European Commission

A Study on Energy Efficiency in Enterprises: Energy Audits and Energy Management Systems

Report on the qualification of energy auditors in all Member States

Energy

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1. Introduction

Background

Europe 2020 is the EU's growth strategy that aims to ensure a smart, sustainable and inclusive economy, driven by five interrelated headline targets. These targets address education, employment, poverty and social exclusion, research and development as well as climate change and energy. With regard to the latter, specific targets include achieving 20% of energy supply from renewable sources, a reduction of greenhouse gas emissions of at least 20% as compared to 1990 levels, and an increase of energy efficiency by 20% as compared to a baseline projection. To support the achievement of the latter target on energy efficiency, the Energy Efficiency Directive (EED) came into force on 5 December 2012 and had to be transposed into Member State legislation by 5 June 2014. The Directive is designed to remove barriers and failures in the energy market while establishing a set of binding measures.

The EED gives energy audits and energy management schemes a substantial role to play in improving energy efficiency in the end-use sectors, as can be read in its Article 8. The EED requires Member States (MS) to promote and ensure the use of high quality, cost-effective energy audits and energy management systems to all final customers. This concerns large as well as small and medium enterprises (SMEs).

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 programs 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 programs to raise awareness among households about the benefits of such audits through appropriate advice services.

   Member States shall encourage training programs 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.

   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.

Aim

Under Article 8(1) of the EED, MS must 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[1].

This study aims to support the European Commission by providing an overview of current implementation practices, tool and instruments related to Article 8 of the EED within the different MS. This report, specifically, addresses the establishment of national legislation requirements for energy auditors, and for supervision by national authorities, across the MS. This includes an identification of approaches used by MS to put in place accreditation schemes for energy auditors, to make sure that a sufficient number of reliable professionals are available. Best practices are also presented, especially with respect to opportunities for harmonisation of qualification requirements across borders.

For this purpose, the following research questions were used to identify structure and analyse the information available for each MS:

- **Energy auditor accreditation schemes:** Have MS put in place certification schemes for the providers of energy audits to help identify appropriately qualified auditors?
    - Are a sufficient number of reliable professionals competent in the field of energy efficiency in buildings, industry and transport sectors available to ensure the effective and timely implementation of and compliance with the requirements?
    - How have MS assessed the national level of technical competence, objectivity and reliability?

[1]Guidance note on Directive 2012/27/EU on energy efficiency, amending Directives2009/125/EC and 2010/30/EC, and repealing Directives 2004/8/EC and 2006/32/EC: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013SC0447&from=EN

  - Have MS provided assurance by 31 December 2014[2] that sufficient certification and/or accreditation schemes and/or equivalent qualification schemes, including where necessary, suitable training programmes are in place?
  - Are consumer groups, including environmental and energy auditors, aware of the availability of these schemes and programmes?
  - What are the fees for an energy auditor applicant to be accredited, if any?
- **Energy auditor tools and training:** Do MS actively encourage training programmes for the qualification of energy auditors?
  - Have qualified experts in the certification of buildings under the Energy Performance of Buildings Directive (EPBD) been targeted for training to become qualified energy auditors under EED?
  - How have the MS ensured that information available on energy efficiency mechanisms and financial and legal frameworks is widely disseminated to all relevant market actors, including environmental and energy auditors?
  - Is training mandatory and specific by sector?
  - Are there standardised manuals or guidebooks that provide support to energy auditors when conducting energy audits?
- **Energy auditors' register:** Is there a publicly available list of qualified/accredited energy auditors as required by Article 16(3)?
  - Who is in charge of maintaining the register?

- **Mutual recognition:** Is there cooperation among the providers of these schemes and programmes in a MS, and with the Commission, such that comparisons can be made within and across MS?
  - Has this type of "mutual recognition of schemes" across MS borders led to a more open European market for energy auditors?
  - Are there any specific conditions or requirements for energy auditors coming from abroad (both from other MS and outside of the EU)?

Methodology

The data sources that were used to address the core objectives of this task include:

- Information documented through the literature review;

  The first element was a structured review of existing documents and literature pertaining to the establishment of accreditation schemes for the providers of energy audits. Within this step, an identification and review of relevant literature, databases and other material (e.g. NEEAPs, EED implementation reports) was carried out. This serves as a means to provide a preliminary description of current practice in MS with regard to activities concerning the implementation of accreditation schemes and training programmes for energy auditors.
- Information gathered through qualitative interviews;

[2]As required by Article 16, EED.

The literature review was complemented by information gathered through interviews with experts on a per MS basis. This interview study aimed to fill information gaps that could not be closed by the literature review, either due to a lack of relevant literature or because it was simply outdated. Furthermore, the interviews served to verify preliminary findings. Interview partners were chosen based on data gaps and do not represent an even or representative split over MS. The interview partners were either familiar with the implementation of Article 8 or with the improvement of energy efficiency in general, or with SME organisations. They originated from different institutions such as national public bodies, the large enterprises impacted by Article 8, and consulting or research institutions. All interviews were based on a semi-structured interview guideline. A total of 30 interviews were carried for this study.

- Input obtained through stakeholder network engagement workshop;

  During the European Sustainable Energy Week 2015, our team organised a workshop with an exclusive focus on Article 8 implementation. Several panellists offered their perspectives on Article 8's "state of play", and discussed their "keys to success", as well as engaged in practical discussions to help MS overcome challenges experienced in carrying out specific implementation activities, including the design of accreditation schemes for energy auditors.
- Information gathered through the quantitative survey.

  In parallel with the literature review and the qualitative interviews, an online survey was conducted to improve both the volume and breadth of perspectives we could address in the various study tasks. A total of 118 responses were received with a mix of EED/Article 8 policy implementers, national energy efficiency scheme administrators, and various types of energy service providers and market participants (e.g. large enterprises, trade associations, energy auditors). Topics that were covered in the survey were high-level, containing mostly close-ended questions that were tailored to the type of individual responding.

Terms and definitions

As a prerequisite to the analysis, a set of terms and definitions needs to be established.

Energy audit

- **Energy audit:** an energy audit is a systematic procedure with the purpose of obtaining adequate knowledge of the energy consumption profile of a building or group of buildings, an industrial or commercial operation or installation, or a private or public service, identifying and quantifying cost-effective energy saving opportunities, and reporting the findings
- **Activities covered:** Annex VI (b) of the EED states that energy audits must comprise a detailed review of the energy consumption profile of buildings or groups of buildings, industrial operations or installations, including transportation.

External vs in-house experts

- **In-house experts:** The audits may be carried out by in-house experts or energy auditors, provided that the MS has put in place a scheme to assure and check their quality. The condition for in-house experts or energy auditors to carry out energy audits is that the MS 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. Where energy audits are carried out by in-house experts, the necessary independence would require these experts not to be directly engaged in the activity audited.[3]

Outline of the study

Section 2 provides a summary of the level of implementation of accreditation schemes per MS. In section 3 of this report, a review of the qualifications of energy auditors in each MS is presented. The data provided covers all the research questions mentioned above. Based on the results of the review of instruments and tools, section 4 provides a set of recommendations for best practices with regard to the implementation of accreditation schemes and training programmes for energy auditors. Finally, an overarching conclusion on the research questions is given in section 5.

[3]Guidance note on Directive 2012/27/EU on energy efficiency, amending Directives2009/125/EC and 2010/30/EC, and repealing Directives 2004/8/EC and 2006/32/EC: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013SC0447&from=EN

2. Status summary

Table 1 below presents a summary of the status of Article 8 implementation in all MS at the time of the research, August 2015.

Table 1: Status of Article 8 implementation in all MS

	AT	BE (Flanders)	BE (Walloon)	BE (Brussels)	BG	HR	CY	CZ	DK	EE	FI	FR	DE	GR	HU
Art 8 transposed	✓	✓	✗	✗	✓	✓	✗	✓	✓	✗	✓	✓	✓	✗	✓
Accreditation scheme	✓	✗	✓	✓	✓	–	✓	✓	✓	✓	✓	✓	✗	✓	✓
Mandatory training (might include an exam)	✓	✗	✓	✓	✗	–	✓	✓	✗	✗	✓	✓	✗	✗	✗
Energy auditors register	✓	n/a	✓	✓	✓	–	✓	✓	✓	✓	✓	✗	✓	–	–
Mutual recognition	✓ conditions apply	✓	✗	✓	✓ conditions apply	–	–	n/a	✓ conditions apply	✗	n/a	✗	✓	✓	✓ conditions apply

	IE	IT	LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	SP	SE	UK
Art 8 transposed	✓	✓	✗	✗	✗	✓	✓	✗	✓	✓	✓	✓	✗	✓	✓
Accreditation scheme	✓	✓	✓	✓	✓	✓	✗	–	✓	✓	✓	✓	✗	✓	✓
Mandatory training (might include an exam)	✓	✓	✗	✓	✓	✓	✗	–	✗	✓ conditions apply	✓	✓	–	✗	✗
Energy auditors register	✓	✓	✓	✓	✓	✓	✗	–	✓	✓	n/a	n/a	–	n/a	✓
Mutual recognition	✗	✓	n/a	n/a	n/a	✗	✓	n/a	✗	✓ conditions apply	n/a	n/a	✓	✓	✗

Key index		
	✓	In place
	✗	Does not exist
	–	To be defined

3. Status per Member State

This section provides a detailed review of Article 8 qualifications of energy auditors in each MS.

Austria

General overview

The Austrian Federal Act on Increasing Energy Efficiency within Industry and the Federal State 72/2014 (EEffG) was approved on 9 July 2014 by the National Council. It was published on 11 August 2014. Paragraph 17 of the EEffG document sets out the minimum requirements for external and internal auditors who carry out Article 8 compliant audits.

Table 2: Overview of requirements for energy auditors in Austria

General requirements	Buildings	Industry	Transport	Services
Educational background	Qualification requirement of § 17 EEffG			
Fees (euros)	n/a			
Work Experience	3 years if the auditor has an educational background in engineering or economics that covers energy efficiency. 5 years if this education background cannot be presented.			
Mandatory training & Completion of an exam	Successful completion of a technical and economic training course			
Number of energy auditors	215	179	50	n/a
Special requirements for internal auditors	Same qualifications as for external auditors + 3 years of employment			

Energy auditor accreditation schemes

The Austrian government has set up a rating scheme where energy auditors need to obtain at least 20 points in all areas when applying for registration. There are 3 areas of qualification:

- Buildings
- Industrial processes
- Transport

The points are allocated based on the educational background, current professional positions, participation in specific training courses such as EUREM[4], F-course, and practical experience. The practical experience must be demonstrated using project references where the role of the applicant has to be clearly demonstrated. The minimum requirements that the reference projects must meet are the following:

- The energy audit must not be older than 5 years.
- The project has to match with the priorities according to Annex III of EEffG and the EN 16247 Part 4.
- For each audit, a separate reference sheet has to be completed.

[4] European EnergyManager

Some points are automatically awarded to specific professional profiles like energy consultants and mobility managers.

According to §17 of the EEffG, external auditors need to meet the following minimum requirements:

- successful completion of in-depth technical and economic training providing knowledge in the field of energy efficiency together with at least one year of experience in that field, or
- at least three years of experience in the field of energy efficiency during the last five years[5].

Internal auditors need to prove their practical experience by giving evidence which shows that they participate in different activities linked to energy efficiency in the company where they have been working for three or more years, rather than by demonstrating sufficient reference projects.

The accreditation process takes place throughout the whole year and auditors need to renew their licence every 3 years[6].

Energy auditor tools and training

Some specific training courses are organised by national certification companies, like Quality Austria, for internal energy auditors. The course "Internal Energy Auditor according to Energy Efficiency Law" has a duration of two days and focusses on the EN 16247 standard (Part 1-5). In addition to this, there is a need for appropriate specific training, in particular in the field of mobility management, where there is currently a lack of qualified auditors.

Register of energy auditors

A register of qualified energy auditors is available on the website of the Federal Ministry of Science, Research and Economy:

http://www.bmwfw.gv.at/EnergieUndBergbau/Energieeffizienz/Documents/Register_Energieauditoren_10_06_2015.pdf

Internal auditors do not need to be registered in the public register (although they can do so on a voluntary basis).

As at 10 June 2015, 265 auditors were listed, including 215 auditors for buildings, 179 for processes and 50 for transport. A number of auditors are listed in both the buildings and processes categories.

Penalties of up to 50,000 EUR can be applied for performing energy audits without required qualification or registration.

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[5]EEffG, *Bundesgesetz über die Steigerung der Energieeffizienz bei Unternehmen und dem Bund, Bundes-Energieeffizienzgesetz EEffG, Bundesgesetzblatt für die Republik Österreich, Jahrgang 2014, Ausgegeben am 11 August* 2014.

[6]http://www.bmwfw.gv.at/EnergieUndBergbau/Energieeffizienz/Documents/Qualit%C3%A4tsanforderungen%20von%20Energieauditoren.pdf

Mutual recognition

Auditors certified in other EU MS are not automatically allowed to carry out audits in Austria: they need to be registered and meet the Austrian requirements[7].

[7]WKO, Wirtschaftskammer Österreich, *personal communication with Ms. Verena Gartner and Ms. Christina Kramer, Department of Environment and Energy Policy, Austrian Federal EconomicChamber, 24 June* 2015.

Belgium – Walloon region

General overview

The Walloon Region has put in place specific accreditation schemes for energy auditors in the field of buildings (AMURE for private sector- UREBA for public sector) and industrial processes (AMURE-Accord de Branche). This is not specifically linked to the implementation of Article 8, but to a pre-existing audit programme in Wallonia.

Table 3: Overview of requirements for energy auditors in Belgium – Walloon region

General requirements	Buildings	Industry	Transport	Services
Educational background	Master's degree in engineering, Master of architecture, Master of engineering sciences	n/a	n/a	n/a
Fees (euros)	n/a	300	n/a	n/a
Work Experience	n/a			
Mandatory training & Completion of an exam	One-day training course provided by Pirotech, the technical expert 'Accords de Branche' appointed by the Walloon government			
Number of energy auditors	169	35	n/a	n/a
Special requirements for internal auditors	n/a			

Energy auditor accreditation schemes

The Walloon government approved a Decree on 2 February 2012, setting up a new approval and new requirements under the AMURE programme. Auditors need to fulfil these requirements in order to be accredited to carry out energy audits in large enterprises[8]. This approval is a specific variation of the approval for AMURE auditors (who are approved by DGO4[9]). Candidates must demonstrate their industrial experience, have been approved as an AMURE auditor for at least five years (individually, not at company level), and follow a one-day training course provided by Pirotech, the technical expert 'Accords de Branche' appointed by the Walloon government[10].

[8]Moniteur Belge, Arrêté du Gouvernement wallon modifiant l'arrêté du Gouvernement wallon du 30 mai 2002 relatif à l'octroi de subventions pour l'amélioration de l'efficience énergétique et la promotion d'une utilisation plus rationnelle de l'énergie du secteur privé (AMURE), Région wallonne, DGO4 (Direction Générale, Aménagement du territoire, du logement, du patrimoine et de l'énergie) 2 February 2012

[9] General Direction under the Walloon Government for "aménagement du territoire, du logement, du patrimoine et de l'énergie'.

[10]AwAC, Branch Agreements in Wallonia: at the crossroads between economic reality and energy climate policy, Walloon Agency for Air and Climate (Agencewallone de l'Airet du ClimatAwAC), 2015.

Energy auditor tools and training

Auditors need to follow the detailed methodology 'Methodologie des Accords de Branche de deuxième generation de l'industrie Wallonne'. This methodology easily allows a company to establish an energy management system according to ISO 50001. It determines the scope and perimeter of the audits, which energy users need to be taken into account (production, buildings and utilities), the reference year to be used, calculation examples and templates that can be used, prioritisation of energy saving measures, definitions, CO_2 mapping, action plan development, reporting deadlines, etc.[11].

Register of energy auditors

A register of qualified energy auditors is available on the website of the Walloon Region-DGO4.

- For energy auditors in industrial processes: http://energie.wallonie.be/fr/les-accords-2014-2020.html?IDC=7863
- For energy auditors in buildings: http://energie.wallonie.be/fr/liste-des-auditeurs-agrees-amure.html?IDC=7790

Mutual recognition

There is no mutual recognition of auditors from other MS (or other parts of Belgium).

[11]Pirotech, Methodologie des Accords de Branche de deuxième génération de l'industrie wallonne, Service public de Wallonie, Direction de la Promotion de l'Energie durable, Département de l'Energie et du Bâtiment durable, Pirotech – Mission d'expert technique, Soutine à la préparation et à la mise en œuvre des Accords de Branche, révision 1, March 2015.

