



ENergy Auditors Competencies
Training and profiles



NATIONAL REPORT

POLAND

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NATIONAL REPORT - POLAND

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1. INTRODUCTION

The present report has been prepared by KAPE - ENACT Polish partner is a national leader in the area of efficient energy management. One of the core business of KAPE is a sustainable building, including support and promotion of thermo-refurbishment (thermo-modernization) in buildings. KAPE carries out important activities in the building sector (e.g. verification of building energy audits for the Polish National Economy Bank, co-operation with governmental bodies in implementation process of EU EPB, ES, promotion of co-generation directives) and participate in many international projects connected with energy management in buildings (e.g. Request, Request2act, BuildupSkills).

2. INSTITUTIONAL - EXISTING PROFILES AND LABOUR MARKET DYNAMICS GOVERNANCE MODELS (ACTORS, TOOLS AND PROCEDURES)

2.1. NATIONAL POLICIES

In Poland, the strategic document describing national energy development is the Energy Policy of Poland until 2030, approved by the Parliament in 2009. Regarding energy efficiency (EE) and renewable energy sources (RES), the essential tasks for the construction sector defined in this document are:

- striving towards maintaining a zero energy economic growth, i.e. economic development without an increase in the demand for primary energy,
- consistently decreasing the energy consumption of Polish economy to the EU-15 level,
- increasing the share of renewable energy sources in the final energy consumption to minimum 15% in 2020 and a further increase of this indicator in the following years.
- The execution of main goals will be achieved thanks to:
- increasing the efficiency of electric energy production by building high-efficiency production units,
- doubling (in comparison with 2006) electric energy production from high-efficiency cogeneration technology by 2020,
- decreasing the indicator of network losses in the process of transfer and distribution by,

- among others, modernizing current and building new networks, exchanging low-efficiency transformers, as well as developing distributed power generation,
- the growth of energy end-use efficiency,
- increasing the relation between annual electric energy demand and maximum power demand during peak load times, which will allow reducing the total cost of satisfying the demand for electric energy.

Energy Policy of Poland until 2050 is in the phase of public and interministerial consultation and should be published in the end of 2015.

Second document defining the requirements in the area of energy efficiency of buildings is the National Action Plan on energy efficiency. This document is prepared in accordance with the reporting obligations to the European Commission on the basis of Directive 2006/32/EC and the Directive on Energy Performance Buildings 2010/31/EC

The third national action plan defined the Polish national energy efficiency target for 2020 (according to Art. 3.1 Directive 2012/27 / EU.)

| | Energy efficiency target | Absolute energy consumption in 2020 | |
|-------------|---|--|--|
| | Reducing primary energy consumption in the years 2010 – 2020 (Mtoe) | Final energy consumption in absolute values (Mtoe) | Primary energy consumption in absolute values (Mtoe) |
| 2020 | 13,6 | 71,6 | 96,4 |

Table 1 Summary of energy efficiency targets for 2020 – According Directive 2012/27 / EU

Accordance with Art. 4 of Directive 2012/27/EU the Third National Action Plan adopted in 2014 was supplemented with the National Strategy for Building Renovation.

This strategy is called. "Supporting investments in modernization of buildings", and it was developed by the Ministry of Infrastructure and Development.

Content of the plan include:

1. an overview of the national building resources based, as appropriate, on statistical samples;
2. determination of cost-effective ways of building renovations appropriate for the type of buildings and climate zones;
3. policies and measures to stimulate cost-effective deep renovations of buildings, including a deep renovation organized in successive stages;
4. foresight in making investment decisions by physical actors, the construction sector and financial institutions;
5. evidence-based estimation of expected energy savings and wider benefits.

The Ministry of Infrastructure published also on 2th of June 2015 the “National plan for increasing the number of nearly zero-energy buildings” according to art. 9 par. 1 of the re-cast Energy Performance of Buildings Directive (EPBD).

The national plan includes the definition of a building with low energy consumption according to the existing conditions and achievable, cost effective measures to improve the energy efficiency in buildings. Moreover, it presents the government promotional actions on low energy buildings, including the aspects of design, construction and reconstruction of buildings in a way that ensures their energy efficiency and energy renewable sources use in new and existing buildings.

2.2. NATIONAL LEGISLATION

Issues related to energy efficiency requirements for buildings and improving the energy standards of buildings are included in several acts.

The very first and fundamental acts specifying requirements for energy efficiency of buildings are: Construction Law from 7 July 1994 and related to it Regulation of the Minister of Infrastructure from 12 April 2002 on the technical conditions to be met by buildings and their location (Dz. U. No. 75, Pos. 690 with amendments) hereinafter called the "Regulation on technical conditions of buildings". The Construction Law regulates the activities involving the design, construction, maintenance and demolition of buildings and sets out the rules of operation of public administration in these areas.

