



O1 - ENERGY AUDITORS COMPETENCIES AND PROFESSIONAL PROFILES - EXECUTIVE SUMMARY

ENACT Project

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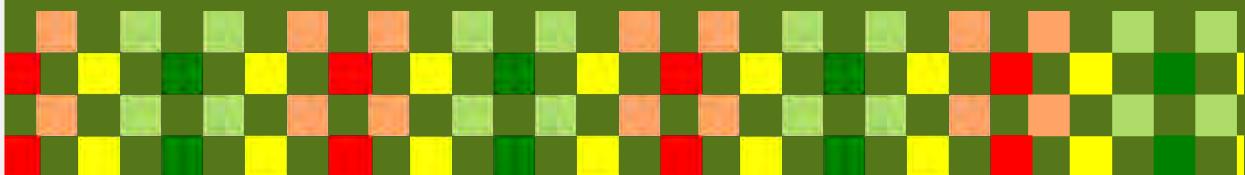
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O1 Energy auditors competences and professional profiles

- Executive Summary -

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2. ENACT – ENERGY AUDITORS COMPETENCIES, TRAINING AND PROFILES

The need of dynamically matching the educational offer and the job market demand represents a relevant challenge to promote and sustain an inclusive and competitive society in Europe. Stimulating open, accessible and flexible education represents one of the main pillars of the Europe2020¹ strategy, as recalled in “Rethinking Education 2030” European strategy and in the EASI (Employment and Social Innovation)² frame. The fulfilment of this strategic goal requires the implementation of common and shared professional profiles (and related competences and learning outcomes system) definition. Furthermore, the ECVET³ frame boosts the transparency and recognition of the learning outcomes and confirms the need to implement innovative and dynamic tools to improve employment and educational excellence.

Effectively addressing this challenge is even more critical in one of the most dynamic, wide and increasing job market area: green-jobs. It represents a very dynamic job market segment requiring new jobs and new skills. Overall 37% of European SMEs declares to have at least one “green” person, with very different professional profiles (from energy saving to zero emission buildings) and levels (from blue collars to managers).

ENACT (*ENergy Auditors Competences, Training and profiles*) addresses the skills matching challenge in the green sector, with special reference to the professional profile of the Energy Auditor.

More specifically, the project intends to positively contribute to the definition and implementation of a common frame for the green professional qualification and competence (and learning outcomes) of the Energy Efficiency Building Auditors. Skills needs anticipating and matching for this profile is very critical for the achievement of higher degrees of job market effectiveness and for the fulfilment of the recent European directive on energy efficient buildings (2012/27/UE)⁴, as well as for the Europe -20 – 20 - 20⁵ strategic goals and the NZEB⁶. The interest and relevance of the definition of an organic, complete and common qualification frames in this scope is also confirmed by the recent (and in some countries still ongoing) process of definition of European certifications, standards and European norms (EN)⁷.

More specifically, expected project impacts/results are:

- ✓ common European based qualification system for the green jobs labour market segments related to the professional figure of energy auditor to foster mobility, employability and a real learning outcomes base learning, educational and employment (and employability) strategy,

1 http://ec.europa.eu/europe2020/index_en.htm

2 <http://ec.europa.eu/social/main.jsp?catId=1081>

3 <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3Ac11107>

4 <https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive>

5 http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/targets/index_en.htm

6 Nearly Zero Energy Buildings

7 http://europa.eu/youreurope/business/product/standardisation-in-europe/index_en.htm

- ✓ integration and development of open educational resources and definition of training resources (and measures),
- ✓ establishment of networks and development and exchange of best practice through targeted events.

Project approach, goals and articulation (as well as its consortium composition) will also contribute to the definition of sustainable “green skills governance model” by implementing an effective dialogue, based on the direct involvement of and a co-building process among all relevant actors.

Activities will support the realization of:

- ✓ Four intellectual outputs (O1 Energy Auditors Competencies and Professional Profiles; O2 ENACT Program and Learning Resources; O3 ENACT integrated system; O4 ENACT Recommendations).
- ✓ Eight multiplier events (2 in each partner countries) and one final conference.

The executive summary, together with the complete research report is available on the project website (<http://www.enactplus.eu/eng-risultati>).