Belgium – Flanders

General overview

In Flanders, different recognition schemes for energy experts are available depending on the type of assessment that needs to be carried out. Within the framework of the "Energiebeleidsovereenkomst (EBO)" programme, the energy expert can either be internal or external, provided that he or she is accepted by an established procedure. The Energy Agency "Vlaams Energieagentschap (VEA)" is assisted by a Verification Agency "Verificatiebureau Benchmarking Vlaanderen (VBBV)" in assessing candidate energy experts. Within the framework of the environmental license regulations, energy plans and studies must be drafted by external energy experts and accepted by VEA (again assisted by VBBV).

The energy expert must have thorough technical and commercial knowledge of the installation to be audited, have suitable experience and expertise, and be able to satisfy the requirements of VBBV.

For auditors carrying out energy audits for large enterprises in general, no further special requirements (education, experience, etc.) have been defined. They can be both internal and external, and only need to be registered (online) with VEA.

Table 4: Overview of requirements for energy auditors in Belgium – Flanders region

General requirements	Buildings	Industry	Transport	Services
Educational background	n/a			
Fees (euros)	n/a	n/a	n/a	n/a
Work Experience	**EBO framework**: 5 years of experience as an energy manager, responsible or expert or active in energy management and energy audits			
Mandatory training & Completion of an exam	No			
Number of energy auditors	n/a	n/a	n/a	n/a
Special requirements for internal auditors	n/a			

Energy auditor accreditation schemes

Different recognition schemes for energy experts are available, depending on the type of assessment that needs to be carried out but there is no accreditation needed to conduct energy audits in Flanders.

The energy expert must have thorough technical and commercial knowledge of the installation to be studied, have enough experience and expertise, and be able to satisfy the requirements of VBBV[12].

In particular for companies participating in the EBO, energy experts need to meet the following requirements[13]: thorough technical knowledge of the installations being

[12]NEEAP Flanders, Third Flemish Energy Efficiency Action Plan, VR 2014 2803 MED. 0159/2, 2014

audited; at least 5 years of experience as an energy manager, responsible or expert or active in energy management and energy audits; sufficient internal tools and competences to be able to analyse technical processes and calculate feasibility of improvement measures; meet guidelines and deadlines from VBBV; independent and impartial; and preferably using professional audit standards.

For auditors carrying out energy audits for large enterprises in general, no special requirements (education, experience, etc.) have been defined. They can be both internal and external, and only need to be registered (online) with VEA. Auditors accredited in other EU MS are hence allowed, provided that they register with VEA[14].

The VEA monitors the quality of the audit reports once they are uploaded via a web application. If the report is deemed to be inadequate, the auditor will be requested to review and update it. If assessments for the same auditor lead to several negative evaluations, the auditor will be excluded from the register.

Energy auditor tools and training

Information from preparing energy plans, energy audits and the results of energy audits needs to be uploaded in a web application by the enterprises, containing the use profiles of buildings and processes, improvement opportunities, and estimations of energy savings and costs. A statistical analysis of these opportunities will help when estimating the budget for any further financial support required by the enterprise. The web application is developed and managed by VEA, which is also responsible for the supervision of energy audits and auditors through this web application[15].

For EBO, a voluntary Energy Policy Agreement, VBBV has developed guidelines on the content of energy audit reports within the framework of the Agreement. Minimum requirements for these reports include: general information on the energy expert, description of the activities of the organisation (feedstock used, products sold, production regime, energy intensity, etc.), technical description of processes and energy flows, diagram showing most important energy flows as well as meters, list of energy carriers and heat transfer, energy balances, most significant energy users, and energy consumption in the past. The VBBV also provides calculation tools to evaluate the internal rate of return of energy saving measures, and templates to report on economically feasible measures[16].

The VEA does not make any distinction between energy auditors for the building, industrial or transport sectors and they do not foresee any lack of auditors to carry out the energy audits in the future.

Register of energy auditors

No information available.

Mutual recognition

Auditors accredited in other EU MS are allowed to carry out energy audits in Flanders, provided that they are registered with the VEA.

[13]EBO, Energiebeleidsovereenkomst voor de verankering van en voor blijvende energie-efficiëntie in de Vlaamse energie-intensieve industrie (VER-bedrijven) zoals goedgekeurd door de Vlaamse regering op 4 April 2014

[14]VEA, Vlaams EnergieAgenstchap, personal contact with Joris Recko, Cel Ondersteuning van Bedrijven, 12 June 2015

[15]NEEAP Flanders, Third Flemish Energy Efficiency Action Plan, VR 2014 2803 MED. 0159/2, 2014

[16]Commissie Energiebeleidsovereenkomst, Toelichting 2: Inhoud energie-auditverslag in het kader van de EBO, 2014

Belgium – Brussels

General overview

Article 8 of the EED has not been officially transposed in Brussels. However, since 30/01/2013, energy audits have to be conducted by an auditor accredited by the Brussels Region Authority. The requirements are only valid for energy audits in the building sector, but a new Decree is currently under discussion to extend the scope to the industry and transport sectors, including the mandatory audit every 4 years. The publication of the new decree is expected in 2016.

Table 5: Overview of requirements for energy auditors in Belgium – Brussels (based on the existing Decree of the Brussels Region Government)

General requirements	Buildings	Industry	Transport	Services
Educational background	a degree in architecture, architect civil engineering, industrial engineering	n/a	n/a	n/a
Fees (euros)	125 € for a legal person, 250€ for companies	n/a	n/a	n/a
Work Experience	n/a			
Mandatory training & Completion of an exam	n/a			
Number of energy auditors	66 (September 2015)	n/a	n/a	n/a
Special requirements for internal auditors	Internal auditors are currently not allowed			

Energy auditor accreditation schemes

Auditors need to fulfil the qualification requirements regarding education, experience and acknowledgement by the Brussels Institute for Environmental Management. The qualification requirements include: holding a degree in architecture, civil engineering, industrial engineering or any other qualification of higher education attesting to training in aspects of energy in buildings or a proof of at least 3 years' practical experience in the building sector. This qualification has to be renewed every five years. In addition, the auditor should maintain a register including energy audits carried out over the past five years. This information has to be sent annually to Brussels Environment via a data collection platform "Irisbox".

Energy auditor tools and training

A guidance note was published in July 2014 and is available on the Institut Bruxellois pour la gestion de l'environnement (IBGE) website.[17] The guidance describes the different steps of the audit process and the input which is required at each stage.

Energy auditors' register

A register of qualified energy auditors is available via the website of Bruxelles Environnement: http://app.bruxellesenvironnement.be/listes/?nr_list=EA00001

Mutual recognition

Brussels Environment can recognise a certificate or a diploma issued in another MS, or delivered by another federated entity in another MS, as long as it fulfils the requirements set by the Brussels Institute for Environmental Management.

[17] http://www.ibgebim.be/index.htm

Bulgaria

General overview

Bulgaria has fully transposed the EED through the new Energy Efficiency (EE) Act which was published 15th May 2015 (Issue 35 15th of May)[18].

The requirements for energy auditors are very detailed and strict. Order No. 38/2013 Regarding the Regulation for Energy Auditors Authorisation, Energy managers Certification and Accreditation of Companies Providing Energy Services sets out the guidelines for issuing certificates and authorisations for auditors and energy managers, organising training workshops, and surveying the energy efficiency market in general. Additionally, certain levels and areas of education are required, as well as a list of equipment that should be owned to undertake audits.

Table 6: Overview of requirements for energy auditors in Bulgaria

General requirements	Buildings	Industry	Transport	Services
Educational background	A certified copy of a document attesting higher technical education as recognised in the Republic of Bulgaria Degree in engineering (at least secondary education)		n/a	n/a
Fees (euros)	A fee fixed according to a schedule adopted by the Council of Ministers		n/a	n/a
Work Experience	Not less than two years for persons with a master's degree, and not less than three years for persons with a bachelor's degree			
Mandatory training & Completion of an exam	Examinations at higher technical schools accredited, by an examination board including professors, representatives of the Ministry of economy, the Ministry of investment and the design agency.			
Number of energy auditors	~250	~50	n/a	n/a
Special requirements for internal auditors	n/a			

Energy auditor accreditation schemes

Energy auditors must submit an application in order to obtain approval from the Sustainable Energy Development Agency (SEDA), an executive agency under the Ministry of Energy which is responsible for the register of energy auditors. A guidance document sets out the details about the registration process and the documents which need to be submitted:
http://seea.government.bg/documents/NAREDBA_RD-16-301_ot_10.03.2014.pdf

The procedure for qualification is quite quick, if there is any document missing or any inconsistency in the documents supplied by the applicant, the applicant shall be

[18] http://seea.government.bg/documents/ZEE.pdf

notified within 5 days. Once the application is completed and validated, SEDA will issue a certificate. The certificate is issued within 14 days after the decision of the executive director of SEDA and has a validity of three years.

Energy auditors for buildings can be companies or individuals; however energy auditors for industrial systems need to meet certain criteria[19]:

- To be a legal entity within the meaning of the Commercial Law
- To possess a list of instruments and equipment e.g. Infrared thermometers
- To have three different specialists trained in energy auditing – power production, heat engineering and electrical engineering.

The accreditation is valid for 3 years.

Energy auditor tools and training

The entities in charge of the training of energy auditors are higher technical schools accredited according to the procedure established by the Higher Education Act.

The typical content of training includes a mix of lectures (75hrs in total) and practical work.

There are no official tools (such as guidelines or calculation tools) available for energy auditors.

Register of energy auditors

The energy auditors listed in the register are the only ones allowed to do energy audits (as defined by ordinance RD-16-301). The link to the register of energy auditors is:

http://seea.government.bg/bg/registers/public-register/registered-34-1

The register only includes auditors who can carry out energy efficiency audits and certification of buildings and energy efficiency audits for industrial systems. There is no separate register for transport, and there are no dedicated transport auditors.

Mutual recognition

The documents for the registration of energy auditors have to be submitted in the Bulgarian language. Energy service providers from abroad can also submit documents but only if those documents are officially translated.

Persons who have completed training in another MS can operate in Bulgaria if they meet the requirements set in a document adopted by the Bulgarian Higher Technical School. There is also a check with the European Quality Assurance Register for Higher Education (EQAR).

[19] http://iet.jrc.ec.europa.eu/energyefficiency/sites/energyefficiency/files/files/documents/events/bg-seda_energy_audits_4.pdf

Croatia

General overview

In Croatia, Article 8 of the EED has been transposed through the Act on Energy Efficiency (NN 127/14, Article 19), which entered into force on 11 May 2014[20].

An Ordinance prescribing the methodology of energy audits for large enterprises, as well as certification requirements for energy auditors, is under development and is expected to be published before the end of the year.

Currently, the existing regulation only covers the provisions and requirements on energy audits of buildings and energy certification of buildings, as well as the criteria for persons who perform energy audits of buildings and energy certification of buildings.

Table 7: Overview of requirements for energy auditors in Croatia

General requirements	Buildings	Industry	Transport	Services
Educational background	Requirements have not yet been set.			
Fees (euros)	Fees have not yet been determined. It is anticipated there will not be a direct fee for auditors, but there may be fees for the required education.			
Work Experience	Not yet determined.			
Mandatory training & Completion of an exam	Not yet determined.			
Number of energy auditors	Unknown since the registry has not yet been established.			
Special requirements for internal auditors	Not yet determined.			

Energy auditor accreditation schemes

The Ministry of Economy will define the minimum requirements in the forthcoming Ordinance. There will be an accreditation through an educational programme; this will be described in a rulebook that has not yet been published.

The accreditation will be granted to qualified energy auditors for a period of five years, according to Article 19 of the Energy Efficiency Act[21].

In the meantime, the existing legislation states that the energy audit of a building should be conducted by a person who is authorised by the Ministry of Construction and Physical Planning pursuant to the Rules on the conditions and criteria for persons conducting energy audits and energy certification of buildings (NN Nos 81/12, 64/13).

Energy auditor tools and training

There will be separate training schemes and qualifications for buildings, processes and transport in the forthcoming Ordinance.

[20] http://www.zakon.hr/z/747/Zakon-o-energetskoj-u%C4%8Dinkovitosti

[21] http://narodne-novine.nn.hr/clanci/sluzbeni/2014_10_127_2399.html

In the last three years, 10 educational institutions were granted authorisation to conduct training for energy certifiers[22]:

1. College of SlavonskiBrod, SlavonskiBrod, Dr. Mile Budaka 1
2. Faculty of Civil Engineering at the University of Zagreb, Zagreb, Fra AndrijeKačića-Miošića 26
3. Faculty of Engineering at the University of Rijeka, Rijeka, Vukovarska 58
4. Energy Institute HrvojePožar, Zagreb, Savskacesta 163
5. Faculty of Mechanical Engineering and Naval Architecture at the University of Zagreb, Zagreb, Ivana Lučića 5
6. Brodarskiinstitutd.o.o., Zagreb, Zagreb, AvenijaVećeslavaHoljevca 20
7. Society of Civil Engineers Zagreb, Zagreb, Berislavićeva 6
8. Croatian Chamber of Mechanical Engineers, Zagreb, UlicagradaVukovara 271
9. Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture at the University of Split, Split, R. Boškovića 32
10. Faculty of Civil Engineering Osijek at the Josip JurajStrossmayer University of Osijek, Osijek, Drinska 16a

Register of energy auditors

According to Paragraph 10, Article 19 of the Energy Efficiency Act (NN 127/14), the Ministry of Economy will keep a register of:

- Authorised energy auditors for large companies and
- Issued reports on the energy audits for large companies.

Mutual recognition

Croatia will likely recognise accreditations from other MS but the specifics have yet to be determined.

[22] 3rd NEEAP, https://ec.europa.eu/energy/sites/ener/files/documents/2014_neeap_en_croatia.pdf

Cyprus

General overview

The bill that will fully harmonise the national legislation with the provisions of Article 8 of the EED is expected to be voted into law in September 2015. Existing directions on this topic are included in the 2012 Decree on the Methodology and Other Requirements for Conducting Energy Audits (RAA 171/2012), which entered into force on 7 May 2012, and will be superseded by the new legislation.

Table 8: Overview of requirements for energy auditors in Cyprus

General requirements	Buildings	Industry	Transport	Services
Educational background	n/a	n/a	n/a	n/a
Fees (euros)	Exam fee of €80 and a registration fee of €200.			
Work Experience	n/a			
Mandatory training & Completion of an exam	80 hours training depending on the category + an exam			
Number of energy auditors	~100 (May 2015)			
Special requirements for internal auditors	n/a			

Energy auditor accreditation schemes

There are three categories of energy auditors specified in the current legislation, depending on the sector they cover:

- Category A: any type of building, regardless of size and cooling technology. Ports, airports and street lighting are also included in this category
- Category B: industrial sites and processes, agricultural sites.
- Category C: transport (excluding aviation and maritime).

With the new Decree, energy auditors who hold a license in categories A and B, should apply the standards CYS EN 16247-1: 2012 (Energy Audits - Part 1: General Requirements), CYS EN16247-2: 2014 (Energy Audits - Part 2: Buildings) and CYS EN 16247-3: 2014 (Energy Audits - Part 3: Processes) - which have been adopted by the Cyprus Organisation Standardisation - when carrying out energy audits.

Energy auditor tools and training

The existing Decree RAA 171/2012 includes a Technical Guide of Energy Audits which must be implemented by energy auditors during audits. The Technical Guide covers a broad range of subjects including:

- Inter alia,
- Energy audit types (cursory energy audit, extended energy audit and detailed energy study) that may be carried out in each case,
- The methodologies used to collect and record data,

- The methodology for measuring energy use,
- The calculation of reference consumption,
- Ex ante estimation of consumption and energy savings,
- Data verification,
- Ex post estimation of energy savings,
- Energy allocation per use,
- The methodology for assessing parameters,
- The extended audit report,
- The available portable audit instruments,
- Standards and legislation to be implemented, etc.

It is compulsory for auditors that wish to be certified to take part in a training course with 80 hours of classes and practice for categories A and B and 32 hours of classes and practice for category C (the ratio of training in classes vs practice is set at 70:30 respectively).

The total training cost is covered by the candidates. There is also an exam fee of €80 and a registration fee of €200.

Register of energy auditors

Energy auditors need to apply for registration in a public register. This register of energy auditors is posted on the Ministry of Energy, Commerce, Industry and Tourism (MECIT) website and is accessible to final consumers[23]. The register is managed by the Ministry of energy and an independent expert panel (5 people). In April 2015, there were 38 certified energy auditors included in the registry.

Energy auditors listed in the registry are obliged to renew their subscription every year, without any additional costs.

There are enough energy auditors for the buildings and industrial sectors in Cyprus but the challenge is to qualify auditors for the transport sector.

Mutual recognition

With regard to energy auditors from other MS who wish to practice in Cyprus, Article 18 of Regulatory Administrative Act 184 /2012 states that they can settle in the Republic and practice as long as they are enrolled in the energy audit registry. Occasional exercise of a service-specific energy audit is allowed to energy auditors as long as they lawfully practice this profession in another MS. Mutual recognition of energy auditors from other MS is still being investigated and advised on by lawyers.