According to the amended provisions of the Regulation on Technical Conditions of Buildings (Dz. 2013 No. 0 item. 926), the requirements for energy efficiency of buildings will be gradually tightened in accordance with the timetable set out in regulation (the table above). The changes are expected to achieve in the year 2021 the goal according to which all new buildings must be nearly zero buildings energy consumption.

| Type of building | Partial maximum index value EP for heating, ventilation and DHW heating [kWh / (m ² * year)] | | |
|---|---|---------------------|---------------------|
| | from 1 January 2014 | from 1 January 2017 | from 1 January 2021 |
| Residential buildings | | | |
| • Single family house | 120 | 95 | 70 |
| • Multi family building | 105 | 85 | 65 |
| Collective residential building | 95 | 85 | 75 |
| Public buildings | | | |
| • health care | 390 | 290 | 190 |
| • others | 65 | 60 | 45 |
| Non-residential buildings: - outbuilding warehouse building production building | 110 | 90 | 70 |
| From 1 January 2019 – in public buildings and being in the property of public authorities | | | |

In the autumn of 2014 a separate Act on the energy performance of the building (Dz. U. 2014, Pos. 1200) was announced. It significantly unifies and coordinates the implementation of the EPBD and Recast and gives higher priority to certification of buildings and other actions within the scope of the directive.

The Act on Energy Performance of Buildings enter into force on 9 March 2015 and sets out the rules of:

- producing energy performance certificates;
- control of heating and air-conditioning systems in buildings;
- establishing a central register of Energy Performance of Buildings;
- developing a national action plan aimed at increasing the number of buildings with low energy consumption.

The above Act and amendment on Regulation technical conditions of buildings introduced into Polish legislation the provisions of the recast Directive 2002/31 / EC of 19 May 2010. on energy performance of buildings (Recast Directive).

Important legislation, from the point of view of financing energy efficiency improvement in buildings, is the Act on Support for Thermal Refurbishment and Renovations (Dz. U. 2008. No. 223, pos. 1459) with amendment from 2010 set out the rules of financing refurbishment and renovations investments leading to the reduction of energy consumption in the building. The Act is legal basis for Regulation from 17 March 2009 on the detailed scope and forms of energy audit

and the part of renovation audit, template of audit sheets, as well as the algorithm assessing the cost effectiveness of the thermomodernization project.

Law on Energy efficiency 15 April 2011 (Journal of Laws No 94, item 551) aims to boost the development of mechanisms stimulating energy efficiency improvement.

The Law introduces the obligation to acquire an appropriate number of energy efficiency certificates, called White Certificates, by energy companies selling electricity, heat or natural gas to end users connected to the network on the territory of the Republic of Poland.

Moreover the Law defines the rules of preparing energy efficiency audits and introduces the obligation for the public sector to perform an exemplary role in energy efficiency. The Law obliges government units and local authorities to perform their duties applying at least two energy efficiency improvement measures from the list of measures given in the Law.

The Energy Efficiency Directive (EED), similar as the Energy Services Directive (ESD), was In general implemented by the Energy Efficiency Law (EEL) (2011)

New draft of the EEL is being prepared. It would extend the duration of the current Energy Efficiency Law beyond 2016 and would introduce necessary changes induced by the EED.,

2.3. LEGISLATIVE FRAMEWORK AND NATIONAL QUALIFICATION FRAMEWORK

2.3.1. EXISTING PROFESSIONS IN THE AREA OF ENERGY EFFICIENCY IN BUILDING

On the Polish market, one could identify several professionals acting in the field of energy efficiency in building sector. The names of the professions related to the consultancy services on energy efficiency till 2015 were not specified in a Polish law and commonly they are called:

- Energy Auditor - a professional that preparing the energy review of building for the purpose of thermo-modernization investment, indicating the optimal solution in terms of its cost and energy savings (requirements of the energy review – audit preparation is specified in the legislation)
- Energy Efficiency Auditor - a professional that preparing analysis of energy consumption, and specifying technical condition of the object, a technical device or installation (including industrial), including a list of projects for improving energy efficiency of this objects, equipment and installation, as well as an assessment of their cost-effectiveness and possible energy savings achievements.

- Energy Certifier – a professional to prepare energy performance certificates for buildings
- RES installer – a professional that install the following types of renewable energy sources:
 - boilers and biomass stoves or
 - photovoltaic systems, or
 - solar heating systems, or
 - heat pumps, or
 - shallow geothermal systems.

In practice the auditors for buildings usually cumulate the qualifications of the energy auditor and the energy certifier.

The Energy Efficiency Auditor is usually concentrated on the industrial installations and objects and possess the widest qualification to analyse energy efficiency in a transversal way (energy efficiency in buildings, installations, industrial processes) from identification to preparation and implementation of projects.

