BS EN 16247-5:2015

BSI Standards Publication

Energy audits

Part 5: Competence of energy auditors

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National foreword

This British Standard is the UK implementation of EN 16247-5:2015.

This standard is part of the BS EN 16247 series of standards on energy audits. This particular standard, on the competence of energy auditors, is a European standard which relates directly to and uses the terminology of BS EN 16247-1:2012, *Energy audits*.

A UK-specific document also exists: PAS 51215:2014, *Energy efficiency assessment. Competence of a lead energy assessor*. *Specification*. The requirements contained in PAS 51215:2014 specifically relate to the competences required of 'lead assessors' acting under the Energy Savings Opportunity Scheme introduced by DECC in 2014 and, in the opinion of the UK Committee, are more detailed.

The UK participation in its preparation was entrusted by Technical Committee SEM/1, Energy Management, to Subcommittee SEM/1/1, Energy Management Systems and Energy Audits.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Foreword

This document (EN 16247-5:2015) has been prepared by Technical Committee CEN/CLC/JWG 1 “Energy audits”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2015, and conflicting national standards shall be withdrawn at the latest by November 2015.

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This European Standard is part of the series EN 16247, *Energy audits*, which comprises the following:

— *Part 1: General requirements*;

— *Part 2: Buildings*;

— *Part 3: Processes*;

— *Part 4: Transport*;

— *Part 5: Competence of energy auditors* [the present document].

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

An energy audit is an important step for an organization, whatever its size or type, wanting to improve its energy efficiency, reduce its energy consumption and bring related economic and/or environmental benefits. Confidence in the energy audit process and the ability to achieve its objectives depends on the competence of the energy auditor.

This European Standard specifies the competence that the energy auditor needs in order to effectively implement the requirements of EN 16247-1, which may be supplemented by the sector specific parts EN 16247-2, EN 16247-3 or EN 16247-4.

This European standard seeks to harmonize training, skills and experience needed by the energy auditor(s) to bring adequate quality to energy auditing services. Competence applies to an individual but would also apply to a team or group of auditors where a wide range of skills is needed. Where the energy auditor is not an individual, a member of the energy auditing team needs to be nominated as lead energy auditor.

The energy auditor's skills, experience and attributes are personal. However larger sites, installations and more complex organizations may need the skills of a variety of technical experts working together. If an energy audit team is appointed, it should be composed of a lead auditor and technical experts, as necessary, to meet the technical competence requirements. The energy audit team approach does not dilute the need for all of the individual attributes noted in the following clauses.

The requirements included in this standard should enable the energy auditor to understand the organization's aims, needs and expectations concerning the energy audit.

1 Scope

This European Standard specifies the competence requirements of the energy auditor.

This European Standard can be used to specify energy auditor qualification schemes at a national level; used by organizations undertaking energy audits to appoint a suitably competent energy auditor and used by organizations, in conjunction with EN 16247-1, EN 16247-2, EN 16247-3 and EN 16247-4, to ensure a good level of quality of the energy audits.

This European Standard also recognizes that all the competence required can reside in the energy auditor or a team of energy auditors.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 16247-1:2012, *Energy audits — Part 1: General requirements*

EN 16247-2, *Energy audits — Part 2: Buildings*

EN 16247-3, *Energy audits — Part 3: Processes*

EN 16247-4, *Energy audits — Part 4: Transport*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16247-1:2012 and the following apply.

3.1
training
process to develop knowledge, skills and personal attributes to meet energy auditor competence requirements

3.2
skill
ability to apply knowledge to complete tasks and solve problems

3.3
experience
actual performance or observation conducted in the work environment resulting in the acquisition of knowledge and skills

3.4
competence
demonstrated personal attributes and ability to apply knowledge and skills

4 Personal attributes

4.1 General

A clear understanding between the organization and the energy auditor is critical for the success of the assignment. Effective communication maximizes understanding, creates confidence and minimizes risks.

The energy auditor shall have good communication skills. This includes moderation and presentation skills.