[23] http://www.mcit.gov.cy/mcit/mcit.nsf/dmlindex_en/dmlindex_en?OpenDocument

Czech Republic

General overview

The Czech Republic has had an energy auditing programme in place since 2000, defined by the Energy Management Act 406/2000 Coll., which was amended in 2012. This programme laid down the details for energy auditing – to a large extent covering requirements of Annex VI of the EED – as well as requirements for energy auditors to be certified. Officially, Article 8 of the EED was transposed through an amendment of 103/2015 to the aforementioned Act, which entered into force on 1 July 2015[24], and through secondary legislation: Ministerial Decree No. 213/2001[25].

Table 9: Overview of requirements for energy auditors in the Czech Republic

General requirements	Buildings	Industry	Transport	Services
Educational background	University degree of technical character			
Fees (euros)	n/a			
Work Experience	**AND** 3-6 years energy management experience depending of level of education			
Mandatory training & Completion of an exam	Mandatory exams and continuing education			
Number of energy auditors	350 across all sectors			
Special requirements for internal auditors	University degree of technical character			

Energy auditor accreditation schemes

The auditor must have a university degree in engineering and three years of energy management experience, or a technical school degree and six years of energy management experience. Additionally, applicants need to pass specific oral and written exams to be considered as an accredited auditor.

Energy auditor tools and training

The Association of Energy Auditors together with the Czech Chamber of Certified Architects is in charge of the training and education for energy auditors. Auditors must participate in continuing education programmes.

Register of energy auditors

Auditors apply for registration in a public register. This register of auditors is maintained by the Ministry of Industry and Trade and contains the following: name, identification number, date of birth, type and date of registry, contact details, business name and date of last completed training. The register is available on the Ministry of Industry and trade website:

[24] http://www.psp.cz/sqw/text/tiskt.sqw?O=7&CT=301&CT1=0 and http://www.tzb-info.cz/pravni-predpisy/zakon-c-406-2000-sb-o-hospodareni-energii

[25] http://www.eis.cz/dokumenty/147_5_0_12005-10-27_17-16-28.htm

http://www.mpo-enex.cz/experti/ExpertListEng.aspx

Mutual recognition

No information available.

Denmark

General overview

The primary legislation regarding the obligation to conduct an energy audit resulting from Article 8 in Denmark is Law No. 345 of 8 April 2014 on obligatory energy audits in large commercial enterprises[26]. The corresponding interpretation guideline called 'Order in mandatory energy audits for large companies' was published in November 2014 by the Danish Energy Agency (DEA).[27]

Table 10: Overview of requirements for energy auditors in Denmark

General requirements	Buildings	Industry	Transport	Services
Educational background	External experts must be registered as energy consultants or be employed with an accredited company.			
Fees (euros)	Danish Technology Institute's Energy Vision Consultant: from September 1, 2015 price increases for processing applications for energy auditor to 8,000 kr. Ex VAT (~€1,100); Annual membership costs kr. 5.000 (~€670), - ex VAT (charged for one calendar year)[28].			
Work Experience	Complete two audits under the supervision of an experienced auditor.			
Mandatory training & Completion of an exam	Optional classes available.			
Number of energy auditors	43 across all sectors. There is a lack of auditors in the transportation area.			
Special requirements for internal auditors	Accreditation is not required as long as qualifications are equivalent to an accredited expert.			

Energy auditor accreditation schemes

DANAK (DanskeAkkrediteringsfond) has been appointed as the national accreditation body. External energy auditors need to be employed by a company accredited by the Danish national accreditation body DANAK or an equivalent body in accordance with international standards, be a registered energy consultant or be approved under similar schemes recognised by DEA, or be an energy labelling consultant employed by a certified energy enterprise in trade and services. Internal auditors do not need accreditation, provided that it can be shown that their qualifications are equivalent to

[26]Klima-, Energi- ogBygningsministeriet (2014): Law amending the Law on the Promotion of savings in energy consumption, the Heat Supply Act, Act on municipal cooling and various other acts. Online: https://www.retsinformation.dk/pdfPrint.aspx?id=162569.
[27]The Danish Energy Agency published a short guideline which aims to support the interpretation of the primary legislation in Denmark. Please see: Danish Energy Agency (2014): Order in mandatory energy audits for large companies. Online: http://www.ens.dk/sites/ens.dk/files/forbrug-besparelser/EE_ny_web/Dokumenter/courtesy_translation_regulation_on_energy_audits.pdf.
[28]http://energisyn.teknologisk.dk/sekretariatet/hvordan-bliver-jeg-energisynskonsulent.aspx

an accredited expert by submitting information on the expert's position, education and experience.

The Danish Technology Institute (DTI) provides an overview of the requirements to become a registered energy auditor[29]:

- Educational background: engineering or off-shore technical management
- Documented extensive theoretical and practical experience in the implementation of energy efficiency and energy saving measures in enterprises: relevant training, experience with project management with several partners (A-level) or external advisors (B-level), completed techno-economic assessments of energy options, responsibility for the establishment of the subsequent technical changes, evaluation of different energy saving measures, design or start-up of energy management systems etc.
- A-level energy consultants need to have at least 3 years of experience within the last 6 years
- B-level energy consultants need to have at least 5 years of experience within the last 10 years and have knowledge of energy, environmental or quality management

B-level energy consultants are allowed to carry out audits on their own. A-level consultants must work with partners to undertake audits.

Energy auditors can be internal or external, as long as they are independent from the processes they are auditing. Internal auditors do not need accreditation, provided that it can be shown that their qualifications are equivalent to an accredited expert by submitting information on the expert's position, education and experience.

Accreditation does not expire and can be applied for at any time.

Energy auditor tools and training

Training classes are voluntary but highly recommended. DI Energi is currently developing a class for transportation audits in order to address the shortage of auditors in this sector.

The auditor needs to have carried out at least two audits under the supervision of an experienced auditor.

Register of energy auditors

The Danish Energy Agency and other organisations (DTI: Danish Technology Institute and SparEnergi) maintain the register of certified auditors, which is available on line:

http://www.ens.dk/en/consumption-savings/energy-efficiency-measures-energy-intensive-companies/energy-audits-large/links

http://energisyn.teknologisk.dk/konsulenter/energisynskonsulenter.aspx

http://sparenergi.dk/offentlig-og-erhverv/bygning/energimaerkning-af-bygninger#widget-1

Mutual recognition

Auditors accredited in other EU MS are not automatically qualified to carry out audits in Denmark, but when the Danish requirements are met, the DEA can allow auditors from abroad, such as UK ESOS approved lead assessors.

[29]Energisyn, Hvordanbliverjegenergisynskonsulent, How to become an energy consultant, available online fromhttp://energisyn.teknologisk.dk/sekretariatet/hvordan-bliver-jeg-energisynskonsulent.aspx

Estonia

General overview

Currently, implementation of the EED into Estonian legislation is not complete. Therefore, only basic information can be given. The Estonian government has published a draft Energy Sector Organisation Act (13-1343), which will transpose Art. 8 of the EED into the national legislation, potentially sometime in the autumn of 2015.

Table 11: Overview of requirements for energy auditors in Estonia

General requirements	Buildings	Industry	Transport	Services
Educational background	University degree in a relevant area			
Fees (euros)	€498 plus VAT; fees for the extension of the certification are €374 plus VAT			
Work Experience	n/a			
Mandatory training & Completion of an exam	Training courses are voluntary and in some cases it might be mandatory to get relevant practice in the field			
Number of energy auditors	~100	10-15	n/a	n/a
Special requirements for internal auditors	n/a			

Energy auditor accreditation schemes

An accreditation system has been in place in Estonia since 2007. This is designed for the accreditation of energy auditors for buildings and is run by the Estonian Association of Heating and Ventilation Engineers (EKVÜ). According to Decision No 13 of the Council of Professional Engineers, 06:12:13, EKVÜ is a professional provider in the field of energy performance of buildings. There is a separate qualification system set up for industry auditors.

The accreditation is valid for 5 years, after which period the auditor needs to retake the exams in order to renew the certification.

A simplified and generalised overview of the qualifications and competences of the energy auditors based on their level of Qualification Framework is presented in the table below[30].

Competence	Energy auditor Level 6		Qualified specialist in energy efficiency Level 7	Authorised specialist in energy efficiency Level 8
	Residential energy audits	Full vocational		
Energy certification of existing buildings	+	+	+	+
Residential buildings	+	+	+	+
Public buildings		+	+	+
Complex of buildings (including				+

[30] ENMAKS_SK: http://eelnoud.valitsus.ee/main#tfgoI9qF

industrial)				
Construction of residential and public buildings, energy efficiency advice (expert evaluations, development plans, feasibility studies, etc.)			+	+
Complex of buildings (including industrial) energy efficiency advice (expert evaluations, development plans, feasibility studies, etc.)				+
Building a dynamic heat transfer modelling, minimum efficiency requirements, low and nearly zero-energy buildings standards verification calculations			+	+
Research and development, training				+

Professional fees for the first application are 498 Euros plus VAT, whereas the fees for the extension of the certification are 374 Euros plus VAT.

Energy auditor tools and training

Training courses are arranged by EKVÜ, in collaboration with the Tallinn University of Technology. Qualification exams take place throughout the year, on dates arranged by the association. Once the auditor has passed the exam, they will be certified for a five-year period.

There are no standardised manuals or guidebooks that provide support to energy auditors when conducting audits in large enterprises in Estonia. However, one of the measures that the Estonian government has undertaken to promote energy audits involves Regulation No 48 of the Minister for Economic Affairs and Communications (2008) that sets out the 'Conditions and rules for conducting energy audits and expert assessments of buildings and for supporting the preparation of design documentation'[31].

Register of energy auditors

The EKVÜ maintains a register of qualified energy auditors, of 8 different levels of the German Qualifications Framework (GQF), following the European standards. This register is available on EKVÜ's website[32].

There are currently about 100 registered energy auditors, mostly for buildings and a limited number (10-15) for industry.

Mutual recognition

Auditors accredited in other EU MS are not automatically qualified to carry out audits in Estonia. According to the framework law, auditors from other MS need to meet the same criteria as the local ones.

[31] https://www.riigiteataja.ee/akt/105042012008?leiaKehtiv

[32] http://ekvy.ee/index.php?option=com_content&view=article&id=14&Itemid=17&lang=et

Finland

General overview

Article 8 of the EED was transposed into Finnish legislation through the Energy Efficiency Act (Energieffektivitetslag), which entered into force on 1st January 2015, and the Government Decree on Energy Audits (StatsrådetsFörordning om Energibesiktningar). The publication of the Act and the Decree was followed by practical guidelines, published by the Finnish Energy Authority, Energiavirasto, on 29 June 2015.

Table 12: Overview of requirements for energy auditors in Finland

General requirements	Buildings	Industry	Transport	Services
Educational background	Degree in engineering or energy (at least polytechnic level)			
Fees (euros)	€500 including a training and an exam			
Work Experience	**OR** at least 3 years of experience in the fields of energy, manufacturing, property, environment or similar			
Mandatory training & Completion of an exam	√	√	n/a	n/a
Number of energy auditors	1,500+			
Special requirements for internal auditors	Must be on the Register of Energy Auditors and meet the eligibility criteria for registration			

Energy auditor accreditation schemes

Energy auditors in Finland need to:

(i) Be registered with Energiavirasto.

(ii) Have an appropriate lower-university or polytechnic degree in engineering, environmental or energy, or have relevant work experience (at least three years in energy, manufacturing, property or environment) replacing this educational qualification.

(iii) Follow a Motiva training course.

(iv) Be familiar with the implementation of energy audits for companies, demonstrated by a successfully completed test on energy audits[33].

All auditors need to be authorised by Energiavirasto before they can carry out a valid energy audit. Authorisation granted lasts for seven years (unless it is revoked by Energiavirasto if the auditor violates the minimum requirements or proves to be incompetent), after which it has to be renewed[34]. Renewal of authorisation can be

[33]Statsrådets Förordning om Energibesiktningar (GovernmentDecree on Energy Audits), 15.01.2015/20, I enlighet med statsrådets beslut föreskrivs med stöd av energieffektivitetslagen (1429/2014), 15 January 2015

[34]Energieffektivitetslag (Energy Efficiency Act), 1429/2014, I enlighet med riksdagens beslut föreskrivs, Utfärdad i Helsingfors den 30 december 2014, published in Helsinki on 30 December 2014

done without a new test, provided that no more than four years have passed since the last energy audit was carried out[35]. During a transitional period until 31 December 2016, Motiva qualified energy auditors (see below) will be accepted to carry out energy audits[36].

Energy auditor tools and training

Motiva is a state-owned company responsible for the development of energy audit models, guidelines and procedures (in close collaboration with different stakeholders), as well as for training and authorisation of the auditors. Motiva runs an energy auditing follow-up system, compiling data on all energy audits and overseeing the quality control of energy audit reporting. It publishes examples of successful auditing projects to promote the work.

To become a qualified energy auditor, Motiva's energy auditor's training course needs to be completed. This consists of a basic part for all, and two advanced parts – one for electrical auditors and one for heating/fuel auditors. The basic course for energy auditors is usually organised twice a year, in May and November.

The auditing qualification requires at least three years of basic education in energy technology and work experience in the sector, plus an examination. Qualified auditors can use Motiva tools to carry out audits, such as the MotiWatti calculation programme, summary tables, reporting tools, inspection check list and measurement records. These tools make the auditing work more efficient and more standardised[37].

Register of energy auditors

More than 1,500 qualified energy auditors have been trained in Finland[38]. Motiva maintains a directory of auditing firms that have auditors with heat and fuels or electrical auditing competency, and who have reported Motiva's energy audits without significant discrepancies in quality since the beginning of 2005.

Mutual recognition

No information available.

[35]Statsrådets Förordning om Energibesiktningar (GovernmentDevree on Energy Audits), 15.01.2015/20, I enlighet med statsrådets beslut föreskrivs med stöd av energieffektivitetslagen (1429/2014), 15 January 2015

[36]Energiavirasto, Suurten yritysten energiakatselmukset - Kysymykset ja vastaukset (Energy audits for largecompanies – Questions and answers), available online from http://www.energiavirasto.fi/documents/10191/0/Kysymykset-vastaukset+10022015/c4ee07c6-7130-41a5-899a-ec6f85deefdb

[37]Motiva, Energy efficiency agreements, available online from http://www.motiva.fi/en/areas_of_operation, consulted on 12 August 2015

[38]http://www.motiva.fi/files/4369/Energy_audits_and_analyses.pdf

France

General overview

Article 8 of the EED was transposed into French law by Decree No 2013-619, adopting various provisions of EU law in the field of sustainable development[39]. Decree No 2014-1393 of 24 November 2014 and its implementing Decree provide guidelines for the scope of audits, the procedures for compliance and the qualification criteria for auditors (internal and external).

The Minister for Ecology, Sustainable Development and Energy (Ministère de l'Ecologie, du Développement Durable et de l'Energie) is responsible for the execution of the legislation, COFRAC (Comité Français d'accréditation) is the national accreditation body of France and ADEME is the French Energy Agency in charge of the country's energy transition.

Table 13: Overview of requirements for energy auditors in France

General requirements	Buildings	Industry	Transport	Services
Educational background	n/a	n/a	n/a	N/a
Fees (euros)	n/a	€3,000	n/a	N/a
Work Experience	n/a	n/a	n/a	N/a
Mandatory training & Completion of an exam	n/a	n/a	n/a	N/a
Number of energy auditors	700 (May 2015)	285 (May 2015)	n/a	N/a
Special requirements for internal auditors	Minimum energy management experience of 2-5 years and understanding of EN 16247. Auditors must not be directly involved in the audited processes			

Energy auditor accreditation schemes

Currently, three qualification bodies - OPQIBI (OrganismeProfessionnel de Qualification de l'Ingénierie Bâtiment et Industrie), LNE (Laboratoire National de métrologie et d'essais) and AFNOR - offer accreditation of external auditors. Organisations whose employees are entitled to perform external energy audits in France have to be "qualified" by one of these qualification bodies.

Those qualification bodies have to be accredited by the national accreditation body (COFRAC in compliance with NF X 50-091-2012: Qualification- general requirements related to supplier qualification organization). A specific accreditation scheme has been set up by COFRAC for this purpose.

Energy auditors can be external or internal, as long as they are independent from the processes they are auditing. External auditors need to be accredited by the EN 16247-

[39]LegiFrance, Le service public de la diffusion du droit, République Française, Décret n° 2013-619 du 16 juillet 2013 portant diverses dispositions d'adaptation au droit de l'Union européenne dans le domaine du développement durable, available online fromhttp://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000029799204&categorieLien=id

5 standard[40]. Internal auditors do not need this accreditation, provided that the organisation is ISO 14001 certified[41]. Auditors need to specialise in the type of audit they are performing, i.e. industrial processes, buildings or transport.