- Verifier applications for funding

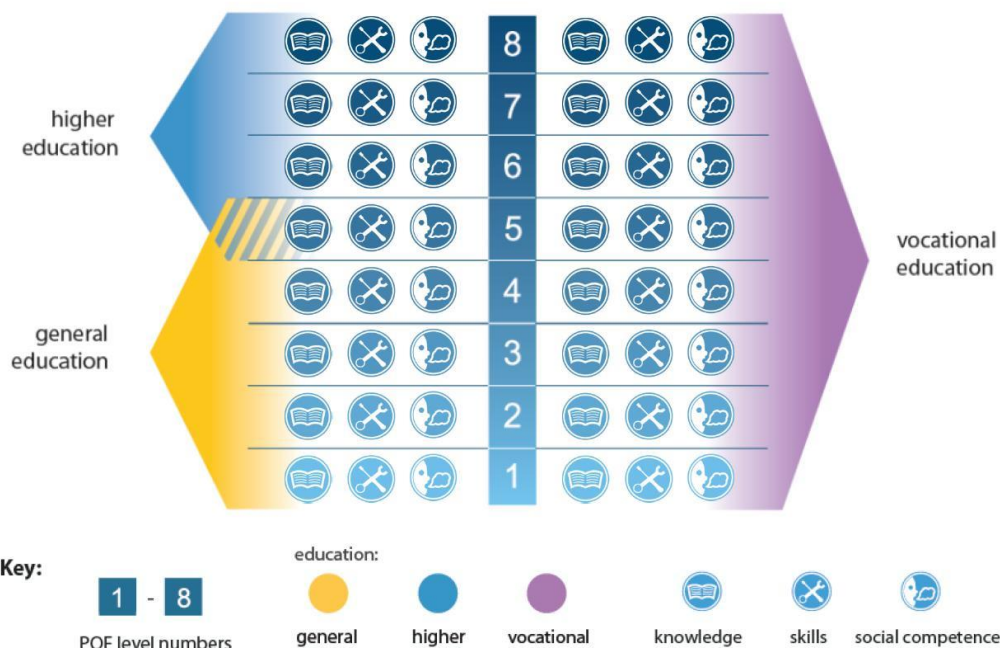
The National Fund for Environmental Protection and Water Management, leading a number of programs in the area of energy efficiency in buildings, determines the requirements for person which verify the beneficiary applications.

The requirements and conditions of accreditation for:

- Verifiers of technic project of energy-efficient houses within the in the program "Improving energy efficiency Part 2) loans for the construction "
- Experts and Auditors in Polish Sustainable Energy Financing Facility, investments in SMEs - PolSEFF

2.3.2. NATIONAL QUALIFICATION SYSTEM

Polish Qualifications Framework (PRK), just as the European Qualifications Framework (EQF), consists of eight levels of qualifications. Each level PRK is described by general statements characterizing the effects of learning which must be confirmed in the qualification to be on that level. PRK takes into account the learning outcomes achieved within a structured education and in other ways (eg. Through training, work experience, self-improvement). It includes general education, higher and professional, including what can be learned not only at school or university, but also, for example. On courses, training courses, at work, at home.



There are two new energy professions defined in Regulation of the Minister of Labour and Social Policy dated on 07.08.2014 on the classification of professions and specializations for the needs of the labor market and its scope. Regulation came into force in the beginning of 2015.

The existing professions are called:

214901 Energy Auditor the national standard is not yet developed but it will cover the energy auditor profession

214932 Energy Manager possess wider competences which are similar to the energy efficiency auditor professional competences but Energy Manager is an engineering profession in the field of managing the usage of energy resources in one specified organization (public or private company, municipality).

Competences needed to perform tasks in the profession of energy manager suggests to use to describe qualifications at level 7 right for the second higher education degree in European and Polish Qualification Framework. Competences for energy auditor are not yet specified but it is expected, at least on 5th or higher level.

On the renewable energy market the profession of technician of renewable energy equipment and systems is specified. The training of this profession is under the vocational training system on the 4th level.

A professional title of Technician of Renewable Energy Equipment and systems 311930 was introduced in 2011 within Regulation on core curricula (Dz.U. nr 100/2011, poz. 582).

2.3.3. LEGISLATIVE FRAMEWORK, REQUIREMENTS AND CERTIFICATION FOR THE FOLLOWING PROFESSIONS

The Energy Auditor

In Poland, the energy auditor does not have entitlements specified by law. Profession started to functionate in 90's for the purpose of implementation support system for initiatives aimed to improve energy efficiency in municipal and household sector introduced by the Act on Support for Thermal Refurbishment and Renovations (Dz.U 1999 No.162/98, pos.1121) in 1999.

Still-functioning system is intended to facilitate the financing of thermomodernization or renovation in order to achieve a reduction in energy consumption, in particular the cost of heating and domestic hot water (DHW). The groundwork of support system is an energy audit of building. Currently, in force is the Act on Thermal Refurbishment and Renovations (Dz. U. 2008 No. 223, pos. 1459), together with the amendment dated 5.03.2010 (Dz. U. 2010 Nr. 76, pos. 493), which entered into force on 19 March 2009.

The Act has not specified requirements for physical persons who carry out the audit. The audit quality is assured by specific regulations which carried out detailed requirements for audit and its verification.

Audit requirements are determined in the current Regulation of the Minister of Infrastructure from 17 March 2009 (Dz. U. 43, pos. 346) on the form and scope of energy audits and renovations.

In accordance with the provisions of this act, an energy audit is the foundation for the construction project.

The Polish National Energy Conservation Agency - KAPE already in 1996 took part in the project "Energy consultancy scheme for buildings" developed under the Polish-Danish governmental programme granted by the Danish Energy Agency. Within the framework of the project trained 12 building energy auditing trainers were educated by DTI in Denmark who developed a training

curriculum and set up basis for building energy consultancy scheme in Poland. Since then, more as 4500 professionals have been trained under this voluntary scheme.