NOTE Communication skills include written and oral.

The energy auditor shall be experienced in communicating with technical and non-technical persons at various levels within the organization such that the energy auditor is able to advise in an adequate manner on all aspects (technical, economic and others) of the energy audit.

4.2 Professional skills

The energy auditor should demonstrate the following professional skills:

— capacity for observation, measurement, analysis, and synthesis;

— ability to articulate concepts and ideas;

— ability to adapt to encountered situations;

— ability to make concrete proposals for improvements;

— project management and methodology skills.

4.3 Ethical principles

The energy auditor shall only accept those assignments that the energy auditor is able to fulfil in a professional manner in accordance with EN 16247-1, EN 16247-2, EN 16247-3 and EN 16247-4 as relevant.

The energy auditor shall, at all times, operate under the requirements and principles given in EN 16247-1:2012, 4.1.

The energy auditor shall have the ability to act in an impartial and objective manner.

5 Knowledge and skills

5.1 General knowledge and skills

5.1.1 Energy audit process

The energy auditor shall possess the appropriate competence to understand and be able to apply energy audit principles and methodology described in EN 16247-1, EN 16247-2, EN 16247-3 and EN 16247-4 as relevant, including:

— classify and highlight relevant energy uses within the scope of the energy audit;

— focus on matters of priority with reference to the agreed scope, aim and thoroughness of the energy audit;

— collect information through effective interviewing, listening, observing, measuring and reviewing documents, records and data;

— assess and act on the quality of the data provided by the organization.

The energy auditor shall be aware of and take into account specific national and local energy auditing guidelines as well as other related standards or related documents.

5.1.2 Project management

The energy auditor shall be able to manage the complete energy audit process, including:

— planning the energy audit in co-operation with the organization;

— conducting the energy audit within the agreed time schedule;

— making effective use of resources during the energy audit;

— managing the uncertainty of achieving the energy audit objectives;

— ability to co-operate with all parties during the energy audit process;

— preventing and resolving conflicts;

— ensuring the energy audit complies with the relevant health, safety, environmental and security requirements;

— coordinating other members of the energy audit team, if any;

— documenting energy audit findings and preparing appropriate energy audit reports.

5.2 Specific knowledge and skills

5.2.1 Regulatory and standard framework

The energy auditor shall have adequate knowledge of the relevant laws, policies, rules, regulations and standards that govern his or her services in the country where the energy auditing activities are being carried out.

5.2.2 Technical

The energy auditor shall:

— have knowledge of physical principles related to energy (thermal, electrical, thermodynamics, heat transfer, fluid mechanics, etc.);

— have specific knowledge and skills appropriate to procedures, activities, energy uses and technologies related to the sector (e.g. building, process, transport) in which he is carrying out the energy audit;

— be capable of making a measuring/metering plan for the data collecting activities within the scope of the energy audit;

— have knowledge of metering and measuring equipment;

— be able to identify and manage the equipment necessary to conduct the energy audit in an appropriate manner;

— be able to verify and validate the measurements of all data and test results and to draw conclusions.

5.2.3 Energy sources and supply

The energy auditor shall have adequate knowledge of energy supply, including:

— availability of energy sources (e.g. fossil, electricity, renewable energy) or carriers (e.g. steam, compressed air);

— energy production, transmission and distribution processes;

— energy unit conversion factors;

— Greenhouse Gas (GHG) emissions factors;

— tariffs and tariff structures;

— general features of the energy market.

5.2.4 Analysis methods

The energy auditor shall have knowledge and skills in analysis methods, presentation and results reporting.

EXAMPLE Pinch analysis, Sankey diagrams, regression analysis, cumulative sum, benchmarking.

The energy auditor shall identify suitable calculation and simulation tools.

The energy auditor shall have the skill to summarize findings and data supplied and analyse it to produce suitable recommendations.

The energy auditor shall be able to:

— confirm the sufficiency and appropriateness of the information to support energy audit findings and conclusions;

— assess those factors that may affect the reliability of the energy audit findings and conclusions;

— understand the appropriateness and consequences of using sampling techniques for energy auditing.