External energy auditors need to follow the NF X 50-091 standard and comply with additional requirements defined in Annex II of the implementing Decree No 2014-1393. These requirements include technical expertise, 3-7 years of experience in energy audits (depending on education), a 3-day training on energy audits, technical means to preform audits, and at least 3 audit references in the past 3 years. Internal auditors need to have 2-5 years of experience in energy management (depending on education) (Journal officiel de la République Française, 2015).

Energy auditor tools and training

ADEME (Agence de l'environnementet de la maîtrise de l'énergie) regularly organises trainings for the qualifications of energy auditors. ADEME has developed a specific training course about energy audits of buildings and has selected 4 organisations to provide this training.

Register of energy auditors

There is no central register for energy auditors.

Mutual recognition

Auditors certified in other European MS do not automatically qualify to carry out audits in France: they need to be certified in France first[42].

[40]Actu-Environnement, L'actualité professionnelle du secteur de l'environnement, available online fromhttp://www.actu-environnement.com/ae/news/obligation-audit-energetique-entreprise-efficacite-22168.php4

[41]ATEE, Association Technique, Energie, Environnement, available online fromhttp://www.atee.fr/management-de-lenergie-audit-energetique

[42]Ministère de l'Ecologie, du Développement Durable et de l'Energie, personal communication with Laurent Cadiou, DG Energie & Ct, Economies d'énergie & énergies renouvelables

Germany

General overview

On 31 July 2014 the German Federal Ministry of Economy and Energy submitted a bill to amend the existing voluntary scheme of energy audits, in order to implement Article 8 of the EED. The German Federal Office for Economic Affairs and Export Control, BAFA, published and regularly updates practical guidelines supporting the implementation of the amended legislation[43]. BAFA also published guidelines on the requirements of energy audits[44] and energy auditors[45].
There is no energy auditor accreditation scheme in the sense of Article 8. Auditors are only required to register to be approved by BAFA.

Table 14: Overview of requirements for energy auditors in Germany

General requirements	Buildings	Industry	Transport	Services
Educational background	Level 6 of the German Qualifications Framework			
Fees (euros)	n/a			
Work Experience	At least three years full-time activity, acquired in the practical knowledge of operational energy consulting.			
Mandatory training & Completion of an exam	Training is voluntary.			
Number of energy auditors	2,200 (August 2015)			
Special requirements for internal auditors	Auditors must not be directly involved in the activity which is analysed in an energy audit.			

Energy auditor accreditation schemes

Energy auditors have to fulfil requirements in three areas:

- Education
- Professional experience
- Independence

[43]BAFA, Merkblatt für Energieaudits, nach den gesetzlichen Bestimmungen der §8 ff. EDL-G, *Bundesamt für Wirtschaft und Ausfuhrkontrolle, available online from**http://www.bafa.de/bafa/de/energie/energie_audit/publikationen/merkblatt_energieaudits.pdf***

[44]BAFA, Energieaudits nach dem Gesetz über Energiedienstleistungen (EDL-G), *Bundesamt für Wirtschaft und Ausfuhrkontrolle, available online from**http://www.bafa.de/bafa/de/energie/energie_audit/index.html?fold=true***

[45]BAFA, Energieaudits nach EDL-G, Hinweise zur Registrierung vor Energieaudits durchführenden Personen, *Bundesamt für Wirtschaft und Ausfuhrkontrolle, available online from**http://www.bafa.de/bafa/de/energie/energie_audit/publikationen/hinweise_registrierung_energieauditoren.pdf***

Education

EDL-G requires an education that corresponds, at least, to level 6 of the German Qualifications Framework:

- Completion of a university or college degree in a relevant field of engineering or science

  A relevant field of study could, for example, be: energy technology, energy production, electrical engineering, process engineering, combustion engineering, environmental engineering, technical building equipment, power engineering, civil engineering, physics, mechanical engineering, electrical engineering.

or

- Certified technician / certified technician in a relevant field of study.

or

- Masters qualification (German: Meisterabschluss) in a relevant field of profession.

  A relevant field of profession for technicians and technicians with master's qualification may include: heating, ventilation, air conditioning, electrical, refrigeration systems engineering, metal engineering, environmental, construction, insulation technology, mechanical engineering, physics, engineering.

Professional experience

EDL-G requires at least three years' full-time activity, acquired in the practical knowledge of operational energy consulting, as professional experience.

As proof of professional experience, the following activities are accepted:

- Employment as energy consultant / energy consultant in a consulting company
- Self-employed as an energy consultant / energy consultant
- Energy consultant / energy counsellors from local companies
- Energy consultant / energy counsellors from chambers, associations
- Energy consultant / energy counsellors from other public institutions
- Energy consultant / energy counsellors from power companies
- Energy consultant / energy counsellors from manufacturers and contractors
- Planning Engineer / Planning Engineer in planning, engineering and architectural firms
- Engineer / Engineer for energy and building technology in enterprises
- Engineer / technician for energy and building technology in enterprises
- Energy Commissioner / energy managers or energy manager / energy manager in company
- Professors / lecturers at colleges, universities, or;
- Work in colleges for engineering in the field of energy technology, energy production, electrical engineering, process engineering, combustion engineering, environmental engineering, technical building services, supply engineering, civil engineering, physics, engineering or other disciplines with teaching in the areas mentioned.

Independence

In order to be considered as acting independently an energy auditor must:

consult the company regarding manufacturers, suppliers and distributors and should not receive any commission or other monetary benefits from a business that manufactures or sells products or builds or rents assets which are used in energy-saving investments in the audited company.

In addition, the applicant has to submit the reports of 10 audits conducted during the last 3 years at the time of the submission of the application to BAFA.

Internal staff may also carry out the energy audit. According to § 8b paragraph 2 sentence 3 EDL-G such a corporate person must not be directly involved in the activity which is analysed in an energy audit. According to the BAFA the energy commissioner or energy manager of a company is also allowed to conduct the audit.

Energy auditor tools and training

Training for educating energy auditors is offered by different companies (e.g. TÜV). A number of commercial software tools are available for conducting energy audits.

Training is voluntary.

There are no standardised manuals or guidebooks available, except the guideline from BAFA. Non-standardised manuals or sample reports may be included in training materials.

Register of energy auditors

BAFA has set up an electronic approval procedure and keeps a list, publicly available on https://elan1.bafa.bund.de/bafa-portal/audit-suche/, with all self-registered energy auditors. Energy consultants who have passed the BAFA examination are registered in a list. It is, however, not mandatory for energy auditors to be included in this list in order to be allowed to carry out energy audits, as long as they are able to provide BAFA with necessary documentation about their expertise and reliability upon request.

Accredited auditors for ISO 50001 may register as energy auditors but have to register at BAFA as well.

The information which is given as part of the BAFA registration process must be self-maintained online. The energy auditor is personally responsible for the accuracy of the data presented in the register.

As of August 2015, there were 2,200 energy auditors registered on the BAFA list. It is assumed that close to the deadline of 5 December 2015 there might be a shortage of available auditors to meet the requirement of all enterprises required to undertake audits.

Mutual recognition

Energy consultants from countries outside of Germany may register at BAFA as long as they meet the same requirements described above.

Greece

General overview

In June 2015, the consultation process for the transposition of the EED into the national law was completed and the government published the draft plan of the legislation that is expected to be voted in before the end of 2015.

The following information is based on the content of the draft legislation at the time of writing.

Table 15: Overview requirements for energy auditors in Greece

General requirements	Buildings	Industry	Transport	Services
Educational background	Engineering degree			
Fees (euros)	n/a			
Work Experience	No required experience for Class A audits Experience in energy auditing activities for Class B and Class C			
Mandatory training & Completion of an exam	No required training or exam (only on a voluntary basis), but this may be subject to change in the future			
Number of energy auditors	n/a			
Special requirements for internal auditors	No special requirements, same as external auditors			

Energy auditor accreditation schemes

The administrative body for energy auditor accreditation is the Hellenic Accreditation System (E.SY.D.), under the overall supervision of the Department of Inspections for the Environment, Construction, Energy & Mines (part of the Ministry of Reconstruction of Production, Environment & Energy).

The Greek draft legislation specifies 3 categories of energy audits:

- Category A: residential buildings, office buildings up to two thousand square meters (2,000 sq m), stores up to two thousand square meters (2,000 sq m) and professional workshops with installed engine power not exceeding twenty-two kilowatts (22 kW) or thermal fifty kilowatts (50 kW).
- Category B: office buildings over two thousand square meters (2,000 sq m) commercial buildings of more than two thousand square meters (2,000 sq m), other buildings which the tertiary sector uses (such as school buildings, hotels, hospitals, etc.) and industrial and commercial facilities with a total installed capacity not exceeding one thousand kilowatts (1,000 kW).
- Category C: industrial and commercial facilities with a total installed capacity exceeding one thousand kilowatts (1,000 kW).

And 3 broad categories of energy auditors:

- Energy auditors for buildings
- Energy auditors for heating systems
- Energy auditors for cooling systems

Every candidate has the right to apply for all three categories.
Energy auditors can then be certified for 3 different licences/classes, depending on the level of their qualifications and experience:

- Class A: qualified engineers from the day they obtain their diploma and technological institutes graduate engineers one (1) year after the acquisition of their degree, as well as energy inspectors, who carry out Class A energy audits.
- Class B: Class A energy auditors can move to this Class after two (2) years and after having proven that they have performed at least five (5) energy audits, as well as engineers with professional experience in relevant energy issues, as this will be determined by the Decision of the Minister of Production Reconstruction, Environment and Energy of paragraph 1 of Article 16, which carry category A energy audits and B.
- Class C: energy auditors Class B specializing in mechanical engineering, electrical, mechanical-electrical and chemical engineering can move to this Class after two (2) years and after they have proven to perform at least five (5) energy audits of Class B control, as well as engineers specialising in mechanical engineering, electrical, mechanical-electrical and chemical engineering who have professional experience in related energy issues, as this will be determined by Judgment Minister Productive Reconstruction, Environment and Energy paragraph 1 of Article 16, which carry out category energy audits A, B and C.

Energy auditor tools and training

The Centre for Renewable Energy Sources and Saving (CRES) is responsible for the dissemination and promotion of energy efficiency applications by systematically carrying out education and training activities for the full and accurate information for professionals working in the field. Training material is published on both organisations' websites:
http://www.cres.gr/kape/education.htm
https://www.buildingcert.gr/entypo.pdf

The Technical Chamber of Greece (TEE) offers examples of energy audits and has, in cooperation with the State, developed the necessary technical instructions, which specify the standards for the inspection of energy performance of buildings.

Register of energy auditors

Energy auditors will be enrolled in the Energy Auditor Register, in the form of an electronic, publicly available, database, the compliance, control and management of which is the responsibility of the Department of Inspections for the Environment, Construction, Energy & Mines (part of the Ministry of Reconstruction of Production, Environment & Energy).

Mutual recognition

Energy auditors from other MS are allowed to carry out energy audits as long as they meet the same requirements described above and they get approval from the responsible department of the Ministry of Reconstruction of Production, Environment & Energy.

Hungary

General overview

Article 8 of the EED was transposed into Hungarian legislation by a series of Decrees that all came into force on 7 June 2015.The Hungarian Energy and Public Utility MEKH published initial practical guidelines (FAQs) on 24 June 2015, which were updated on 16 September 2015 and will be continuously updated when new, or more detailed, guidelines are established.

Full details of the Legislation are expected to be announced through a Ministerial decision in the near future.

Table 16: Overview requirements for energy auditors in Hungary

General requirements	Buildings	Industry	Transport	Services
Educational background	MSc. in Agriculture and Food, Mechanical Engineering, Agriculture Engineering or equivalent.			
Fees (euros)	There will be a registration fee and an annual maintenance fee.			
Work Experience	**AND** five years of experience between 2005 and 2015.			
Mandatory training & Completion of an exam	Mandatory written exam and optional training class.			
Number of energy auditors	None yet.			
Special requirements for internal auditors	Auditors can be internal or external as long as they are registered with MEKS and meet all requirements.			

Energy auditor accreditation schemes

The Hungarian Energy and Public Utility, MEKH (Magyar EnergetikaiésKözmuszabályozásiHivatal), oversees registration for energy auditors. Auditors are required to hold a MSc. in Agriculture and Food, Mechanical Engineering, Agriculture Engineering or equivalent, have at least five years of relevant experience between 2005 and 2015 as well as have a clean criminal record.

Accreditation will not expire for Hungarian auditors; foreign auditors' accreditations will be valid for five years.

There will be a registration fee as well as an annual fee for accredited auditors but the amounts are not available.

Energy auditor tools and training

The registration body will develop a tutorial for auditors to prepare them for the accreditation exam. This training is optional.

Register of energy auditors

There will be a register of auditors but no details are available.

Mutual recognition

Energy auditors qualified in other European MS are allowed to carry out audits in Hungary, provided that they meet the same requirements on education and experience, and are registered with MEKH. The examination is not required[46].

[46]NFM, *MagyarországKormanya, Ministry of National Development, personal communication with Dr. PéterZoboki,*

Ireland

General overview

The EED has been transposed into Irish law by the European Union (Energy Efficiency) Regulations 2014 (Statutory Instrument (SI) 426 of 2014). Part 3 of this legislation covers energy audits for large enterprises. The Sustainable Energy Authority of Ireland (SEAI) has published a Guidance Note on the Scheme[47] and a Guidance Note for Registered Energy Auditors[48], both are available online.

Table 17: Overview requirements for energy auditors in Ireland

General requirements	Buildings	Industry	Transport	Services
Educational background	At least a level 7 in a relevant discipline (Engineering, Building Services, Architecture, Energy)			
Fees (euros)	There is no fee for initial registration in 2015. This will be subject to change in the future.			
Work Experience	7 years of experience			
Mandatory training & Completion of an exam	None at the moment. SEAI may draft guidance on this in the future but currently EN 16247 is used as the template for auditors to follow			
Number of energy auditors	59 (September 2015)			
Special requirements for internal auditors	Must be on the Register of Energy Auditors and meet the eligibility criteria for registration.			

Energy auditor accreditation schemes

To become a registered energy auditor, a person must apply for registration to Sustainable Energy Authority Ireland (SEAI), pay an accompanying fee and meet any other requirements specified by SEAI. The applicant should be sufficiently qualified or should have successfully completed an approved training course in relation to different classes of energy audits. Suspension or withdrawals of energy auditors will be noted in the register[49].

The educational requirements to enter the Register of Energy Auditors are:

- at least a level 7 of the Irish Qualifications Framework (equivalent to a Master's degree) in a relevant discipline (Engineering, Building Services, Architecture, Energy), and
- 7 years' experience, and
- successfully complete one of the specified courses or be on one of the registers:

[47]SEAI, Sustainable Energy Authority of Ireland, Energy Auditing Scheme Guidance Note, version 004, http://www.seai.ie/

[48]SEAI, Sustainable Energy Authority of Ireland, Guidance Note for Registered Energy Auditors, version 004

[49]SI, Statutory Instruments, S.I. No. 426 of 2014, European Union (Energy Efficiency) Regulations, 2014

- Energy Institute Chartered Energy Engineer;
- Energy Institute Chartered Energy Manager;
- Association of Energy Engineers Certified Energy Manager;
- Association of Energy Engineers Certified Energy Auditor;
- Practicing Non Domestic BER Assessor Registered with SEAI;
- ESOS (UK Auditing scheme) Lead Assessor.

Initial registration is for one calendar year and registrations operate on a continuous basis. Renewal of registrations is subject to in date public/products liability, professional liability and, if applicable, employer's liability insurance policies, and may be subject to additional educational or administrative requirements.

Internal auditors are allowed to carry out energy audits as long as they are on the Register of Energy Auditors and meet the eligibility criteria for registration.

Energy auditor tools and training

SEAI has developed a wide range of tools and resources to support energy auditors and organisations during the auditing process. This material includes technology assessment tools, energy saving calculators and a list of best practices per application.

Enterprises are recommended to assess auditor competences when procuring the service, by applying the British Standards Institution's (BSI) Publically Available Specification (PAS) 51215 on Energy Efficiency Assessment and Competency of a Lead Energy Assessor, providing a methodology to assess the competency of a person to conduct an energy audit. An example of the Competence Assessment Template is presented on page 86[50].

SEAI does not provide an audit template, as the level of detail depends on the scale and nature of the operation being audited, but it suggests following the following standards:

- ISO 50002: 2014 Energy audits: Requirements with guidance for use
- EN16247 Parts 1-4 covering energy audits in buildings, process and transport
- CIBSE AM5:1991 Energy Audits and Surveys

Register of energy auditors

SEAI maintains a registration scheme for energy auditors to guarantee the quality of the audits. SEAI has established an interactive online register of auditors[51]. Currently (August 2015) 40 energy auditors are registered at SEAI[52].

Mutual recognition

To undertake Article 8 compliant audits in Ireland, auditors from other countries must become a Registered Energy Auditor under the Irish scheme. SEAI accepts ESOS UK qualified consultants from Northern Ireland provided they have similar levels of educational qualifications and experience.