There is no certification process for energy auditors, only KAPE provides nono-obligatory accreditation for profession but during the last few years it wasn't organized.

The Energy Efficiency Auditor

Energy Efficiency Act dated on 15 April 2011 introduces “white certificates”, which is the support system for the pro-efficiency investments, for which an investor will need to prove achieving of the assumed energy savings. To prove the savings, it will be necessary to perform an energy audit, allowing to specify the expected savings and another one after the pro-efficiency investments - verification audit.

Originally energy efficiency audits (initial /verifying) could be carried out by a qualified auditor, according to the provisions of the Energy Efficiency Act.

However, this profession has been deregulated with the amendment to the Energy Efficiency Act in October 2012 (Art. 29), which deleted article concerning requirements of the person preparing the audit energy efficiency.

The new regulations aimed to increase access to the profession, and as a result lead to increase competition in the market and higher availability to the services.

The quality of the audit ensure Regulation of the Minister of Economy of 10 August 2012 on the detailed scope and method of preparation of the energy efficiency audit, template form of audit and the methods for calculating energy savings (Dz.U. 2012 nr 0 poz. 962)

There is no certification or accreditation process for energy efficiency auditors.

The Energy Certifier

A legal title of the Energy Certifier was created in September 2007 within the amendments to the Construction Law - dated on 19 September 2007 (Dz. U. Nr. 191, pos. 1373), and another amendment – dated on 27 August 2009 (Dz.U. 2009, No. 161, item. 1279) introducing the necessary corrections and additions. It was 3 years delay transposition of the Directive 2010/31/EU from 19 May 2010 on the energy performance of buildings in Poland.

Originally energy performance certificates were carried out by a qualified auditor, according to the provisions of the Construction Law, however, this profession also was deregulated by the Minister of Justice.

Announced on 8 September 2014 Act on Energy Performance of Buildings (Dz.U. 2014 poz. 1200) enter into force in March of 2015 defines the rules for preparing the energy performance certificates and new educational requirements of person entitled to prepare certificates.

Previously person preparing the the energy performance of the building must have a university degree and the building construction entitlements or it was necessary to complete training /postgraduates studies and pass an exam at the Ministry of Infrastructure.

The new provisions specifies that person preparing the energy performance certificates will be able to meet only one of the requirements:

1. have an engineer or Master of Science degree;
2. complete the other higher studies and postgraduate studies, which the program takes into account issues related to the energy efficiency of buildings , performing energy audits of buildings, construction energy saving and renewable energy sources;
3. have the building construction entitlements, referred to in Art. 14 paragraph 1 of the Act of 7 July 1994 - Construction Law.

Thus, it is now impossible to obtain entitlements through training and passing the examination at the central level.

The RES Installer

The Directive of the European Parliament and Council Directive 2009/28 / EC of 23 April 2009 on the promotion of the use of energy from renewable sources provides a system of certification of installers RES, as well as accreditation of training centers for installers. Implementation of the provisions of Directive 2009/28 / EC into Polish law was by amending the Act of 10 April 1997- Energy Law (Dz.U. 2012. Poz 1059 - jt). Amendment of Energy Law, came into force in September 2013.

According to this law the Office of Technical Inspection is responsible for accreditation of training providers and certification of installers of micro and small installations of the following types of renewable energy sources:

- boilers and furnaces for biomass, or
- photovoltaic systems, or
- solar heating systems, or
- heat pumps, or

- shallow geothermal systems.

Detailed regulations for certification and accreditation of installers and training providers are contained in the following Regulations, issued on the basis Art. 20v w / in the Act:

- Regulation of the Minister of Economy of 25 March 2014. On the conditions and procedures for issuing certificates and accreditation of training providers in the field of renewable energy sources (Dz.U.2014. Poz. 505)
- Regulation of the Minister of Economy of 20 March 2014. On charges for carrying out the examination, issuance and renewal of a certificate and for granting accreditation in the field of renewable energy sources (Dz.U. 2014. Poz. 425).

Accreditation of installers of micro and small RES installation is voluntary and has national geographical coverage.

The application for a certificate may be submitted in the selected branch office the Office of Technical Inspection (UDT). Throughout Poland there are 29 such branches. List of branches of UDT with contact details can be found at the website of office. A candidate must meet specified in Energy Law Act requirements.

The certificate for installers is issued for 5 years. The validity of the certificate will be extended for a further period of five years, upon fulfillment of certain requirements.

In order to issue a certificate of renewable energy installer, the installer must meet a number of requirements . These requirements are separated into two groups:

- installers who have vocational education in the field of renewable energy equipment or related higher education,
- installers who has completed training in an accredited training center and passed a test

A detailed training program is set out in Annex 4 of the Minister of Economy of 25 March 2014 on the conditions and procedures for issuing certificates and accreditation of training providers in the field of renewable energy sources.

2.3.4. FINANCING OF IMPROVING ENERGY EFFICIENCY IN RESIDENTIAL SINGLE FAMILY BUILDINGS

Since 1998 Bank Gospodarstwa Krajowego (BGK) has been servicing Thermal & Refurbishment Fund (TRF). The Fund supports an accomplishment of thermo modernization and refurbishment undertakings.