5.2.5 Energy performance

The energy auditor shall:

— be able to quantify and analyse energy consumption and uses;

— be able to calculate energy savings and/or energy efficiency improvements and to explain his or her calculations and the assumptions upon which they are based;

— be able to estimate the interactions between the energy efficiency improvement opportunities;

— be able to propose and calculate suitable energy performance indicators (e.g. specific energy consumptions) to quantify the energy performance and to make comparisons to references (benchmarks, standards) if available;

— have suitable knowledge and skills necessary to recommend energy efficiency improvement opportunities and possible different solutions for implementation (e.g. different type and levels of insulation);

— be able to propose an action plan to the organization enabling it to monitor the energy performance.

5.2.6 Economic assessment

The energy auditor shall be able to make suitable economic assessment of the energy efficiency improvement opportunities proposed.

EXAMPLE Life-cycle cost analysis (LCCA), payback period, rate of return on investment, discounted cash flow, net present value.

For the economic assessment, the energy auditor shall have the skill and experience to evaluate and take into account:

— lifetime of equipment;

— related costs (e.g. energy, investment, maintenance and operational);

— financial incentive measures (e.g. subsidies, tax credit, feed-in tariff, white certificates, carbon tariffs);

— the evolution of the tariff structure, energy prices and energy costs to the organization.

6 Acquisition, maintenance and improvement of competence

6.1 General requirements

The energy auditor shall demonstrate suitable education, work experience and training to allow him or her to carry out an energy audit.

The energy auditor competence shall be based on a combination of the following:

— education that contributes to the development of knowledge and skills in technical disciplines and sectors the energy auditor intends to audit;

— work experience in a relevant technical, managerial or professional position involving the exercise of judgement, decision making, problem solving and communication with managers, professionals, peers, customers and other interested parties;

— training or experience in energy audits acquired under the supervision of an energy auditor with appropriate skills in the same discipline or sector.

The energy auditor shall establish and maintain a record of his or her technical skills and knowledge.

6.2 Initial education

The energy auditor's initial technical knowledge in the energy efficiency of buildings, processes or transport can be defined by a national awarding body or equivalent.

EXAMPLE Science, technology or engineering.

6.3 Work experience

The energy auditor’s work experience in the energy efficiency of buildings, processes or transport can be defined by a national awarding body or equivalent.

Consideration for general competence criteria relevant to energy auditing shall be given to the following:

— recent experience;

— professional credentials;

— demonstrated skills.

The energy auditor shall have a suitable professional experience in the sector(s) building, process or transport the energy auditor expects to work in.

When requested by an organization or a national awarding body or equivalent, the energy auditor shall prove his or her relevant professional experience with sample reports of energy audits carried out in the recent past.

6.4 Training

The energy auditor shall attend a training process for energy auditing methodology when required by the national body or equivalent.

The energy auditor can increase his or her knowledge by training and gain experience by participating in more complex energy auditing activities or in other sectors with an experienced energy auditor.

6.5 Maintenance and improvement of competence

The energy auditor shall maintain and improve general knowledge and skills on energy audit methodology and also about the modifications of national energy auditing guidelines, latest news in the field of energy efficiency, energy saving technologies, auditors' tools, etc.

The energy auditor shall demonstrate the maintenance and improvement of suitable and recognized skills, experience and expertise.

The energy auditor shall update and improve the necessary technical knowledge and skills from:

— professional training which may be sector or technology specific, as appropriate;

EXAMPLE Lighting, HVAC, industrial processes, transport, building automation, energy management systems, measurement and verification (M&V), greenhouse gases (GHG).

— participation in conferences and/or seminars;

— reading technical journals;

— internships;

— participation in energy audits in more complex organizations and/or in other sectors.

Bibliography

[1] CEN Guide 14, *Common policy guidance for addressing standardisation on qualification of professions and personnel*

[2] The European Qualifications Framework (EQF), http://ec.europa.eu/ploteus

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