[50] http://www.seai.ie/Your_Business/Energy-Auditing-Scheme/Competencies-Assessment-Template.docx
[51] http://www.seai.ie/Your_Business/Energy-Auditing-Scheme/Register-of-Energy-Auditors-12-2-2015.pdf
[52] SEAI, Sustainable Energy Authority of Ireland, Energy Auditing Scheme Guidance Note, version 004

Italy

General overview

Italy transposed the obligation resulting from Article 8 for large enterprises with production sites in the national territory through Decree No. 102 from 12 July 2014.[53] In May 2015 the Italian Ministry published a Guidance Document in Italian to support companies regarding the interpretation of the national legislation, providing more details regarding the energy audit requirements[54].

Table 18: Overview requirements for energy auditors in Italy

General requirements	Buildings	Industry	Transport	Services
Educational background	n/a			
Fees (euros)	€1,000 for the initial accreditation, then €100 per year.			
Work Experience	N/a			
Mandatory training & Completion of an exam	There are mandatory training schemes in place for energy auditors seeking accreditation.			
Number of energy auditors	Approximately 500 auditors.			
Special requirements for internal auditors	Audits completed by internal auditors will automatically be reviewed by the Italian Energy Agency (ENEA) (instead of the random statistically significant sample for other enterprises).			

Energy auditor accreditation schemes

The Legislative Decree indicates the following professional bodies which can conduct energy audits without accreditation until 19 July 2016: Energy Saving Companies (ESCOs), experts in energy management, energy auditors, or the Institute for Environmental Protection and Research (ISPRA) in relation with the voluntary EMAS. Energy management experts and energy auditors can be internal or external.

After 19 July 2016 energy auditors need to be certified by a body that is accredited to UNI CEI 11352, UNI CEI 11339 or other requirements (technical standards for voluntary certification of energy auditors for industry, services, transport and buildings) provided in Article 12 of the Decree related to energy auditors (GazzettaUfficialedellaRepubblicaItaliana, 2014). ACCREDIA (l'EnteItaliano di Accreditamento) is the accreditation body in charge of the accreditation of energy auditors.

Once certified, energy auditors' accreditation is valid for five years.

[53] DECRETO LEGISLATIVO 4 luglio 2014, No. 102. Online: http://www.gazzettaufficiale.it/eli/id/2014/07/18/14G00113/sg.
[54] Ministero dello Sviluppo Economico (2015): CHIARIMENTI IN MATERIA DI DIAGNOSI ENERGETICA NELLE IMPRESE AI SENSI DELL'ARTICOLO 8 DEL DECRETO LEGISLATIVO N. 102 DEL 2014. Online: http://www.sviluppoeconomico.gov.it/images/stories/documenti/Efficienza_energetica_CHIARIMENTI_DIAGNOSI_IMPRESE_19_05_15.pdf.

Energy auditor tools and training

There are mandatory training schemes in place for energy auditors seeking accreditation.

Some training programmes for the energy auditors in buildings are organised with the collaboration of ConferenzadelleRegioni e delle Province Autonome[55].

There are a number of guidelines available for audits in different sectors.

Register of energy auditors

All completed audit reports must be sent to the National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), where they will be stored in a national database.

There are multiple registers for auditors. Currently, each region has its own accreditation system and corresponding register as these were previously set up. A master register is under development.

Mutual recognition

Energy auditors accredited in another EU MS are allowed to carry out audits in Italy without additional Italian accreditation.

[55] IL RECEPIMENTO DELLA DIRETTIVA 2012/27/UE E IL RUOLO DELLA NORMATIVA TECNICA MILANO – 10 SETTEMBRE 2014 Palazzo Lombardia – Sala Biagi

Latvia

General overview

Article 8 of the EED has not yet been fully transposed into Latvian law. The existing energy efficiency directions and requirements are described in the Energy End-use Efficiency Law, whereas provisions for industrial energy audits are included in Cabinet Regulation No 138 of 12 March 2013.

In the meantime, the Ministry of Energy has published recommendations for mandatory energy audits for large enterprises[56]. The following information is based on the content of these recommendations and additional literature review at the time of writing.

Table 19: Overview requirements for energy auditors in Latvia

General requirements	Buildings	Industry	Transport	Services
Educational background	Master's degree in any field of engineering			
Fees (euros)	n/a			
Work Experience	Have a good knowledge of the technological processes of the enterprise in which an energy audit is performed			
Mandatory training & Completion of an exam	Qualification exams organised by the national Accreditation Bureau			
Number of energy auditors	n/a			
Special requirements for internal auditors	Company staff or any of its equipment designers/manufacturer, suppliers or installers are excluded from carrying out energy audits.			

Energy auditor accreditation schemes

The Latvian National Accreditation Bureau of the limited liability company "Standardisation, Accreditation and Metrology Centre" is responsible for assessing the applications for energy auditors and for organising the qualification exams.

According to Cabinet Regulation No 138, employees of an energy auditor who perform an industrial energy audit need to:

- Have acquired a master's degree or a professional master's degree in any field of engineering (energy, thermal energy, thermal technology, environmental sciences);
- Have a good knowledge of the energy audit procedures;
- Have a good knowledge of the technological processes of such enterprise in which an energy audit is performed;
- Know how to create technical notes containing information regarding the progress of the audit and the conclusions drawn during the audit;

[56] https://em.gov.lv/files/energetika/energoauditi19022015%20(1).docx

- Perform an energy audit of the buildings owned or used by the relevant enterprise and comply with the requirements laid down in the laws and regulations regarding certified energy auditors;
- Ensure they have civil and professional liability insurance in relation to activities which they are authorised to perform;
- Observe confidentiality in relation to information obtained in performing energy audits, except information to be provided to State supervision and control authorities, which in accordance with laws and regulations perform monitoring of energy efficiency.

Company staff or any of its equipment designers/manufacturer, suppliers or installers are excluded from carrying out energy audits.

Each year by 1st March, qualified energy auditors are required to submit a report to the Ministry of Economics on the industrial energy audits they performed during the previous calendar year. The report includes information regarding the number of industrial energy audits performed, the fields of industrial activities, the identified priority energy efficiency measures and the assessed potential of energy savings.

Energy auditor tools and training

The recommendations published by the Ministry of Energy include instructions for energy auditors on the requirements to be followed when they carry out an audit:

1. List the total energy consumption of the enterprise;
2. Carry out an energy audit;
3. Identify cost-effective energy efficiency measures;
4. Report on mandatory energy audit to the Ministry of Economy;
5. Report annually to the Ministry of Economy regarding existing energy efficiency measures and achieved energy savings of the enterprise.

Copies of the International standards that auditors need to apply during energy audits are available from the Centre for Standardisation, Accreditation and Metrology (http://www.samc.lv)

Register of energy auditors

A list of energy auditors is kept updated by the Latvian National Accreditation Bureau (LATAK) and is accessible on its website. The Ministry of Economy also maintains a list of independent experts in the field of energy performance of buildings (building energy auditors)

https://em.gov.lv/lv/nozares_politika/majokli/eku_energoefektivitate/neatkarigo_ekspertu_eku_energoefektivitates_joma_registrs/

Initially, accreditation is granted for four years. The term of accreditation after a repeat accreditation procedure is five years.

Mutual recognition

No information available.

Lithuania

General overview

Article 8 of EED has not yet been officially transposed into the national law. A new energy efficiency law is currently being prepared, although clarifications on the requirements for energy auditors are provided through secondary legislation 1-148 that was recently amended (7 February 2015)[57].

Table 20: Overview requirements for energy auditors in Lithuania

General requirements	Buildings	Industry	Transport	Services
Educational background	Degree in civil or energy engineering	Degree in electrical or energy or industrial engineering		Degree in electrical or energy or industrial engineering
Fees (euros)	n/a			
Work Experience	3 years of professional experience in energy auditing and energy management activities			
Mandatory training & Completion of an exam	Training course provided by educational institutions			
Number of energy auditors	100+			
Special requirements for internal auditors	1 year of professional experience and not being directly involved in the activity to be audited			

Energy auditor accreditation schemes

According to the secondary legislation 1-148, Article 8 compliant audits need to be carried out by energy auditors that hold the following qualifications:

- A university degree in the field of 'sciences and technology' or equivalent education (bachelor's or professional bachelor's degree);
- At least 3 years of professional experience in energy efficiency activities;
    - energy audits
    - implementation of energy management
    - building energy performance certification
    - energy manager activities
    - technological engineering systems design
    - building energy systems design
    - building structure design
    - technological process management
- For building audits, specifically, a degree in civil or energy engineering is required whereas for processes auditing a degree in electrical or energy or industrial engineering is needed.

[57] https://www.e-tar.lt/portal/en/legalAct/TAR.0B8D09CABCF1/GJHEibvfhF

Internal auditors need to have at least 1 year of professional experience in energy auditing and they cannot be directly involved in the activity to be audited.

Energy auditor tools and training

Energy auditors need to complete a training course in order to be certified. Training courses are only provided by educational institutions that have been approved by the Lithuanian Ministry of Energy. Sections VI. and VII. of the amended Secondary legislation 1-148 list out detailed requirements of accredited educational institutions.

Register of energy auditors

Currently there are over 100 energy auditors[58] who have granted an auditor's qualification to conduct energy audits, according to the provisions of Order No 1-148 of the Minister for Energy of the Republic of Lithuania (August 2012). The register is publicly available through the website of the Lithuanian Ministry of Energy:

http://www.ena.lt/pdfai/Auditorius_duombaze_internete.pdf

Mutual recognition

No information available.

[58] http://www.ena.lt/pdfai/Auditorius_duombaze_internete.pdf

Luxembourg

General overview

Article 8 of the EED has not yet been transposed into the national law. The existing provisions for energy audits in businesses as well as the requirements of energy auditors are included in the "Règlement grand-ducal du 11 août 1996 concernant la réalisation d'audits énergétiques dans les bâtiments du secteur résidentiel et tertiaire, ainsi que dans les entreprises"[59].

Table 21: Overview requirements for energy auditors in Luxembourg

General requirements	Buildings	Industry	Transport	Services
Educational background	Auditors must be registered architects or consulting engineers.			
Fees (euros)	n/a			
Work Experience	**OR** auditors can apply for a permit from the Ministry that requires them to demonstrate their qualifications.			
Mandatory training & Completion of an exam	Training is required for self-certification on 'Myenergy' but the certification is optional.			
Number of energy auditors	n/a			
Special requirements for internal auditors	n/a			

Energy auditor accreditation schemes

Anyone conducting energy audits must be certified to issue energy performance certificates. In order to issue an energy performance certificate, individuals must be registered architects or consulting engineers. Alternatively, auditors can apply for a permit from the Ministry of the Economy and demonstrate their qualifications.

Energy auditor tools and training

The government created 'Myenergy' to distribute information, training and advice about energy efficiency. 'Myenergy' is a collaboration between the central government and local authorities and disseminates information to different target groups.

The government has also collaborated with the "Centre de Ressources des Technologies pour l'Environnement" to raise awareness about energy audits and offer advice.

Auditors are encouraged to participate in training classes on energy efficiency in buildings, but this is not required. These training classes are provided by the Ministry of the Economy and include the following topics:

- Energy Advisor for Residential Buildings

[59] http://www.legilux.public.lu/leg/a/archives/1996/0067/a067.pdf#page=1

- Certified Passive House Planner
- Advanced Class on Thermal Bridge Calculations
- Advanced Class on Internal Insulation
- Training in Energy Management (ISO 50001)
- A full list can be found online: http://eacademy.lu/

The Professional Association of Architects and Consulting Engineers and CRP Henri Tudor also organises a series of advanced training classes in construction and energy.

Register of energy auditors

Individuals who have participated in the expert training classes are added to a register as experts on residential or non-residential buildings.

'Myenergy' also offers a self-certification for energy auditors. This list is targeted towards the consumer in order to provide a dependable source of information on the quality of energy auditors. This certification is optional, but requires energy auditors to make their work available for professional review if requested and attend training courses.

Mutual recognition

No information available.

Malta

General overview

Article 8 of the EED was transposed into Maltese legislation by Legal Notice 196 of 2014 and Building Regulation Act (CAP. 513) on Energy Efficiency and Cogeneration Regulations)[60] which entered into force on 1 January 2014. Practical guidelines to interpret this Act have been published by Malta Resources Authority (MRA) in the Guidance Note on the carrying out of mandatory energy audits by non-SMEs.

Table 22: Overview requirements for energy auditors in Malta

General requirements	Buildings	Industry	Transport	Services
Educational background	Level 6 (Bachelor degree) or higher in engineering or in a related applied science or employed with a reputable firm with expertise and a track record in energy management			
Fees (euros)	n/a			
Work Experience	n/a			
Mandatory training & Completion of an exam	Training courses mandatory for auditors to be accredited Organised and held by private companies			
Number of energy auditors	39 energy auditors and 8 certified energy managers (July 2015)			
Special requirements for internal auditors	Internal auditors can carry energy audits provided that: a) They have suitable experience and training for carrying out energy audits according to LN 196 of 2014 b) They act in an independent manner in the performance of the audit.			

Energy auditor's accreditation schemes

Energy auditors can be external or in-house experts. External auditors need to be (i) registered at the MRA and for 2015 qualified at least to MQF[61] (Malta Qualifications Framework) level 6 or higher in engineering or in a related applied science, or (ii) be employed with a reputable firm with expertise and a track record in energy management, in which case the audit must be signed by a person qualified and registered as above. MRA requires that energy auditors follow appropriate training

[60] L.N. 196, Legal Notice 196 of 2014, Malta Resources Authority Act (CAP. 423) and Building Regulation Act (CAP. 513), Energy Efficiency and Cogeneration Regulations, 2014.

[61] The Malta Qualifications Framework for Lifelong Learning is based on the EQF (European Qualification Framework). EQF acts as a translation device to make national qualifications more readable across Europe, promoting workers' and learners' mobility between countries and facilitating their lifelong learning. An MQF level 6 corresponds to a bachelor's degree.

courses as in GN 1302[62] and are certified as such. The validity of the certification issued to energy auditors is restricted for a period of time of ten years.

In-house experts need to have suitable experience and training for carrying out energy audits that meet the minimum requirements, and cannot be directly engaged in the activity being audited[63] .

Energy auditor tools and training

Training courses are mandatory for auditors to be accredited and they are organised and held by private companies (not by the government). By August 2015, two courses had been completed with 30 engineers certified as energy auditors. A third course (of 15 applicants) is planned for the near future. A list of registered training courses leading to the Certification of Renewable Energy System installers, Energy Managers and Energy Auditors (non-buildings) is available on the website of MRA64.

Training for energy auditors and energy managers must be in line with EN ISO 50002 or EN 16247 -1 (Energy Audits), or if including an energy audit, EN ISO 14000 (Environmental Management Systems).

Register of energy auditors

There is an online register available for companies to search for energy auditors. This has been available since March 2015. The link to the list of Certified Energy Auditors (non-Buildings) and Energy Managers as per GN 1302 of 2014is available on the MRA website[65] and it has already been shared with a network of SMEs. In July 2015, there were 39 certified energy auditors listed in the official MRA register.

Mutual recognition

There is no mutual recognition for energy auditors certified in other MS.

[62]Government Notice 1302 relates to the Scheme for the registration of training courses leading to the certification of renewable energy system installers, providers of energy services, energy auditors and energy managers.

[63]MRA, Guidance Note on the carrying out of mandatory energy audits by non-SMEs pursuant to LN 196/2014 transposing the energy efficiency Directive 2009/27/EU, Malta Resources Authority, available online from http://mra.org.mt/wp-content/uploads/2012/08/884/Non-SMEs-Guid-Note-final-3-1.pdf

[64]http://mra.org.mt/wp-content/uploads/2013/07/4297/EnergyCourses20May2015.pdf

[65]http://mra.org.mt/wp-content/uploads/2013/07/4297/EnergyAuditorsManagerList1stJuly2015-2.pdf

Netherlands

General overview

Article 8 of the EED has not yet been fully transposed into Dutch legislation. A Decree on Environmental Management (ActiviteitenbesluitMilieubeheer) is under development which will ensure the full implementation of Article 8 and which will run in parallel with the existing Voluntary Agreement scheme.

In the meantime, the Dutch government published the binding Temporary Regulation on the Implementation of Article 8 on 15 July 2015[66], together with an overview of 'Frequently Asked Questions' and a 'Step-by-Step Approach to Understand the Audit Obligation'[67].

Table 23: Overview requirements for energy auditors in the Netherlands

General requirements	Buildings	Industry	Transport	Services
Educational background	The Dutch government does not have specific requirements or a specific accreditation process.			
Fees (euros)	n/a	n/a	n/a	n/a
Work Experience	The Dutch government does not have specific requirements regarding work experience.			
Mandatory training & Completion of an exam	The Dutch government does not have specific requirements.			
Number of energy auditors	n/a	n/a	n/a	n/a
Special requirements for internal auditors	No special requirements, internal auditors are allowed.			

