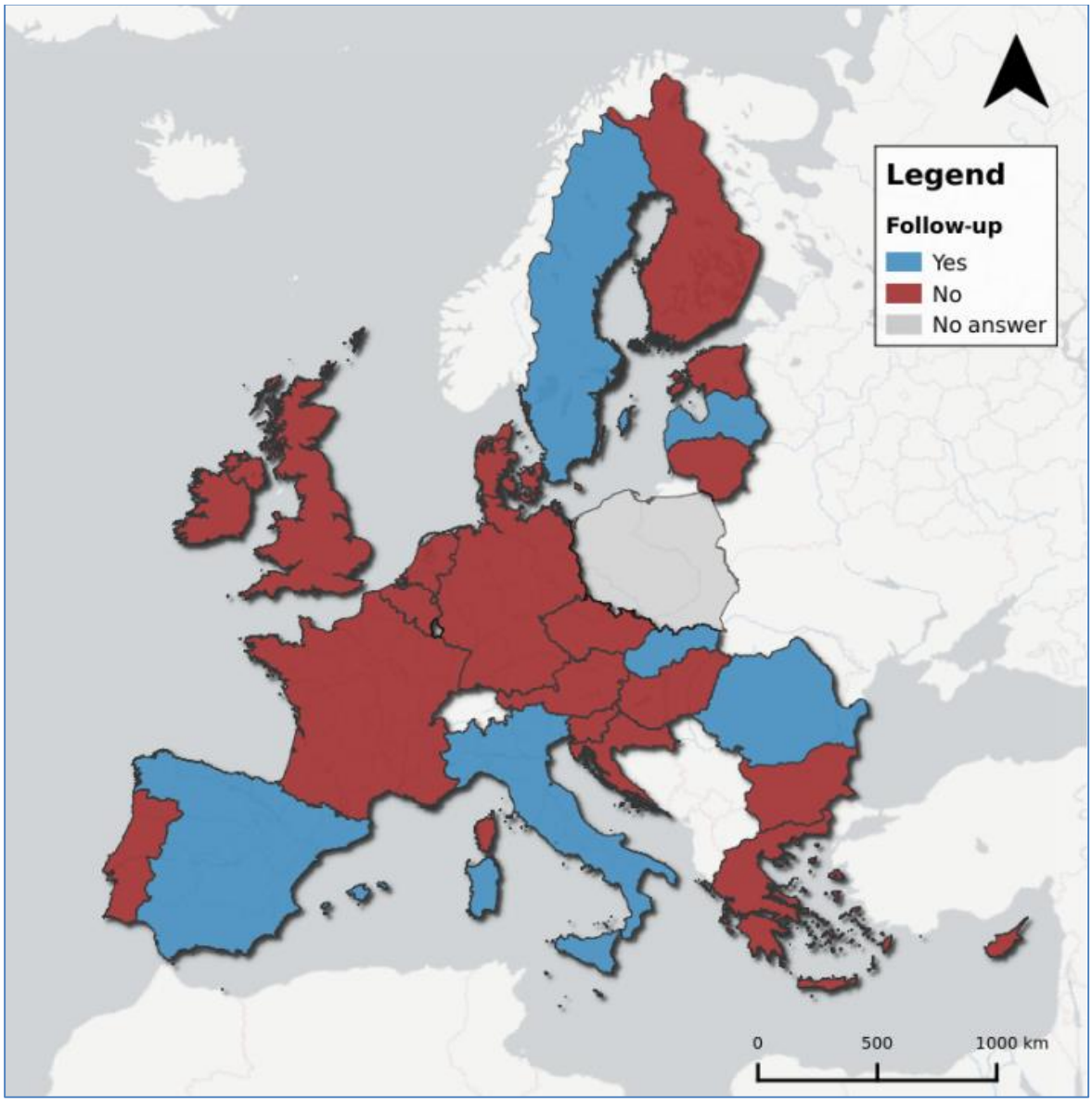
Romania has declared to having no quality control on its mandatory audits in place at the moment, however, starting from 2017 the energy audit must be accompanied by a form of assessment of the quality of the audit. This for includes indicators like the compliance of the minimum criteria for the elaboration of the audit, the relevance of the recommended energy efficiency measures or the achievement of a minimum energy efficiency calculation or the proportionality of the cost related to the type of audit elaborated. No indication was given in terms of what is being done with this information.

In **Slovakia**, the Slovakian Innovation and Energy Agency has the right to check the full energy audit, in case of doubt in the figures presented.