Its framework covers, among others:

- thermal refurbishment of all types of residential buildings (excluding state owned buildings);
- buildings used by municipal entities for purposes of public services (schools, hospitals etc.);
- local district heating network and local heat sources;
- installation of renewable energy sources or high efficiency.

Specification of thermomodernization subsidy:

- after completion of the undertaking an investor receives a thermomodernization premium of valued to 20% (of the commercial bank loan value (after March 19, 2009)
- the subsidy could not exceed:
 - 16 % of the total cost of undertakings
 - double expected annual energy costs savings (set in energy audit).

Unfortunately, as it can be see in table above, the instruments was used mainly through the multifamily houses and public buildings. Only, 701 single family houses used the subsidy in the period of 14 years.

| Applications structure by type of real estate (1999 – 2014) | | |
|---|--------|------------|
| | Number | Percentage |
| Multifamily houses | 32756 | 93,47% |
| Public real estate | 1296 | 3,70% |
| Single famliiy houses | 731 | 2,09% |
| Local sources of heating | 106 | 0,30% |
| Special community houses | 96 | 0,27% |
| Pipeline heating systems | 53 | 0,15% |
| Other sources of heating | 6 | 0,02% |
| Total | 35044 | 100% |

In 2015, the National Fund for Environmental Protection and Water Management plans to launch a pilot program “RYŚ” for thermomodernization of buildings addressed to owners of single-family houses. For the purposes of the program simplified energy performance of the building will be developed. At this stage, the person preparing it, and substantive scope of the study is indefinite.

The idea of the program is to give incentive for the advisory services and designing process as well as for the thermomodernization investment under certain conditions there will be loan on awarded preferential terms. The budget for the program is 300 mln PLN.

2.3.5. CURRENT FORMS OF BUSINESS ACTIVITIES

Auditors and certifiers work mostly as free lancers or running their own business in form of contract for services. Auditors can be also employed in micro and small companies focused on selling consulting services for construction.

Consequently, the income from work are regulated mostly by the unit price of developing audit or certification sector.

A volume of work available for residential buildings auditors is dependent on the level of awareness of building owners and according to that financial factors motivating them to improve the energy performance of buildings. Residential energy audits are carried out mainly for the purpose of obtaining credit and bonus thermomodernization from the National Fund for Refurbishment and Renovation, which mainly relate to multi-family buildings.

The new financial instrument program “RYŚ” of National Fund for Environmental Protection and Water Management - will undoubtedly an additional stimulus for single-family housing market to take larger steps to increase energy consumption in this sector.

The market of energy certification of buildings is regulated by the requirements of the Directive and the Act on the energy performance of buildings. Under the existing Act, owners or managers of property who want to sell them or rent, have a duty to provide the energy performance certificate. Due to availability on market different software for calculations necessary to make certificate and extension of persons who can perform them, profession is highly competitive and rarely is a form of self-maintenance.

3. TRAININGS

The following section describes trainings for energy auditors, energy certifiers in the first part and in second part there is a separate description for RES installers. Due to deal with industrial energy audits the qualification and training of energy efficiency auditor is not interest of the project.

3.1. TRAINING FOR ENERGY AUDITOR AND CERTIFIER

3.1.1. MERIT CONTENT

As it was mentioned above the program of trainings or studies are based on requirements concerning the “output” which is described in appropriate legislation:

- merit content for energy audits is based on the Act on Support for Thermal Refurbishment and Renovations from 17.10.2008 (Dz.U. 223, poz.1459) and Regulation of the Minister of Infrastructure from 17.03.2009 (Dz. U. 43, pos. 346) on the form and content of energy audits and renovation.
- merit content for energy certifier is based on the regulation of Minister of Infrastructure and Development from 27 February 2015 on the methodology of determining the energy performance of a building or part of a building and energy performance certificates.

The trainings or studies programs are concentrated on the effects of learning and the outcome.

Program of studies is approved by the minister responsible for education taking into account opinion of the minister responsible for construction, local planning and spatial management and housing.

3.1.2. ENTITIES RESPONSIBLE FOR TRAINING

Higher schools provide a combined education in energy auditor and certification competencies on postgraduates studies. At least 25 public technical universities provides studies to gain qualification for preparing audits and certificates, also many private higher school provides education in this direction in all country (national coverage)

Trainings are also provided by the several institution operating in the field of energy efficiency, for example KAPE or Energy Conservation Foundation which realizes separately trainings for energy auditor and separately for certifiers.

3.1.3. STRUCTURE AND METHODOLOGY OF TRAINING

Higher academic education:

Usually studies are conducted in the form of lectures and exercises with elements of individual work. Duration of studies is at least 2 semesters – around 270 hours, number of ECTS credits: 96.

The requirement for attending is higher technical education with specializations on: power engineering, electrical engineering, mechanical engineering, environmental engineering, construction, architecture or other related services. It is also possible participation of people with higher education in economics and persons with secondary technical education.