3. O1 “ENERGY AUDITORS COMPETENCES AND PROFESSIONAL PROFILES” OVERVIEW

The “Energy Auditors Competences and Professional Profiles” is the first intellectual outcome developed within the ENACT project. It contains the results of the analysis and comparison of the National and European frames of green jobs related to the wide family of professional figures related to energy efficiency. It provides the basis to define a common professional profile (activities, competences and training) of the ENACT Energy Auditor and the relative ECVET training program and learning resources.

The “Energy Auditors Competences and Professional Profiles” has been defined and structured building on an organic comparative analysis of scenarios, state of the art and best practices in two main dimensions:

- ✓ Institutional - in terms of existing profiles and labour market dynamics, with special reference to the governance models (actors, tools and procedures), relevant for the targeted energy auditors profiles existing in the partners country. A deep and compared analysis on closed and ongoing researches and professional peer groups reports has been carried on;
- ✓ Sectorial - in terms of relevant emerging scenarios in the targeted job segment of auditors and in the wider green job sector in terms of skills needs, learning outcomes and professional profiles. A map of existing educational and VET curricula and training programs has also been carried on.

To collect inputs / information / insight for the “Energy Auditors Competences and Professional Profiles” the partners have initially analysed the situation in their own countries and have then compared the various National situations. The National analysis have been carried out through desk research and meeting with stakeholders as described below:

- ✓ Italy – meetings with the main national stakeholders (such as accreditation bodies, sectorial training organizations, other synergical research project, etc.) to discuss the new *ENACT Energy Audit* profile and identify possible common initiatives;
- ✓ Poland – desk research, including also ongoing projects with the participation of KAPE and information provided by Polish institutions;
- ✓ Portugal – desk research, with emphasis on the activities in the frame of the energy certification of buildings and institutional relationship with accreditation entities;
- ✓ Spain – desk research, based on online consultation of relevant policies and legislation, being the main sources the public administration, certification entities and professional associations.

The “Energy Auditors Competences and Professional Profiles” output is articulated in two interrelated sections: **Comparative Report (O1A1)** and **Energy Auditors professional profile(s) matrix (O1A2)**.

The **Comparative Report (O1A1)** aims to present and supply information about the qualification, certification and training system of the energy efficient professional figures (energy auditors, energy managers, etc.) in each partner country (Italy, Poland, Portugal and Spain) in an homogeneous and comparable manner. It is based on the four national reports developed by the partners (annexed to the report), integrating and enriching them. The focus of the Comparative Report is on the residential sector and its content is structured in 3 main axes - institutional framework, training schemes/systems and best practices.

The comparative research (both desk and in field) has also addressed, integrated and valorised the ongoing definition of the European standards and certifications, with special reference to the European norm EN 16247 (“Energy Audits”, subdivided in its various chapters) and the Italian norm UNI CEI 11339 (“Expert in Energy Management – general conditions for the qualification). The Comparative Report allows to:

- ✓ have an overview of the situation in all involved countries,
- ✓ identify possible areas for collaboration and/or sharing of expertise/experience regarding training of energy auditors,
- ✓ build the conceptual frame of a common (and modular) *ENACT Energy Auditor* professional profile.

Based on the results of the national researches and the comparative analysis, the professional profiles of the various professional figures of the energy efficiency sector (including related skills, learning outcomes and

competences) and the referentiation both at national (NQF⁸) and European (EQF⁹) level, have been specified and collected in the **Energy Audit Professional profile(s) Matrix (O1A2)**. The matrix allows a comparative analysis of the diverse qualifications (energy auditing related) in order to:

- ✓ define the conceptual, methodological and operative base for the **ENACT Energy Auditor professional profile definition, a modular structure of learning outcomes, related competences/knowledge and training schemas** (illustrated in the second project outcome - O2);
- ✓ focus on the **common and diverse “bricks”** of the Energy Auditors related professional profiles at regional, national and European level (including European standards and norms) supporting the:
 - definition of an European professional, labour and learning space, able to valorise mobility (both in terms of common qualifications and ECVET based training)
 - valorisation of ENACT impact at each geographical level.

4. O1A1: THE MAIN INSTITUTIONAL AND PROGRAMMATIC FRAME

EUROPEAN UNION - INSTITUTIONAL AND PROGRAMMATIC FRAME

Improving the energy performance of buildings is a key factor in securing the transition to a “green” resource efficient economy and in achieving the European climate and energy objectives, mainly a 20% reduction in the Green House Gas (GHG) emissions and a 20% increase in energy savings by 2020. The 2011 Energy Efficiency Plan identified private and public buildings as being the sector with the greatest energy saving potential. The plan focuses on instruments to trigger the renovation process in public and private buildings and to improve the energy performance of the components and appliances used.