In **Sweden**, checks of all the reported data are being performed. A more detailed spot check of the actual audit report is made on selected companies. The same occurs in the United Kingdom and Portugal which have spot checks being performed by the competent authorities.

2.3.2 Follow-up directed to companies

Replying to the question whether if any kind of follow-up was being directed to non-SMEs in the time between mandatory audits, from the 26 replies, 19 of these were negative. As seen in Figure 19, Italy, Latvia, Malta, Romania, Slovakia, Spain and Sweden are the only Member States to have declared to perform verification actions on the companies' implementation of recommended measures outlined in the energy audits, while the remaining countries have declared that companies do not have the requirement to implement any of the measures.



More specifically, the Italian expert has referred that the Italian Energy Agency (ENEA) has produced guidelines specifying the kind of follow-up to be undergone. Each company has the responsibility to communicate, through its dedicated audits portal, in a yearly basis, the achieved energy savings. The same occurs in Latvia, with large companies being obliged to report every year for a three-year period, an update on the measures implemented as a result of an energy audit or energy management system.

In Malta, although companies are not obliged to act on the recommendations proposed in the audits a different type of verification tool has been implemented. A voluntary agreement scheme is being set up to encourage companies to implement the findings of the audit. Companies entering such scheme may benefit from funds from the European Regional Development Fund.

In Romania, non-SMEs report yearly, to the Romanian Energy Agency the Programme of Energy Efficiency measures. This programme is based on energy efficiency measures outlined by the energy auditors and is updated on a yearly basis. This is a way to monitor the progress in the implementation of energy efficiency measures resulting from the mandatory energy audits.

Slovakia has also replied to have in place a follow-up procedure after the realisation of mandatory energy audits. This should occur every four years and evaluate the implemented measures, in the period when the next mandatory audits will be performed.

2.3.3 How is the audits information being used?

Table 3 summarises the results on the question on "How the information collected through energy audits is being used?". The majority of Member States have replied to being using this information to track the overall energy performance of companies (**BG**, **CY, CZ, DK, EE, GR, HU, IT, LV, NL, PT, RO, SK, SE**). Only **Greece, Italy, Lithuania** and the **Netherlands** are using such information as a benchmark for energy performance of companies.

Denmark, Estonia and Italy are also using this information as a way to compare companies by sector, while **Estonia, Italy, Latvia, Romania and Sweden** are using the information as a way to compare different sectors.

Several Member States have indicated to having the objective to use this information in "Other" ways. **Austria** and **Spain** have indicated to be using the information merely to check the fulfilment of legal requirements for non-SMEs, thus complying with the EED's requirements, whereas **Belgium** is using the information collected for policy preparation. Also the UK has indicated that the information being provided to the Environment Agency is being used to track the number of participating organisations carrying out energy efficiency audits, but also to assess the quality of audits and identify common areas for improvement.

Finland, with its voluntary energy audit scheme in place since 1994, has been collecting and using the information arising from audits for communication purposes, targeted both to companies and municipalities but also to consulting companies which are marketing and performing energy audits. Although being different schemes and entities managing the collection of the data, due to having already this system in place, it hasn't been seen appropriate to separately communicate about the mandatory energy audits.

Although not at the moment, **France** is planning in the medium-term to use the collected data for performance benchmarking and comparisons between companies and economic sectors.

Malta is considering using the information from energy audits to assess the available energy savings in Industry and help the Agency project energy consumption. This data would then be used as an input to the National Energy and Climate Action Plan.

Romania is using audits data for the dissemination of energy efficiency measures as a way to show best practices for communication purposes within workshops, conferences, meetings or reports published on the Energy Agency website. The estimation of energy savings by sector is another use for the audits information in Romania.

Germany, Croatia, Slovenia have indicated that are not using the information collected at the moment. Ireland is giving a consideration on how best to build on the potential of the information of the mandatory audits.

Table 3 - How is the information of Audits being used?

	To track the overall energy performance of the companies	As a benchmark for energy performance of companies	As a way to compare companies by sector	As a way to compare different sectors	Other
Austria					X
Belgium					X
Bulgaria	X				
Croatia					X
Cyprus	X				
Czech Republic	X				
Denmark	X		X		
Estonia	X		X	X	
Finland					X
France					X
Germany					X
Greece	X	X			
Hungary	X				
Ireland					X
Italy	X	X	X	X	
Latvia	X			X	
Lithuania		X			
Malta					X
Netherlands	X	X			
Portugal	X				
Romania	X			X	
Slovakia	X				
Slovenia					X
Spain					X
Sweden	X			X	X
United Kingdom					X

2.3.4 Barriers on the monitoring and verification phases

As for the collection of the energy audits information, the Member States experts also expressed their views on the barriers encountered for the monitoring and verification phase of the mandatory Energy Audits programmes. The administrative capacity needed to proceed a proper monitoring of the audits realised has been identified by several Member States, namely in Croatia, Czech Republic, Denmark and Lithuania.