Non formal training:

The trainings last from 3- days (24 hours) up to 8 days (50hours). Sometimes training providers apply the preliminary stage - self-study – listeners read the lecture and training materials. No e-learning platform is identified.

Training consist of lectures, exercises and self calculations.

Sometimes there is practical part offered and participant prepares fragments of Energy Audit under the guidance of trainee .

3.1.4. REGISTERS

Central register of the energy performance of buildings, which includes lists of persons entitled to provide energy performance certificates lead minister responsible for construction (D.U.2014 poz. 1200.). An observed number of certified persons in central register is – 11 859 (3.09.2015)

Currently in Poland operating at least 2 lists of energy auditors. Chronologically older is a list of energy auditors authorized by the Polish National Energy Conservation Agency and was established in 1996. The process of training and authorization auditors was based on the Danish experience and there were trained first auditors.

KAPE provides the only one exiting authorization of energy auditors. On the list of authorized energy auditors KAPE is now 201 people.

Last authorization of new auditor was in the 2010 year. 1810 was trained till 2010.

The criterion for inclusion on this list requires to have relevant experience, length of service and performing three energy audits. The quality of audits is verified. Authorization process ends within positively passed an exam.

To pass the exam it is required to submit and defend, in a front of Qualification Committee, at least one energy audit of:

- residential building – multifamily building (min. 5 apartments) cubature min. 1000 m³,
- public building – cubature min. 1000 m³,
- industrial building – cubature min. 2000 m³ or energy consumption not more than 120MWh/rok.

The list is available on KAPE'S website: <http://www.kape.gov.pl/dbaudit/fs-audita.phtml>.

Besides list of KAPE there is also a list of energy auditors who are members of established in 2000 Association of Energy Auditors. The list was established in 2005 and the criterion for inclusion on this list is to perform at least three positive verified by BGK (National Economy Bank) energy audits in accordance with the Act on refurbishment and renovations.

List and rules of inclusion on the list are available on the website: www.zae.org.pl

In the list of energy auditors is now around 330 people. The association has more than 1400 members.

3.2. TRAINING FOR RES INSTALLER

Education of employees on executive-level involved in renewable energy according to the current education law can be carried out in the school system. From 2011 it is possible to get qualified as a technician of equipment and renewable energy systems in the technical vocational schools. The profession is currently taught in 17 schools in Poland for 272 students.

From 1 September 2012 achieving qualifications of RES technician is also available through attending to vocational qualification course involving two qualifications:

- installation of equipment and renewable energy systems,
- operation of equipment and renewable energy systems.

The course ends with an examination in front of the Regional Examination Board.

Polish system of vocational trainings allows working adults/employees to get the qualifications of technician after passing the above mentioned exam.

3.2.1. MERIT CONTENT

A detailed scope of profession and its objectives, means professional skills which student must achieve contain the regulation on core curricula (Dz.U. 100/2011, pos. 582).

RES Technician must have the skills common to all occupations in the following areas:

- Health and Safety
- Specialized foreign language
- Business activity
- Personal and Social Competencies
- The organization of work of small teams

The curricula core also determines the skills that are the basic for technician of equipment and renewable energy systems and i energy technician:

- identify sources of conventional and non-conventional energy;
- characterizes energy resources in Poland and the possibility of their use;
- characterizes the processes of generating energy: electrical, mechanical and thermal;
- distinguishes energy facilities and determines their impact on the environment;
- characterizes renewable energy systems;
- determines the possible uses and renewable energy systems in construction;
- apply the law of fluid mechanics, electrical and fuel combustion;
- performs calculations of parameters characterizing the flow of liquids and gases;
- performs measurements of physical quantities;
- complies with rules for the implementation of sanitary and electrical;
- apply the provisions of construction law and energy law;
- performs drawings using specialized computer programs
- outlines the benefits arising from the use of energy from renewable sources;
- manages energy in a rational way;
- used computer programs supporting the execution of tasks.

Crucial for the technician of equipment and renewable energy systems learning outcomes:

B.21. Installation of equipment and renewable energy systems

1. Organizing installation of equipment and renewable energy systems
2. The preparation of cost estimates, offers and contracts for the installation of equipment and renewable energy systems
3. Perform installation of equipment and renewable energy systems

B.22. Exploitation of of equipment and renewable energy systems

1. Monitoring and supervision of renewable energy systems
2. Maintenance and repair of equipment and systems for renewable energy

The person who holds diploma of this qualification can achieve the accreditation without the training and exam. For those who have similar qualification or already are working in the profession there is separate training for certified installer of RES.

The scope of the basic training program, appropriate for the type of renewable energy source , include:

1. theoretical part:
 - a) general issues covering basic concepts and definitions related to the installation of renewable energy sources ,
 - b) physical and technological installations and the provision of reference documents ,
 - c) specialized topics, (attachment nr 4 directive 2009/28/WE)
2. practical part:
 - a) exercise and practical tasks related to the installation of renewable energy sources , giving a list of appropriate technical equipment , including laboratory equipment and the rules for their safe use

3.2.2. ENTITIES RESPONSIBLE FOR TRAINING

Profession of equipment and renewable energy systems technician is currently taught in 17 in the technical schools in Poland. In 2013 there were 272 students educated.