Energy auditor accreditation schemes

The Dutch government does not have an accreditation scheme and does not have specific requirements for energy auditors.

Energy auditor tools and training

There are a number of training programmes available in the Netherlands, many of which have been accredited by independent organisations such as the StichtingKwaliteitsborgingInstallatiesector (Foundation for Quality Assurance in the Installation Sector, KBI) or the Platform for Certification of Environmental and Occupational Health & Safety Management Systems (SCCM). The Accreditation Council (Raad voor Accreditatie) supervises the certifying bodies.

[66]Staatscourant, Regeling van de Staatssecretaris van Infrastructuur en Milieu, van 10 juli 2015, nr. IENM/BSK-2015/103340, houdende vaststelling van regels ter implementatie van de artikelen 8, vierde, vijfde en zesde lid, en 14, vijfde en zesde lid, van de richtlijn energie-efficiëntie (PbEU 2012, L 315) (Tijdelijke regeling implementatie artikelen 8 en 14 Richtlijn energie-efficiëntie), Officiële uitgave van het Koninkrijk der Nederlanden sinds 1814, Jaargang 2015, Nr. 20036

[67]RVO, Veel gestelde vragen en antwoorden bij de auditverplichting van de EED, Rijksdienst Voor Ondernemend Nederland, available online fromhttp://www.rvo.nl/sites/default/files/Veel%20gestelde%20vragen%20en%20antwoorden%20en%20stappenplan%20bij%20de%20auditverplichting%20EED.pdf

Register of energy auditors

There is no register as there are no certification or accreditation requirements. There is a register of the data used and the results of each energy audit performed. It is the responsibility of the audited enterprise to upload the audit results to the register.

Mutual recognition

The audit can be carried out by an internal or external energy auditor. The Dutch government does not impose an accreditation obligation for auditors, or any specific requirements regarding education, training or experience. Therefore, auditors qualified in other MS are automatically allowed to also carry out energy audits in the Netherlands [68].

[68] RVO, *Rijksdienst Voor Ondernemend Nederland, personal communication with Jorieke Rienstra, RVO Advisor*

Poland

General overview

The Polish government is currently revising the existing Energy Efficiency Law (EEL) – expiring by the end of 2015 - and a draft of the amendments of 8th January 2015 (version 1.21) is available online[69].

Table 24: Overview requirements for energy auditors in Poland

General requirements	Buildings	Industry	Transport	Services
Educational background	n/a	n/a	n/a	n/a
Fees (euros)	n/a	n/a	n/a	n/a
Work Experience	n/a	n/a	n/a	n/a
Mandatory training & Completion of an exam	n/a	n/a	n/a	n/a
Number of energy auditors	n/a			
Special requirements for internal auditors	Internal auditors not directly involved in the activity being audited are allowed.			

Energy auditor accreditation schemes

According to the January 2015 amendments of the EEL, audits need to be carried out by an independent external auditor who has sufficient knowledge and professional experience to carry out the audit, but it can also be carried out by an internal auditor provided that he or she is not directly involved in the activity being audited.

Energy auditors have to be aligned with guideline document "Rozporządzenieministragospodarki w zakresieaudytuenergetycznegonapotrzebyustawy o efektywnościenergetycznej" and the energy audit reports will be randomly verified by URE (Energy Regulatory Office).

Energy auditor tools and training

In the third Polish NEEAP it is stated that the Polish-Japanese Energy Conservation Technology Centre (PJCEE), operating at the KrajowaAgencjaPoszanowanieEnergii (KAPE S.A. Polish National Energy Conservation Agency), organises cyclical training sessions for persons involved in energy management, and for managerial staff of enterprises, to increase the competences of persons carrying out energy audits. Training is conducted in the form of lectures, practical workshops in laboratories (work with pumps, ventilators, compressors etc.).

Training projects are also carried out under the Operational Programme Human Capital. Depending on the sector, training courses are organised by third level educational institutions (public and non-public), by research institutions, and by foundations, associations, and private enterprises.

[69]EEL, Energy Efficiency Law revision of 8 January 2015 (draft), version 1.21, 2015.

Register of energy auditors

No information available.

Mutual recognition

No information available.

Portugal

General overview

On April 30 2015 Portugal published its Decree Law, Decreto-Lei n.º 68-A/2015[70], to formally transpose the EED. This law has made some modifications to Portuguese legislation, including the requirement for large enterprises (as defined by the EC) to carry out energy audits, in order to harmonise the conditions with the existing SGCIE scheme (Management System of Intensive Energy Consumption) for industry.

Energy auditors' requirements are presented in Lei n.°7/2013 and Lei n.°58/2013.

Table 25: Overview requirements for energy auditors in Portugal

General requirements	Buildings	Industry	Transport	Services
Educational background	Degree in architecture or a certain type of engineering	University degree+1 year of energy auditing activities **OR** 2 years of energy auditing activities		Degree in architecture or a certain type of engineering
Work Experience	5 years of professional experience			5 years of professional experience
Fees (euros)	>€250	€250		n/a
Mandatory training & Completion of an exam	Exam organised by SCE			
Number of energy auditors	~2,000	323	n/a	n/a
Special requirements for internal auditors	n/a			

Energy auditor accreditation schemes

Since Portugal already had its own mandatory scheme in place for energy audits, professionals qualified to undertake audits in compliance with Article 8 must be part of the existing recognition scheme. Article 8 audits must be conducted by an engineer recognised either by the "Ordem dos Engenheiros" or by the "AssociaçãoNacional dos EngenheirosTécnicos".

The recognition schemes require certain levels of competence to be met through qualifications and experience in conducting audits, requirements which differ according to the object of the audit: buildings, industry or transport.

For the industrial or transport sector, the following qualifications are required:

- If the auditor has a university education in the field of energy auditing, a proof of having performed energy consulting or energy auditing activities for one year;

[70] https://dre.pt/application/file/67123417

- Otherwise, proof of having worked as an engineer in an energy-intensive company for three years or having performed energy consulting or energy auditing activities for two years.

For the commercial and services sector (buildings), the following qualifications are required:

- A degree in architecture or a certain type of engineering (inter alia civil engineering, mechanical engineering, electro-technical engineering, air-conditioning and energy engineering).
- Five years of professional experience in the building construction sector.

Auditors can be qualified in more than one sector and can apply to be recognised by the scheme at any time- this recognition lasts indefinitely.

The range of companies that auditors can come from is restricted. At the moment there are:

- Industry: 323 auditors from around 48 companies (no further companies will be allowed to be recognised now).
- Buildings: About 2,000 auditors.

There is an accreditation fee for industry and transport audits of 250 Euros. The fee for buildings is slightly higher than this, but specific information was not available at the time of this study.

Energy auditor tools and training

Auditors are required to pass a specific exam organised by the entity responsible for the Portuguese energy certification system ("SCE").

For industry audits there is legislation under the decree law that sets out what the audits should include. For building audits, a number of guidance documents are available. For transport there is information on audit content in the legislation and a guide will also be published soon.

Register of energy auditors

A list of competent auditors is provided on the Ministry website.

Mutual recognition

Accreditations for auditors from other MS are not recognised in Portugal.

Romania

General overview

Romania has transposed Article 8 of the EED though the Law on energy efficiency (legeprivindeficienţaenergetică) of 1 August 2014, and provisions on the certification of energy managers has been issued by the Romanian National Regulatory Authority for Energy (ANRE) (2794/17.12.2014) in 17 December 2014.

The requirements for external and internal energy auditors are quite detailed and strict. Only accredited auditors are listed in the register and they are the only ones allowed to carry out audits. Additionally, there are certain levels and areas of education and lists of equipment that should be owned to undertake audits.

Table 26: Overview requirements for energy auditors in Romania

General requirements	Buildings	Industry	Transport	Services
Educational background	Engineering or technical degree.	No qualification process, done by sector experts.	n/a	n/a
Fees (euros)	€378 for individual auditors and €667 for legal entities.	None.	n/a	n/a
Work Experience	**AND** two to three years of energy management experience (depending on education).	No qualification process, done by sector experts.	n/a	n/a
Mandatory training & Completion of an exam	**AND** completion of a training course by ANRE unless the auditor holds a master's degree in energy efficiency or a doctorate in engineering.	No qualification process, done by sector experts.	n/a	n/a
Number of energy auditors	208 individual auditors and 59 legal entities.	None registered.	n/a	n/a
Special requirements for internal auditors	No difference.			

Energy auditor accreditation schemes

Auditors need to hold a degree in energy efficiency or related engineering and have two to three years of energy management experience (depending on their level of education). The auditor also needs to complete a training course approved by the Romanian National Regulatory Authority (ANRE) unless they hold a master's degree in energy efficiency or a doctorate in engineering. Auditors should also have a clean criminal record.

The authorisation to conduct audits is issued by ANRE and all applications must be approved by ANRE. Applications can be submitted at any time. The accreditation is valid for three years and can be extended by another three years upon request and ANRE approval.

There are two types of applications for the authorisation of energy auditors:

- Energy auditors for buildings-authority responsible for authorisation: Ministry of Regional Development and Public Administration
- Energy auditors for industrial sector: authority responsible for authorisation Regulatory Authority for Energy (ANRE)

There is no qualification process for transport auditors; this is currently undertaken by the industry sector energy experts.

For each type of energy auditor, a register exists which is managed by the authority mentioned above.

Energy auditor tools and training

A mandatory training class is provided by ten ANRE approved universities (for buildings and industrial sectors only). The training has both theoretical and hands-on portions and includes the following modules:

- I: Basics of electric and thermal energy (15 hours)
- II: Electric and non-electric measures (20 hours)
- II: Development and analysis of electric and thermal energy audits (25 hours)

ANRE also provides an online library with relevant documents, available here:

http://www.anre.ro/ro/eficienta-energetica/legislatie/legislatie-efic-en

Register of energy auditors

Once accredited, building and industrial sector auditors are recorded in a register managed by ANRE.

http://213.177.15.183/PublicLists/ListeEficienta/AuditoriPFEF

ANRE maintains a separate register of the audit results.

Mutual recognition

Energy auditors authorised in another MS of the European Union or European Economic Area can be recognised in Romania, if they prove knowledge of Romanian legislation by undertaking an interview. Applicants must submit the following documents to Regulatory Authority for Energy:

a) a certified copy of the authorisation issued in a MS of the European Union or the European Economic Area translated and legally certified;

b) references to work carried out in the past 3 years as energy auditor;

c) list of equipment owned by the applicant specific to work required for energy audits

Energy auditors from countries outside the European Union must attach to the documentation (in addition to the documents mentioned above) certificates of equivalence/recognition of university degrees related issued by the National Council for Recognition and Equivalence of Diplomas from Romania.

Slovakia

General overview

Article 8 of the EED has been transposed in Slovakia through the law on Energy Efficiency (321/2014)71 which entered into force on 1 December 2014. Additional provisions on the conditions for carrying out energy audits are included in previous legislation 429/2009.

Table 27: Overview requirements for energy auditors in Slovakia

General requirements	Buildings	Industry	Transport	Services
Educational background	Technical vocational or university degree in a technical, economic or natural science field with a focus in mathematics, physics or chemistry disciplines.			
Fees (euros)	n/a	n/a	n/a	n/a
Work Experience	**AND** five years of experience in energy consulting or technical economic analyses of energy if the auditor holds a vocational degree, three years if the auditor holds a university degree and two years if the auditor has a master's degree.			
Mandatory training & Completion of an exam	Must take a refresher course once every three years.			
Number of energy auditors	n/a	n/a	n/a	n/a
Special requirements for internal auditors	No additional requirements. Internal and external auditors need to be registered with the Ministry of Economy.			

Energy auditor accreditation schemes

Paragraph 12 of the Energy Efficiency Act 321/2014 sets out the requirements to become a registered energy auditor in Slovakia (Energy Efficiency Act 321/2014): Auditors must have a technical vocational or university degree in a technical, economic or natural science field with a focus in mathematics, physics or chemistry disciplines. The auditor must also have five years of experience in energy consulting or technical economic analyses of energy if the auditor holds a vocational degree, three years if the auditor holds a university degree and two years in the auditor has a master's degree.

Energy auditor tools and training

Every three years accredited auditors need to take a refresher training class.

Register of energy auditors

Energy auditors must report their audits to a monitoring system.

[71] http://www.economy.gov.sk/index/open_file.php?ext_dok=144394

Mutual recognition

According to the legislation it is possible for auditors who are certified in other MS to perform audits in Slovakia, however the recognition process in not yet well defined.

Slovenia

General overview

Slovenia has not yet fully transposed Article 8 of the EED despite the general provisions of Art. 354 of the Energy Act (Energetski zakon) of 4 March 2014[72]. Large enterprises shall be subject to an energy audit every four years.

Table 28: Overview requirements for energy auditors in Slovenia

General requirements	Buildings	Industry	Transport	Services
Educational background	Degree in a relevant discipline	n/a	n/a	n/a
Fees (euros)	n/a	n/a	n/a	n/a
Work Experience	**AND** two years of work experience in energy efficiency or renewable energy.	n/a	n/a	n/a
Mandatory training & Completion of an exam	**AND** a training course on issuing energy performance certificates.	n/a	n/a	n/a
Number of energy auditors	n/a	n/a	n/a	n/a
Special requirements for internal auditors	n/a			

Energy auditor accreditation schemes

The Ministry of Infrastructure is responsible for EED implementation.

The Ministry has not yet set the criteria for energy auditors.

Auditors in the buildings sector need to have a degree in a relevant field and at least two years of work experience in the energy efficiency or renewable energy fields. Additionally, they must take a training course about energy performance certificates before they can perform audits. These requirements only apply to auditors in the buildings sector.

Energy auditor tools and training

The Chamber of Commerce and Industry Slovenia has organised several conferences to promote energy audits.

Register of energy auditors

No information available.

Mutual recognition

No information available.

[72] https://www.uradni-list.si/1/content?id=116549

Spain

General overview

Spain has not yet transposed the obligation to conduct energy audits for large enterprises resulting from Article 8 EED into national legislation. A draft Royal Decree (June 2015) is currently under discussion and still pending approval by the government. Therefore, the following description of the general framework conditions regarding this law is based on the preliminary information currently available.

Table 29: Overview requirements for energy auditors in Spain

General requirements	Buildings	Industry	Transport	Services
Educational background	n/a	n/a	n/a	n/a
Fees (euros)	€2,000 (quote from ENACE)	n/a	n/a	n/a
Work Experience	n/a	n/a	n/a	n/a
Mandatory training & Completion of an exam	n/a	n/a	n/a	n/a
Number of energy auditors	n/a	n/a	n/a	n/a
Special requirements for internal auditors	Internal auditor must not be directly involved in the activity being audited.			

Energy auditor accreditation schemes

Energy audits in Spain must be independent and carried out by internal competent personnel or - at the administration's discretion - by authorised auditing bodies or entities. They must be carried out by energy auditors qualified in accordance with the provisions of the Royal Decree (NEEAP III Spain, 2014).

According to the draft legislation, energy auditors who carry out Article 8 compliant audits need to fulfil the following requirements:

- Possession of a university degree in engineering or architecture, or higher level, or other university degrees or Master in scientific and technical disciplines.
- Provide appropriate technical means to provide energy services in the area of activity in which the company acts.
- Be discharged from the corresponding Social Security regime and meet current obligations to the Social Security
- Have signed liability insurance to cover the risks that can result from their actions, for a minimum amount of 300,000 euros, which can be updated by order of the Minister of Industry, Energy and Tourism

- Depending on the field of activity in which the company providing the energy service operates (Heating systems, lighting, refrigeration, etc.), specific knowledge and competencies must be demonstrated.
- When energy services are provided by a Joint Company (UTE), it is sufficient that one of its members is registered as an auditor.

Auditors can be internal or external, provided that they are independent and not directly involved with the processes that are subject to the energy audit, and provided that they are accredited by the National Accreditation Body ENAC (EntidadNacional de Accreditacion).

Energy auditor tools and training

There is not an official training scheme, or guidance document provided by the government at this stage.

In the absence of a central training scheme offered by the government and with the deadline of 5th of Dec 2015 approaching, ENACE (EntidadNacional de Auditores y Certificadores de Edificación) has taken the initiative to develop a unique training scheme referring to the European standards, and uses best practice examples from Germany, Malta and Finland. The number of energy auditors in Spain is not sufficient to cover the Article 8 requirements and that is why ENACE is working to increase the number of qualified auditors.

The ENACE training programme is split into 3 levels:

- Basic
- Expert
- Lead: Independent energy auditor, carries out audits as an external

Experts and Leads are qualified to become Building Managers.

The training scheme follows the European Standards (SEN Committee. 16247/part5). They are also in cooperation with the UK Energy Managers Association.

Register of energy auditors

The energy auditors will be enrolled in the Energy Auditor Register, in the form of an electronic database, whose compliance, control and management is in the responsibility of the Ministry of Industry, Energy and Tourism.