Several Member States experts have identified the delay or the ongoing development of tools to evaluate the quality of energy audits. The **Cypriot** expert has declared that the procedure for the quality control of energy audits is under development. **Slovenia, Estonia, Portugal, Latvia** has mentioned that an electronic model for the monitoring is still missing, meaning that large companies need to send all the information that needs to be inserted into a spreadsheet by the ministerial staff, which is consuming resources in a large scale.

Although the monitoring and verification system is already established by law, **Hungary** has only now started the audit control process and so far there is no experience with the monitoring of the audits realised.

France has identified the difficulty or impossibility to check some of the collected data, like energy consumption or companies' energy savings.

3 Energy Audits data collection, treatment, monitoring and verification – an analysis

Two years after the time limit of the first mandatory energy audits to be executed under the Energy Efficiency Directive, it is possible now to assess how Member States are proceeding in the collection of the data arising from such audits, what kind of use is being done and how Member States are monitoring the progress of companies after the realisation of the first audits.

Although it has been found hard to find consistent information on the procedures in place regarding the data collection and treatment of audits in the EU there are some conclusions to be withdrawn from the analysis performed by the consultation of energy efficiency experts and energy audits policies throughout the EU-28.

As to be expected, different Member States have taken different approaches on the methodologies to collect, treat and use this data. While Member States with long-standing energy audits programmes have had to minimally adapt their structures and procedures, others were obliged to draft completely new procedures which may have led to a delay on the collection and evaluation systems. Member States like Bulgaria, Czech Republic, Portugal and Romania, which had already mandatory Energy Audits programmes and Austria, France or Ireland who had voluntary programmes have adapted their procedures in the collection of data within the same institutions.

One of the conclusions to be noticed was that the energy audits data procedures are still in an early stage, with some Member States receiving the first batch of mandatory audits only in 2017, while others have received the audits information back in 2015 and are keeping the data without much being done at the moment. Several Member states are still adapting their structures to face the incoming of the audit reports and face a lack of resources to deal with them.

Overall the majority of Member States oblige companies to inform the responsible authorities on the audits results, with only six countries not having this mandatory requirement. A functional mailbox and specific web applications were the main tools chosen by the majority of countries to collect information arising from audits. There are cases where these two tools are combined, with Member States collecting both specific data and the whole audit report. Energy agencies, as the most operational bodies working with energy efficiency are usually the authority responsible for the collection of the audits information, with the Ministry of Energy coming in second as the responsible entity.

On the type of information being collected, 15 of the Member States are collecting information on the general energy performance of the company and 13 Member States collecting detailed energy performance of the company divided by facilities and uses. The survey has also found that 11 of the Member States are collecting specific information on individual energy savings, measure per measure, thus increasing the data granularity.

One of the problems found in the redaction of this report were that since Member States are not obliged to perform any assessment on the audits realised and the data collected, it was possible to realise that in some cases, both companies and responsible authorities see the mandatory character of energy audits only to fulfil a legal obligation. Since it is not mandatory for Member States to report on what is being done with the data being collected via audits, some Member States are sitting on the data collected and no major follow-up is occurring in the majority of Member States.

Some of the barriers found by Member States' authorities regarding the collection of data relate with the identification of non-SMEs that are obliged to perform energy audits. Issues in terms of timing to receive all the audits and the time spent by auditors filling out the data requirements by authorities were also pointed out. The lack of templates and guidelines were indicated by some Member States representatives as hurdles for the collection and evaluation of the data presented.

The low priority that companies give to the mandatory energy audits compliance, with the realisation of audits seen only as a way to comply with the legal requirements has been found an important obstacle in Member States, as long with the difficulty to guarantee quality data from these audits.

Although there are minimum quality requirements outlined by ANNEX XI of the EED and some Member States give ISO 50002 or EN 16427 as guidance requirements for the audits to be realised, there is still openness left for the auditors and the professionals implementing the energy/environmental management systems in terms of reporting of the results of the audits. This may lead to inconsistency in terms of results, making it hard for the authorities to evaluate in a systematic way the results from all the non-SMEs.