The vocational training can be also offered by the other training bodies or companies which meet the requirements of accreditation process lead by Ministry of National Education.

The most popular trainings are offered by the companies or distributors of RES equipment (Viessmann Academy, Vaillant, Danfoss, Bosch, Buderus, Immergas, Bims Plus, InstalKonsorcjum, Klimosz, itp) ususally covering all country.

Accreditation body for training providers (training for certified installers) is led by the Office of Technical Inspection. In the register is only 12 training providers.

The accreditation for training companies is given for 5 years.

3.2.3. STRUCTURE AND METHODOLOGY OF TRAINING

The minimum number of hours of vocational training is specified in the core curriculum and covers about 2 years

Learning outcomes common to all professions and learning outcomes common for occupations within the construction area constituting the foundation for vocational education or occupational group 380 h

B.21. Installation of equipment and renewable energy systems - 590 h

B.22. Exploitation of equipment and renewable energy systems - 380 h

Within on-site practice - 160 h

The school undertaking training in this profession should have the following classrooms:

- Classroom for documentation
- Laboratories of renewable energy systems
- Stands to the technical work

Training consist of lectures, exercises but non-school institutions and product companies also offer education in the form of e-learning.

3.2.4. REGISTER

Central register for RES installers lead Office of Technical Inspection it contains 77 certified installers (mostly PV) state on December 2014. It works from November 2013.

The certification is voluntary .

4. BEST PRACTICE

Education of energy auditor and energy certifier is provided by nearly all public technical universities and several non-public higher education institution. The program of studies is nearly the same at every academy it allows to provide:

a) the energy performance of buildings on the basis of:

- Regulation of the European Parliament and of the Council 2010/31 / EU on the energy performance of buildings (EPBD Recast) date on 19.05.2010 r.
- Regulation of the Minister of Infrastructure and Development “Methodology for calculating energy performance building” date on 03.06.2014 r.
- Act on Energy Performance of Buildings date on 29.08.2014 r.

b) energy audits of buildings to the needs of thermomodernization basis:

- Act on supporting refurbishment date on 21.11.2008. with amended

c) evaluating the energy efficiency of buildings on the basis of:

- Regulation of the European Parliament and of the Council 2012/27 / EU on energy efficiency (EED) date on 25.10.2012r.

d) the exchange of technical projects in the ecologically combustion heating clean - in force since 2011.

e) the design of low energy buildings - in force since 2012.

Studies "Certification and Energy Audit of Buildings"

Example of studies programme on "Certification and Energy Audit of Buildings"

organized by the Faculty of Environmental Engineering on the Wroclaw University of Technology

Duration of study: 2 semesters - 249 hours + 15 hours work final

Number of ECTS credits: 96

1. Legislation and regulations in the EU and Poland
2. Building physics
3. Design of buildings taking into account the energy class
4. The energy efficiency of building heating systems
5. The energy efficiency of air conditioning systems in buildings
6. Energy efficiency of hot water systems
7. Energy efficiency of energy installations
8. Methods of assessing energy performance of buildings
9. Thermomodernization and energy audit
10. Economic analysis of the cost-effectiveness EE undertakings
11. Energy management in buildings
12. Diploma Seminar

The **Polish National Energy Conservation Agency** (KAPE) - ENACT Polish partner is a national leader in the area of efficient energy management. One of the core business KAPE is a sustainable building, including support and promotion of thermo-refurbishment (thermo-modernization) in buildings. KAPE already in 1996 took part in the project "Energy consultancy scheme for buildings" developed under the Polish-Danish governmental programme granted by the Danish Energy

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Agency. Within the framework of the project trained 12 building energy auditing trainer were educated by DTI in Denmark who developed a training curriculum and set up basis for building energy consultancy scheme in Poland. Since then, more as 4500 professionals have been trained under this voluntary scheme.

Substantial scope of training program:

1. The use of energy and energy savings.
2. Legal Regulations / National Policies
3. Energy consulting
4. Thermal protection of buildings.
5. Boilers for solid fuel, liquid and gas.
6. Ventilation and air conditioning.
7. Heat pumps and renewable energy sources.
8. Internal heating systems and heating systems.
9. Economical use of water.
10. Saving electricity.
11. Energy management and energy measurement.
12. Economic and energy efficiency evaluation of investment
13. Methods of measurements and tests.
14. The technique of thermography.
15. Energy Auditing in residential sector and public buildings.
16. Financing projects and cooperation with banks.

The network of entities offering the training for energy auditors was very wide but within introduction to higher education courses related to auditing the number of training courses offered by other entities and private companies has decreased.

The most known training entity is Energy Conservation Foundation which was established in 1992. It is a non-profit organization and a Business Environment Institution which focuses its efforts on issues related to energy efficiency. The main goals of the Foundation are promotion of energy efficiency issues, social education and preparation of specialists in the field of energy advisory and energy efficiency. High quality of training and advisory services of the Foundation ensures the implemented Quality Management System which complies with PN-EN ISO: 9001:2009. Energy Conservation Foundation, as the first one in Poland, published the standard for Energy Auditing and commenced trainings for the energy audit activities.

Energy Conservation Agency trainings for energy auditors.