Currently, there is also a database of energy auditors which is administered by ENAC and is saved on their website[73].

Mutual recognition

To be defined in the new legislation.

[73] https://www.enac.es/web/english

Sweden

General overview

The obligations of Article 8 of the EED for large enterprises are transposed into national legislation by the law on energy audits in large companies (SFS 2014:266) in conjunction with regulation SFS 2014:347 on energy audits in large companies. The Swedish Energy Agency is the supervising authority for energy audits in large companies in Sweden. A set of instructions by the Swedish Energy Agency (STEMFS 2014:2) provides further specifications on the implementation and reporting of energy audits in large companies.

Table 30: Overview requirements for energy auditors in Sweden

General requirements	Buildings	Industry	Transport	Services
Educational background	Technical college degree + 3 years of work experience **OR** Relevant university degree + 4 years of work experience **OR** Technical secondary education or advanced vocational training + 5 years of work experience **OR** 10+ years of experience			
Fees (euros)	n/a	n/a	n/a	n/a
Work Experience	n/a	n/a	n/a	n/a
Mandatory training & Completion of an exam	Written and oral exam			
Number of energy auditors	n/a			
Special requirements for internal auditors	Not being directly involved in the activity to be audited.			

Energy auditor accreditation schemes

When a company has a certified energy or environmental management system, the energy audit can be carried out by an internal auditor, provided that this auditor meets the skills requirements of the Swedish Energy Agency (STEM). If no such management system is in place, an external certified energy auditor needs to be contracted: STEM and the Swedish Board for Accreditation and Conformity Assessment (SWEDAC StyrelsenförAckrediteringochTekniskKontroll) are currently working on a certification scheme for individuals. Once this certification scheme has been established, a list of certified auditors will be published online[74].

[74] *http://www.energimyndigheten.se/Foretag/Energikartlaggning-i-stora-foretag/*

A recent guidance document (September 2015) for energy audits in large companies was published by STEM and describes the following requirements that apply to certified energy auditors[75]:

- a technical college degree and at least three years of work experience in the fields of energy efficiency, energy audits and energy management, or
- a relevant university degree and at least four years of work experience in the fields of energy efficiency, energy audits and energy management or
- technical secondary education or advanced vocational training and at least five years of work experience in the fields of energy efficiency, energy audits and energy management or
- at least ten years of experience in the fields of energy efficiency, energy audits and energy management.

Auditors also need to pass both a written and oral exam and their accreditation is valid for a period of five years.

Energy auditor tools and training

STEM is currently developing guidelines to help companies assess the definition of a 'representative image' of the company's totally energy use as well as the scope, boundaries and priorities of the energy audit. According to the Agency's guidance, an energy audit should take into account the overall energy consumption of the enterprise as well as the detailed energy use of its most energy intensive units in order to have this representative image[76].

Register of energy auditors

No information available.

Mutual recognition

Auditors certified in other EU MS are allowed to carry out audits in Sweden without additional Swedish accreditation.

[75] https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=0CCcQFjABahUKEwi0jtDKpojIAhXo8XIKHZbgBLc&url=https%3A%2F%2Fenergimyndigheten.a-w2m.se%2FFolderContents.mvc%2FDownload%3FResourceId%3D5505&usg=AFQjCNHA3P-bUp9s_W-HswW9ExOcbtBeWQ&sig2=nhXVSh7e0lCMgxR-RHUyUw&bvm=bv.103073922,d.bGg

[76] STEM, Lagen om energikartläggningistoraföretag*(The law on energy audits for large enterprises), Energimyndigheten, available online from http://www.energimyndigheten.se/Foretag/Energikartlaggning-i-stora-foretag/*

United Kingdom

General overview

In the UK, Article 8 implementation and transposition into national law has taken the form of the Energy Savings Opportunity Scheme (ESOS) Regulations which came into force in 17 July 2014. The Environment Agency has been nominated as the scheme administrator and is responsible for maintaining a list of approved registers. Energy audits need to be carried out by certified Lead Assessors with appropriate knowledge and experience.

Table 31: Overview requirements for energy auditors in the UK

General requirements	Buildings	Industry	Transport	Services
Educational background	PAS 51215:2014 requirements			
Fees (euros)	Each professional body has its own fees depending on the length of the training course			
Work Experience	Minimum length of two years' professional energy assessment and energy audit experience Involvement with two or more energy efficiency assessments/audits			
Mandatory training & Completion of an exam	1-day training course			
Number of energy auditors	500+ lead assessors			
Special requirements for internal auditors	n/a			

Energy auditor accreditation schemes

An ESOS compliant energy audit must be carried out by an ESOS lead assessor or by an auditor who is not a lead assessor, but will then need to be signed off by a certified lead assessor. For someone to become an ESOS lead assessor they need to be a member of an approved professional body register for one of the following:

- Association of Energy Engineers: Certified Energy Manager International (CEMI) and Certified Energy Auditor International (CEAI) certifications
- CIBSE (The Chartered Institution of Building Services Engineers)
- ECMK Limited
- Elmhurst Energy Systems
- Energy Institute (EI)
- Institution of Chemical Engineers
- Institution of Environmental Sciences
- National Energy Services Limited
- Quidos
- Stroma Certification Ltd
- The Energy Managers Association

- The Institute of Environmental Management and Assessment
- The Institute of Environmental Management and Assessment

All professional register bodies follow the same accreditation process that has been developed by the Environment Agency (EA):

- Meet the competence requirements established by PAS 51215:2014.
- Prove a minimum length of two years' professional energy assessment and energy audit experience
- Involvement with two or more energy efficiency assessments/audits (either as an assessment team member or as the lead assessor)
- Attendance of one-day training course.

A lead assessor can be an employee or a third party (external contractor).

Energy auditor tools and training

The UK market provides a wide range of training and qualification opportunities for energy auditors, including post-graduate level qualifications in energy and environmental management. The UK also has a well-established framework for energy managers with a variety of training schemes and education packages offered by the Energy Institute and the Institute of Environmental Management Assessment (IEMA) (NEEAP UK, 2014).

The EA has approved the Certified Energy Manager International and Certified Energy Auditor International certifications, provided by the Association of Energy Engineers (AEE), as meeting the requirements of the UK Energy Savings Opportunity Scheme to implement Article 8 of the EED. Within this scope, the AEE has prepared a presentation that gathers all the relevant key requirements in order for auditors to understand what it entails to become an ESOS Lead Assessor:

http://www.aeecenter.org/files/certification/International/ESOS.pdf

The EA has developed and published in its website a guide on complying with the scheme[77] which provides details on required qualifications for energy auditors.

The Energy Institute, one of the professional bodies listed above, provides a range of tools for auditors, including the ESOS Toolkit, in its website. The toolkit is designed for those undertaking audits to help with compliance and cost-effective action to reduce energy use. The toolkit, which can be used by in-house or consultancy based Lead Assessors and others involved in ESOS work, contains tools to help collate information on total energy consumption, audit completion, life cycle cost and commercial considerations[78].

The EA does not require data to be collated or recorded in particular formats, and therefore they have not developed any standard templates for the ESOS activities or the presentation of findings.

The only standardised element is the notification of compliance, which needs to be made to the EA via an online portal. This is available on the ESOS webpage:

https://www.gov.uk/energy-savings-opportunity-schemeesos#submit-your-esos-notification-of-compliance

[77] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/445205/LIT_10094.pdf
[78] https://www.energyinst.org/training/energy-management-courses/esos-training/esos-toolkit

Energy auditors' register

Organisations can find a lead assessor using the hyperlinks to the approved registers on the ESOS page[79]. On the webpages of the approved professional bodies' registers there are lists of contact details and specialisms for approved lead assessors who are willing to act as lead assessors for third parties.

Mutual recognition

Mutual recognition is not applicable in the UK.

[79]https://www.gov.uk/energy-savings-opportunity-scheme-esos

4. Best practices

Our study on the national qualification systems of energy auditors has shown that there is vast diversity between MS in the transposition of Article 8. While this is proving to be challenging - especially for multi-national enterprises that may need to comply with different national requirements – it is also leading to the development of recommended courses of actions, through broad experience and research, where MS have the opportunity to learn from each other and adjust their policies accordingly.

In this section we provide a set of recommendations for best practices with regard to the implementation of accreditation schemes and training programmes for energy auditors, as well as knowledge sharing opportunities to support MS implementation of Article 8.

1. Apply sub-categories in auditor training

MS are required to "encourage training programmes for the qualification of energy auditors to facilitate sufficient availability of experts" (Article 8(3)) and to ensure quality audits.

Enterprises that undergo an energy audit do not have an obligation to implement any energy saving measures once the audit is completed. A number of MS are addressing this potential 'missed opportunity' by making sure that there are enough suitably skilled and specialised auditors who are capable of identifying and making detailed recommendations for reducing energy use throughout the enterprise being assessed.

During our research, we have identified that several MS have defined sub-categories of auditor training requirements, meaning that the auditors have to have skills that are specifically aligned to the sector/company for which the audit is being carried out. This way, auditors develop necessary skills to potentially propose recommendations to businesses in addition to just identifying cost-effective ones. MS that follow this approach are Austria, Belgium Walloon Region, Cyprus, France, Greece and Portugal.

2. Apply sub-categories in auditor accreditation

Most of the MS have specific accreditation requirements by sector; however, there is a general lack of specific schemes for transport audits. The fact that specific accreditations for buildings, mainly due to the pre-existing requirements to assess the energy performance of buildings, and industrial processes are put in place seeks to ensure a comparable level of energy auditor's expertise.

Good practice in guaranteeing high-quality through qualification/ accreditation requirements:

In defining the accreditation requirements for experts, Cyprus defined separate accreditation schemes for buildings, industrial processes/facilities and transport. As such, energy auditors must be accredited under the correct scheme in order to undertake energy audits, in line with Article 8, of buildings, industrial processes/facilities or transport.

This approach helps to guarantee high quality energy audits by firstly confirming, through the accreditation process, that the expert has the relevant qualifications and practical experience relevant to the scope of the audit to be undertaken

This approach mirrors the 'scope of accreditation' requirements for verifiers under the EU Emissions Trading System (EU ETS), where verifiers must be accredited by their

national accreditation body for activities pursuant to Annex I or other activities pursuant to Articles 10a and 24 of the EU ETS Directive[80].

3. Increase reliability of energy auditors and promote certified quality

A set of quality labels for professionals will increase the quality of the work provided. This is the case for the RGE quality label in France.

French certification scheme: RGE quality label

RGE stands for 'Reconnu Garant de l'Environnement' : guarantee for the environment. It is a voluntary scheme that was set up in 2011 as a set of quality labels for professionals that applies to the company and was signed by public authorities, building professionals and building federations. With the building sector being the most energy consuming in France, this scheme aimed at encouraging professionals to develop their competences and at encouraging clients to seek for qualified businesses.

The qualification process includes the following:

- a mandatory training course (3 to 5 days) for the company's technical manager
- Combination of attendance of a few days of training concluded by a theory evaluation, and practical evaluation in some cases
- References of former achieved works for existing companies
- An on-site audit within two years

For each engineering consulting firm or economist which wants to obtain the "RGE" label, an independent body verifies that the company[81]:

- Complies with its legal and financial obligations;
- Has references that will be analysed in detail by instructors.
- Has a trained technical referent for every 20 employees in the relevant field;
- Has appropriate technical means (e.g. software);
- Is able to make proposals for energy monitoring of buildings;

The scheme's commitment led to increased reliability while promoting certified quality. It has attracted multiple professionals as it is also linked to energy efficiency financial incentives offered by the government; from January 2015, "RGE Study" certifications are mandatory to benefit from ADEME's subsidies for decision making studies (preliminary study, feasibility study, audits).

By the end of August 2015 35,000 enterprises had obtained the RGE label and since this date there have been +/- 5000 requests per month[82].

[80] Directive 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC

[81] http://www.measures-odyssee-mure.eu/public/mure_pdf/household/FRA59.PDF

[82] http://www.netpme.fr/info-conseil-1/gestion-entreprise/gestion-quotidienne/formalite-administrative/actualite/95251-embouteillages-chez-les-artisans-candidats-au-label-rge

4. Increase reliability of energy auditors and implement a verification programme

The sectoral agreements "Accord de Branche" in the Walloon Region, in Belgium, aims to improve the energy efficiency of industrial sites. Energy audits are carried out at each of the industrial sites by energy auditors accredited under "AMURE-Accord de Branche". The branch agreement provides an external verification to examine the methodology used for the energy audit and the correct consolidation of the industrial site's results. The use of external, independent reviews is intended to increase the quality of the final recommendations and to recognise the expertise of the energy auditors. In the case of non-conformity of the audits, the verification process may also act as a coaching process for new or less experienced auditors.

5. Provide tools and guidelines for energy auditors

Support documents and application templates are available in most MS, intended to facilitate the work of energy auditors[83]:

- In Hungary, a tutorial for auditors will be prepared for the accreditation process, in order to minimise the time spent and the administrative burden.
- Several MS provide guidelines and templates for energy auditors
  - guidelines on the content of energy audit reports (Belgium Flanders)
  - publication of successful auditing projects (Finland, Motiva)
  - example of energy audits (Greece).

Additional tools are also made available to auditors in order to make the auditing work more efficient and more standardised. Examples of tools which have been developed are: calculation programmes, summary tables, reporting tools, inspection check lists and measurement records.

6. Centralise the information on certified/accredited/qualified energy auditors in a national register

Despite the fact that in some MS the accreditation of auditors is organised at regional level and not at national level, for example Belgium and Italy, registers with the certified/accredited/qualified energy auditors are available, but not always easily accessible for the enterprises. Further efforts are needed to improve the communication regarding the availability of those registers and in some cases the location of those registers could be reviewed in order to facilitate the access to this information. In several MS the register of qualified energy auditors is available via the website of the National Authority in charge of Energy and Energy Efficiency. A central location allows easy access to the database and facilitates the update of the information.

7. Facilitate identification of expert auditors by enterprises

It is important for enterprises to be able to easily find the certified/accredited/qualified experts that will carry out the energy audits. Publicly available registers of qualified energy auditors are available in approximately two thirds of MS and in some cases are split by category of expertise: buildings, industry and transport.

[83] 62% of the energy auditors surveyed (11/18) confirmed that there are standardised manuals or guidebooks that provide support to them when conducting the energy audits

These results are also validated by the responses received through the online survey where almost 90% of energy auditors and sector associations surveyed stated that there is a publicly available register in the representative MS. Additionally, according to the responses we collected from the online survey, 63% of large enterprises (10/16) that completed an energy audit in the past 4 years said that *"it was easy to identify an energy auditor"* with one company though, commenting that "*it is more difficult now to find certified auditors for EED*", compared to 2010 when they had their previous audit.

In some accreditation schemes, it is mandatory for the energy auditors to include a specific number of previous audit reports in their application in order to assess their expertise. However, most often, all information on energy use and costs from audits is strictly confidential so the sharing of data may constitute a challenge for the energy auditors, especially when they are under a confidentiality agreement with their clients. One way to solve this issue could be that the certification/accreditation/qualification body does not require this level of detail from the energy auditor but that enterprises - when assessing their energy auditors - request relevant project references.

Auditor's competence assessment template: SEAI

The Sustainable Energy Authority of Ireland (SEAI) does not require auditors to provide samples of previous client audits in their application; however, in order to help enterprises make an informed decision as to the suitability of an energy auditor for their class of business, SEAI recommends to enterprises that they request examples with relevant references when procuring the service.

Within this scope, SEAI has created a competence assessment template in order to assist enterprises with the selection of a suitable auditor. A registered energy auditor needs to complete this template and can then share it with a prospective client. SEAI is trying in this way to help enterprises choose the right auditor and at the same time help auditors sell their services more effectively.

http://www.seai.ie/Your_Business/Energy-Auditing-Scheme/Competencies-Assessment-Template.docx

SEAI Registered Energy Auditor
COMPETENCY ASSESSMENT TEMPLATE

Competency Assessment Template Based on BSI - PAS 51215:2014 Energy efficiency assessment. Competence of a lead energy assessor				
*In order to assist enterprises with selection of a suitable auditor, this template may be completed to assist in the final selection. It should **NOT** be returned to SEAI but made available to a prospective client.*				
Auditor Name:				
Project 1				
Project 1 Title	Start Date	Completion Date	Sector/Business Type	Core Competencies engaged (1,2,4,.....)
Description of Auditor's Role (100 words Maximum)				
Client				
Referee Contact Name				
Contact Address				
Contact Number				
Email Address				
Project 2				
Project 2 Title	Start Date	Completion Date	Sector/Business Type	Core Competencies engaged (1,2,4,.....)
Description of Audit's Role (100 words Maximum)				
Client				
Referee Contact Name				
Contact Address				
Contact Number				
Email Address				

COMPETENCY ASSESSMENT TEMPLATE

Competencies

Ref	Competency Area	Example of Competence (overwrite the text below)
1	Understanding operational context of the organisation being assessed.	▪ Analysing energy use, energy consumption and energy efficiency. ▪ Identifying trends, anomalies, and investigating the reasons for anomalies, where practicable. ▪ Where the appropriate and relevant, complementing the analysis with energy benchmark data. ▪ Identifying and quantifying variables influencing energy consumption and energy efficiency. ▪ Identifying and calculating energy performance indicators for the organisation and/or the scope of the energy efficiency assessment. This could include data from external as well as internal sources, for example, the interpretation and scrutiny of energy billings and anomalies in such data sources.
2	Familiarity with, and ability to apply, the requirements of energy efficiency assessment methods.	▪ Using collected energy data, and other relevant data, to understand energy use in order to identify opportunities for improvement. ▪ Using the relevant technical and non-technical knowledge and skills to check any assumptions made, explain the energy data, and check the applicability of identified opportunities for improvement. ▪ Developing a concept and cost for the potential implementation of opportunities.