Other issue pointed out by Member States experts relate to confidentiality. While traditionally energy audits' information stays only with the company, the fact that companies may be obliged to provide sensible information and companies may be adverse to share, is an issue to be taken into consideration.

It has been found that several Member States apply or intend to apply penalties to companies not sending their energy audit information. Although being a way of negative reinforcement, this may lead to higher compliance in terms of delivery of proper audit information.

Regarding the monitoring and verification phases that occur in the space time between mandatory energy audits, different Member States have taken different approaches on controlling the quality of the data gathered from these audits.

The majority of Member States perform a quality control of the data. There are cases of countries that evaluate the entirety of the audit report while others only perform random checks and sharpen their analysis in case of evident incongruences. There are several cases of Member States that are leaving the quality assurance to the requirements *a priori* (by the use of ISO/EN standard guidelines), trusting the quality of audits performed by accredited auditors or relying on third party independent control systems. Others are relying on the local entities responsible for collecting the audits data.

In terms of actual follow-up being made by authorities towards non-SMEs, there are only few Member States accompanying companies in the time between mandatory audits with only 7 of the respondents having a follow-up procedure, being through annual reporting or through the implementation of voluntary schemes encouraging companies to implement the energy efficient measures identified in the energy audits.

On the topic of how authorities are using the information collected in the mandatory audits, the majority is using this data to track the overall energy performance of companies, with few using this information as a benchmark or to compare companies by sectors or between sectors. Ultimately the use that is being given to the information provided by companies is used to control the legal compliance of companies, with little action occurring after this.

In terms of positive aspects found in the Member States evaluation, the use of predefined web templates for companies or auditors to upload the information from their audits is a best practice that would be interesting to be followed by all Member States for the sake of turning the workload associated to the analysis of the results more streamlined. Even if, at first, the time to develop such a tool may be significant, the automatisations that are possible after, may reduce the time to evaluate the energy audit results and the workforce needed for these evaluations.

In another way to make sure that the data being delivered is of quality, some Member States are recommending companies to comply with ISO 50001 or EN 16247 reporting guidelines, which leaves some assurance that the information arising from audits is of quality content.

An interesting best practice found in several Member States procedures is the creation of guideline templates which serve as a follow-through for auditors to compile the audits information. Even if only through guidelines and not by obliging companies to follow a certain format, the fact that these guidelines exist is already positive so that authorities might have an easier task to evaluate the information from all the non-SMEs audits.

It has been found that in some Member States, a cross-check between the information available for the energy authorities and tax authorities has been found effective in the identification and compliance assurance for companies having to perform energy audits.

The lack of resources to evaluate all the energy audits realised has been pointed out by authorities as one of the main hurdles in the whole mandatory energy audits provisions. Several Member States have found a way to overcome this difficulty by thoroughly checking only a small percentage of all completed audits in a random way or if incongruences are found in the reported data.

In the case of Member States with a small market, it has been found useful to contact directly the company (e.g. Malta), especially the most energy-intensive ones, where a greater difference in energy savings may be made. Although not always feasible (in big markets or with international companies), a direct communication channel between the authorities and companies may present itself as a practice with a potentially good level of success. Another interesting find in the Maltese audit scheme was the implementation of voluntary agreements to encourage companies to implement the findings of the audits.

Besides the collection of traditional energy audit information, there are Member States (e.g. Romania) that are choosing to take it a step beyond and collect information on specific measures with estimated costs for every

measure also being collected. This type of information can serve as a market benchmark and be used for demonstration purposed for other interested companies. Another found best practice being used by Romania is a yearly report for companies to send to the authorities on how the energy efficiency measures outlined in the audits are being implemented.

Overall, for the most part, the EU Member States have already in place systems to collect, store and manage the information arising from the mandatory energy audits programmes surging from the EED's provisions on non-SMEs. Being by gathering full audit reports or only some indicators, the data is being collected in its most part by the responsible authorities. The transposition of the EED's article 8 provisions can be considered to being, in its bigger part, complete. From the sent survey results, some issues arise regarding on what to be done when the collection of the data is completed. The authorities still need to adapt their structures to face the great amount of information and to realise what to do with the data in their possession. Although several countries are assuring that the energy audits contain high quality information through the implementation of standards and template guidelines, for the most part it is very much time consuming and ineffective for countries to evaluate all the energy audits reports, so a sample check may be seen as a good compromise at a first stage. The monitoring and verification stages phase are clearly where the majority of Member States still need to figure out on what to do with this great amount of valuable information in the mean time between mandatory audits cycles.

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