The training consist of two stages:

- Preliminary stage - self-study – listeners read the lecture and training materials –at least 10 days before
- 3- day training (24 hours) in Warsaw. Training consist of lectures, exercises and self calculations and prearing of fragments Energy Audit - under the guidance of trainee

Training is conducted in the form of lectures and exercises with elements of individual work.

Substantial scope of training program

The course covers the following subjects:

- a) on the basis of the training materials submitted (in initial stage) for self-study
 - a. Energy use and energy savings in buildings
 - b. Energy consulting
 - c. Heating systems
 - d. Domestic hot water
 - e. Ventilation systems
 - f. Solid fuel boilers, liquid and gaseous
 - g. Heat pumps and renewable energy sources
 - h. Energy saving electrical installations
- b) lectures and exercises in a group (3-day training)
 - a. Legislation related to energy auditing
 - b. Thermal protection of buildings
 - c. Calculation of energy consumption in buildings
 - d. Economic analysis and efficiency of thermomodernization
 - e. Methods for preparation of building thermomodernisation audits
 - f. Methods for preparation of audits of building retrofit.

“New pro-innovation services in energy consultancy for buildings” Energy Conservation Foundation

In order to help businesses that want to apply the latest energy efficiency solutions in buildings, Energy Conservation Foundation prepared the very interesting project NOWYIEKSPERT – a tool that makes it possible to select and make innovations within the enterprises through the transfer of know-how at no cost.

The national project entitled “New pro-innovation services in energy consultancy for buildings” was implemented as part of the Operational Program Innovative Economy Measure 5.2.

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Background

In order to meet market demands, energy-saving experts - architects and designers, real estate management companies and energy advisors have to calculate, correctly and precisely, parameters giving the insulatory capacity of compartments in the building, evaluate the parameters of heating and ventilation devices, or forecast heating and water consumption costs. They also have to assess whether, when renewable energy is being introduced into everyday use, passive investments should be carried out. In a situation of such intense technological development and wider choice of solutions, raising product knowledge, potential use of new solutions and their proper selection is extremely important.

Structure and methodology

The target group were entrepreneurs providing businesses service in one of three areas of energy efficiency in buildings:

- energy advice, including the preparation of energy audits and energy certification of buildings;
- design of buildings and utility installations in buildings;
- property management throughout its service life.

Know-how transferred to a business entity comprises eight subject areas, described below. Knowledge and tools relating to individual issues had been grouped as a “know-how set” prepared for transfer within the business entities.

The subjects of “know-how” sets offered in the project:

- Energy supply systems in new buildings
- Evaluation of the level of heat retention in buildings
- Evaluation of the quality of the interior climate and whether a building is airtight
- Use of renewable energy in buildings
- Designing of low-energy and passive buildings
- Energy management systems in buildings
- Methods for evaluating the environmental impact of use of the building
- Methods for effective implementation of technological and organizational know-how in a business

The know-how package was transferred in stages. Each subject area was transferred separately during 2-4 day group or individual meetings with project consultants and experts. Depending on the type of issue, the meetings take the form of:

- a lecture with exercises,
- workshops, including use of diagnostic equipment,
- consultations regarding independently prepared projects – studies of participants' own cases at random or cases prepared by the consultant,
- study trips to look at practical implementation of projects.

The business entity receives a set of materials with every transferred part of the package: textbooks, procedures, sample reports, ring binders and spreadsheets.

280 benefices took part in the project, up to 173 enterprises transferred issues of know-how dedicated to energy advisors.

5. CONCLUSIONS: BARRIERS, GAPS AND GENERAL RECOMMENDATIONS

In Poland, the system of training for energy auditors, both in the construction and industry sector is determined by the effect of education means the ability to realize an energy audit of the building or installation. The scope of this audits is given with the relevant regulations. The level of knowledge and skills in the field of energy auditing is very high and on the market there are high-quality experts in the area of thermo-modernization of buildings.

Training programs, both in formal education (postgraduate) and non- formal is based legal records and do not go beyond that. This applies to both profiles developing energy audits for the needs of a refurbishment and energy certificate of the building.

Meanwhile, there is more and more demand on other skills, not included in the legal regulations that allow auditor for proper implementation of modernization measures and / or implementation of energy efficient solutions and renewable energy in housing construction. Among them they can be described broadly defined social or marketing skills, that allow for education and promotion of energy-saving solutions among investors.

Whether renovated or newly built house is energy efficient the awareness of investor is insufficient and requires the assistance of a specialist at the stage of implementation of specific energy efficiency solutions. Meanwhile, the auditor prepared to develop audit does not necessarily have

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the skills and knowledge to implement these solutions. It demands a continuous retraining oriented on innovative solutions for energy efficient construction both in terms of building design and installation on suppliers of media.

The development of energy auditing market tends to have more and wider competencies needed to perform various studies and services related to improving energy efficiency which expand energy auditor competencies to energy advisors.

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7. ANNEXES

ANNEX 1: THE NATIONAL STANDARD OF PROFESSIONAL COMPETENCE IN THE POLISH NATIONAL QUALITY FRAMEWORK FOR ENERGY MANAGER 214.932