3	Scoping an energy efficiency assessment, as applicable to the organisation being assessed.	▪ Working with clients/organisation/other internal personnel to:
		  ▪ Identify the different groups in organisations that can have an effect on energy consumption;
		  ▪ Identify the diversity of expertise, knowledge, skills and attitudes required to achieve an improvement in energy performance;
		  ▪ Establish two-way communication with all of the identified groups of ideas, and to engage the different groups to implement energy efficient behaviours.

4	Understanding, in detail, energy use and energy systems applicable to the organisation being assessed.	▪ Producing a technical and non-technical energy efficiency assessment report. ▪ Producing a business case for improving energy performance. ▪ Making presentations of energy efficiency assessment findings to both technical and non-technical staff in the organisation being assessed.
5	Managing energy efficiency assessment team budgets	▪ Analysing energy use, energy consumption and energy efficiency. ▪ Identifying trends, anomalies, and investigating the reasons for anomalies, where practicable. ▪ Where the appropriate and relevant, complementing the analysis with energy benchmark data. ▪ Identifying and quantifying variables influencing energy consumption and energy efficiency. ▪ Identifying and calculating energy performance indicators for the organisation and/or the scope of the energy efficiency assessment. This could include data from external as well as internal sources, for example, the interpretation and scrutiny of energy billings and anomalies in such data sources.

COMPETENCY ASSESSMENT TEMPLATE

6	Understanding the techniques of measuring, sampling, sub-metering and establishing an energy balance.	▪ Using collected energy data, and other relevant data, to understand energy use in order to identify opportunities for improvement. ▪ Using the relevant technical and non-technical knowledge and skills to check any assumptions made, explain the energy data, and check the applicability of identified opportunities for improvement. ▪ Developing a concept and cost for the potential implementation of opportunities.
7	Data interpretation, including analysis and scrutiny of energy use, energy consumption, and energy performance data.	▪ Working with clients/organisation/other internal personnel to: ▪ Identify the different groups in organisations that can have an effect on energy consumption; ▪ Identify the diversity of expertise, knowledge, skills and attitudes required to achieve an improvement in energy performance; ▪ Establish two-way communication with all of the identified groups of ideas, and to engage the different groups to implement energy efficient behaviours.
8	Identification, quantification, ranking and prioritising of opportunities for improvement.	▪ Producing a technical and non-technical energy efficiency assessment report. ▪ Producing a business case for improving energy performance. ▪ Making presentations of energy efficiency assessment findings to both technical and non-technical staff in the organisation being assessed.
9	Managing working relationships.	▪ Analysing energy use, energy consumption and energy efficiency. ▪ Identifying trends, anomalies, and investigating the reasons for anomalies, where practicable. ▪ Where the appropriate and relevant, complementing the analysis with energy benchmark data. ▪ Identifying and quantifying variables influencing energy consumption and energy efficiency. ▪ Identifying and calculating energy performance indicators for the organisation and/or the scope of the energy efficiency assessment. This could include data from external as well as internal sources, for example, the interpretation and scrutiny of energy billings and anomalies in such data sources.
10	Familiarity with, and ability to apply, the requirements of energy efficiency assessment methods.	▪ Using collected energy data, and other relevant data, to understand energy use in order to identify opportunities for improvement. ▪ Using the relevant technical and non-technical knowledge and skills to check any assumptions made, explain the energy data, and check the applicability of identified opportunities for improvement. ▪ Developing a concept and cost for the potential implementation of opportunities.

5. Conclusions

The transposition of Article 8 across MS varies significantly with respect to the accreditation and qualification of energy auditors, with a number of MS being ahead of other countries when it comes to auditor qualification framework.

At the time of this report 22 MS had implemented accreditation schemes and adopted Article 8 qualification criteria for energy auditors. Mandatory training requirements exist in 13 MS, whereas minimum education requirements based on certain degrees have been set up in 22 MS. Guidelines, templates and calculation tools have been developed by a number of MS in order to assure the quality of energy audits and assist auditors in meeting the requirements, as well as improving the process of identifying energy saving opportunities. In general, good initiatives are already implemented regarding the accreditation of energy auditors but it is quite surprising to see that some MS, such as the Netherlands and Poland, do not have any clear guidelines or requirements in place. The lack of clear requirements may complicate and delay the audit process and compromise the quality of the audit results.

It should be noted that substantial progress on the development of accreditation and certification schemes has been made in accordance with Article 16 and Article 17 of EED implementation by the MS. According to Article 16 - which complements the provisions of Article 18 - where a MS considers that the national level of technical competence, objectivity and reliability is insufficient it shall ensure that certification, accreditation or equivalent qualification schemes are available for providers of energy services, energy auditors, energy managers and installers of energy-related building elements. In this context, several MS have introduced new certification schemes or updated their existing ones in order to satisfy the requirements described both in Article 8 and Article 16 of the EED.

Lack of auditors in some MS

The data collected during the project allowed us to roughly identify the MS where the lack of qualified energy auditors would be most marked. Based on the number of large enterprises and the number of energy auditors identified, the overview in Appendix A has been established. Following a rough estimation and based on the input received during the interviews with the national authorities, Bulgaria, Denmark, Romania, Spain and the UK could potentially face challenges regarding the availability of energy auditors. It is not possible to make an accurate assessment of the potential shortage of energy auditors given that the deadline for compliance is only a few months away. Another parameter that should be taken into account is the fact that several enterprises have already or are in the process of receiving ISO 50001 certification, leading to a reduction in the requirement for first time audits.

Global lack of auditors for the Transport sector

Transport can make up a large part of enterprises' energy use. Annex VI (b) of the EED states that energy audits must comprise a detailed review of the energy consumption profile of buildings or groups of buildings, industrial operations or installations, including **transportation**. Some MS have included in their transposition documents, or draft guidelines, specific provisions for energy audits in transport. For example, in Spain enterprises with an energy management system are exempted from the obligation to conduct an audit on transportation only if they have transport plans for the workplace, courses on efficient management of fleets or efficient driving, etc.

In Romania organisations with more than 25 vehicles are required to develop monitoring programmes and management of fuel consumption.

So, even though transport is included in audits of large companies, training of energy auditors on these topics has not been well developed yet. Our research reveals that most MS recognise a shortage of auditors in this sector. In most MS there is no distinction for qualification requirements between buildings, processes and transport, whereas in some others, although there is a specific qualification process or a separate register for buildings and industry audits (e.g. in Bulgaria), transportation is not covered at all, creating a challenge for enterprises to identify suitable transport auditors.

The establishment of explicit training courses for transport auditors as well as additional or specific requirements for their qualification criteria from the MS would help to address the shortage of auditors in this sector. Portugal, Croatia and Cyprus have defined separate scopes of accreditation for buildings, industrial processes/facilities and transport, an approach that helps to guarantee high quality energy audits by firstly confirming, through the accreditation process, that the expert has qualifications and practical experience relevant to the scope he/she wishes to be accredited for.

Also, DI Energi in Denmark is currently developing a training course for transportation audits, as they recognised that this is a new area in the country and there is still a shortage of qualified transport auditors, with the deadline quickly approaching.

Opportunities for harmonisation of qualification requirements across borders

MS are undertaking various measures to qualify energy auditors in the different sectors but concrete actions still need to be taken to ensure a harmonised quality of energy audit across all EU MS.

At present, there is no scheme to harmonise auditor registration and recognition across the EU. It is often unclear whether a country will accept an energy auditor qualified in another EU country. At the time of writing this report 11 MS allow energy auditors qualified in other MS to carry out audits in their country, without additional national accreditation. However, in most cases, they require that the auditors meet the same criteria on education and experience, and to be registered with the national scheme administrator, leading to a rather cumbersome approval procedure.

Moving to a mutual recognition of schemes would open the European market for energy auditors. During the qualitative interviews, public authorities from at least 4 MS raised concerns as to whether they would have enough suitably skilled auditors to meet the demand from the enterprises. This capacity issue around the availability of accredited or qualified auditors could be addressed through the establishment of a mutual recognition scheme. Administration bodies that are currently developing the details of Article 8 national transposition and implementation should consider the synergies with existing schemes/requirements from other MS as well as the benefits that mutual recognition of experts could bring. Directive 2005/36/EC on the recognition of professional qualifications could be applied by MS to allow energy auditors from other MS to carry out energy audits.

The Environment Agency in the UK has approved the Certified Energy Manager International (CEMI) and Certified Energy Auditor International (CEAI) certifications, provided by the Association of Energy Engineers (AEE), as meeting the requirements of the UK Energy Savings Opportunity Scheme (ESOS) to implement Article 8 of the

EED. This has widened the availability of energy auditors to a pool of thousands of professionals worldwide and in the EU. Other MS could also consider adopting the same approach of recognising international certifications that can be acceptable under every national scheme.

Significant differences observed in the costs for qualification/accreditation and renewal of accreditation

During the research, we have also identified that the costs for the accreditation can vary significantly MS by MS. Costs amounting to several thousand euros may be charged during the application, and fees are also requested for the renewal of accreditation. High costs could be a barrier to the accreditation of energy auditors, especially for small and medium organisations wishing to specialise in this area. Another important observation is that the validity of accreditation of energy auditors can vary from 2 years to 10 years depending on the MS. A 3-year validity period applies in most MS allowing enough time for 'refresher' training and additional qualifications for energy auditors. Longer validity periods could be more difficult to manage.

A central database for the identification of energy auditors on European level

Many national energy agencies are in favour of a European database for the energy auditors. During the online survey, public authorities where asked 'what type of information they would like to have received from the Commission in assistance for the Article 8 implementation'. The most popular types of support requested are:

- Guidelines for Annex VI;
- Best practice examples; and
- **A European register for energy auditors**.

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Appendix A

Overview of energy auditors and large enterprises by MS

Member State	**No of large Enterprises**	No of energy auditors
Austria	1,100	444
Belgium (Flanders)	n/a	n/a
Belgium (Walloon)	n/a	224
Belgium (Brussels)	n/a	66
Bulgaria	400	~300
Croatia	144	n/a
Cyprus	100	~100
Czech Republic	2,150	350
Denmark	500	43
Estonia	n/a	~115
Finland	660	n/a
France	7,000	985
Germany	50,000	~2,200
Greece	400	n/a
Hungary	n/a	n/a
Ireland	600	51
Italy	4,000	~500
Latvia	n/a	
Lithuania	318	~100
Luxemburg	150	n/a
Malta	81	39
Netherlands	3,000	n/a
Poland	2,600	n/a
Portugal	500	~2,300
Romania	1,500	>210
Slovakia	614	n/a
Slovenia	n/a	n/a
Spain	3,782	n/a
Sweden	1,500	n/a
United Kingdom	9,400	>500

Appendix B

In the course of the study the online survey link was shared with the following organisations:

Country	Organisation	Type of organisation
Austria	Austrian Paper Industry Association	Sector association
Austria	Register of energy auditors	Energy auditors/vendors
Belgium	Port of Antwerp	Large enterprise
Bulgaria	Bulgarian Industrial Association	Sector association
Bulgaria	Bulgarian Chamber of Commerce and Industry	Sector association
Croatia	List of enterprises from the Croatian Chamber of Commerce and Industry	Large enterprise
Czech Republic	ENVIROS	Energy auditors/vendors
Czech Republic	Ministry of Industry and Trade	Public authority
Czech Republic	SCHP - Association of Chemical Industry of the Czech Republic	Sector association
Czech Republic	Association of the Pulp and Paper Industry (SPPC)	Sector association
Denmark	DI Energi - Danish Energy Industries Association	Sector association
Denmark	The Danish Ecological Council	NGO
Estonia	Estonian Chamber of Commerce and Industry	Sector association
Finland	Chemical Industry Federation of Finland	Sector association
Finland	Paper Engineers' Association	Sector association
France	ATIP - L'Association Technique de L'Industrie Papetière	Sector association
Germany	Deneff E.V.	Sector association
Germany	Verband der Wellpappen-Industrie e.V. (VDW)	Sector association
Greece	Register of energy auditors	Energy auditors/vendors
Hungary	Hungarian Chamber of Commerce and Industry	Sector association
Ireland	Register of energy auditors	Energy auditors/vendors
Italy	50&PIÙ	Sector association
Italy	ADF - Associazione distributori farmaceutici	Sector association
Italy	Aice Italian Association foreign trade	Sector association
Italy	ALFA CENTAURI S.P.A.	Sector association
Italy	GALENO RP S.R.L	Sector association
Italy	SASOL ITALY S.P.A.	Sector association
Italy	SAPIO Produzione Idrogeno Ossigeno S.R.L.	Sector association
Italy	RIVOIRA S.P.A.	Sector association
Italy	LIQUIGAS S.P.A.	Sector association
Italy	3M ITALIA S.R.L.	Sector association
Italy	AVERSANA PETROLI S.R.L	Sector association
Italy	AXXONOIL S.R.L.	Sector association
Italy	BA.CO.GAS S.R.L.	Sector association
Italy	CE.M.O.N. S.R.L.	Sector association
Italy	CEINGE BIOTECNOLOGIE AVANZATE S.C.R.L.	Sector association
Italy	CHIMPEX INDUSTRIALE S.P.A.	Sector association

Italy	COBEGAS S.R.L.	Sector association
Italy	DERMOFARMA ITALIA S.R.L.	Sector association
Italy	ESMALGLASS S.P.A.	Sector association
Italy	IMA S.R.L. - IND.MOLE ABRASIVE	Sector association
Italy	LINDE GAS ITALIA S.R.L.	Sector association
Italy	NOVARTIS FARMA S.P.A	Sector association
Italy	SOL S.P.A.	Sector association
Italy	ALBA MILAGRO INTERNATIONAL S.P.A.	Sector association
Italy	ALFA WASSERMANN S.P.A.	Sector association
Italy	BASELL POLIOLEFINE ITALIA S.R.L.	Sector association
Italy	ELANTAS ITALIA S.R.L.	Sector association
Italy	FERRO SPAIN S.A. ITALY BRANCH	Sector association
Italy	ASSOCARTA	Sector association
Italy	Aticelca	Sector association
Latvia	Latvian Chamber of Commerce and Industry	Sector association
Latvia	Latvian Paper Producers Association (LPRA)	Sector association
Lithuania	Lithuanian Chamber of Commerce and Industry	Sector association
Lithuania	Register of energy auditors	Energy auditors/vendors
Malta	Chamber of Commerce and Industry of Malta	Sector association
Multinational	BP	Large enterprise
Poland	Polish Chamber of Commerce	Sector association
Poland	Association of Polish Papermakers	Sector association
Poland	Multiple Iron & Steel industries	Large enterprise
Poland	Izba Energetyki Przemysłowej i Odbiorców Energii (Energetics and Industrial Energy Consumers Chamber)	Sector association
Poland	KIG	Sector association
Portugal	APEQ - Associação Portuguesa das Empresas Químicas	Sector association
Portugal	Multiple Pulp & Paper Manufacturers	Large enterprise
Slovakia	Slovakian Chamber of Commerce and Industry	Sector association
Slovakia	Pulp and Paper Industry Federation of Slovak Republic (ZCPP)	Sector association
Slovenia	GZS - Chamber of Commerce and Industry of Slovenia Dimiceva	Sector association
Spain	ENACE	Accreditation body
Spain	Technical Association of the Spanish Paper Industry (IPE)	Sector association
Sweden	Swedish Energy Agency	Public authority
Sweden	Swedish Association of Pulp and Paper Engineers (SPCI)	Sector association
UK	First Fuel	Energy auditors/vendors
UK	Energy Services and Technology Association	Sector association
UK	Energy Institute	Sector association
UK	Confederation of British Metal forming	Sector association
UK	Aluminium Federation	Sector association

Additionally, the online survey link was shared with:

- All contacts in the participant list of the EU Sustainable Energy Week 2015
- All contacts in the participant list of the ECEEE Summer Study 2015
- An extensive range of DNV GL's and Ricardo's contacts which include large enterprises and SMEs

ECEEE included the survey in its news broadcast for a few weeks during September 2015.