The main European Directives and practical support initiatives to pursue these objectives are:

- ✓ **Energy Performance of Buildings Directive (EPBD)¹⁰** is, at European level, the main policy driver affecting energy use in buildings, and sets out common key requirements for Member States;
- ✓ **Ecodesign of Energy-related Products Directive¹¹** establishes a framework for the setting of eco-design requirements (such as energy efficiency requirements) for all energy-using products and energy-related products in the residential, tertiary and industrial sectors;

⁸ National Qualification Frame

⁹ European Qualification Frame

¹⁰ <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32010L0031>

¹¹ <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0125>

- ✓ **Energy Labelling Directive¹²** establishes a framework for the harmonisation of national measures on end-user information, particularly by means of labelling and standard product information, on the consumption of energy and where relevant of other essential resources during use, and supplementary information concerning energy-related products, thereby allowing end-users to choose more efficient products;
- ✓ **Energy Efficiency Directive¹³** establishes a set of binding measures to help Europe reach its 20% energy efficiency target by 2020¹⁴, all European countries are required to use energy more efficiently at all stages of the energy chain from its production to its final consumption
- ✓ **BUILD UP Skills¹⁵** is a strategic European initiative to harmonise the training of craftsmen and other on-site workers in the building sector on the topics of energy efficiency and renewable energy. It is part of the European Commission's Energy Efficiency Plan and is funded by the Intelligent Energy Europe programme¹⁶.
- ✓ **CA-RES II¹⁷** is a structured and confidential dialogue between national authorities responsible for the implementation of the Directive 2009/28/EC and is organized around 7 core themes in the areas of support schemes for the development of renewable energy sources.

ENACT COUNTRIES - INSTITUTIONAL AND PROGRAMMATIC FRAME

The European Union has defined energy as a strategic sector as it is affected by climate constraints and geopolitical factors (energy dependence) and its increasing costs impact on the competitiveness of the Union as a whole. Energy was therefore set as one of the areas addressed by the "Europe 2020 Strategy"¹⁸ for sustainable growth, which intends to adapt the economies of the European Member States and to foster the competitiveness of these countries. These objectives can only be achieved through national intervention and implementation.

In each of the four ENACT country (Italy, Poland, Portugal, Spain) the situation is different even though with some common points as reported below. In line with the European Directives, there is in all ENACT countries an Action Plan for Energy Efficiency:

- ✓ [Italy](#) - outlines energy efficiency goals that Italy has planned to achieve by 2020 as well as running policy measures for achieving them;

12 <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32010L0030>

13 <http://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive>

14 http://ec.europa.eu/clima/policies/strategies/2020/index_en.htm

15 <http://www.buildupskills.eu/>

16 <https://ec.europa.eu/energy/intelligent/>

17 <http://www.ca-res.eu/>

18 http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/targets/index_en.htm

- ✓ Poland - the strategic document describing national energy development is the Energy Policy of Poland until 2030, approved in 2009, in which is defined the tasks to be performed in the fields of energy efficiency and renewable energy sources;
- ✓ Portugal - integrates the implementation of national action plans on energy efficiency and renewable energies, respectively for the periods of 2013-2016 and 2013-2020. These plans aim to boost the energy efficiency and RES (Renewable Energy Sources), through the structural reduction of public spending and efficient use of resources;
- ✓ Spain - sets up a National Plan for Energy Efficiency for the period comprised between 2011 and 2020 that continues and deepens the achievements of previous National Plans and establishes some key measures.

ENACT COUNTRIES -QUALIFICATION FRAMEWORK

The ENACT comparative research is based on the state-of-the-art in the four countries of all the professional profiles related to the energy efficiency, mainly energy auditing, in order to build a comparable frame. The situation in the various countries is quite different as summarised below:

- ✓ Italy - the Energy Auditor professional figure has been introduced by the legislative Decree 102/2014, but the Italian legislative framework foresees the existence of other different professional profiles involved in energy efficiency: energy manager, expert in energy management and energy certifier.
The qualification frame is the result of the national and regional professional repertoires. The regional frames of the professional figures in the energy efficiency field are quite different in the various Italian regions for their institutional competence in the qualification scheme definition (as illustrated in the following paragraph on the Energy Audit Professional profile(s) Matrix - O1A2).
Accredia, the Italian certification body, is now-a-days defining and publishing the standard professional competences of the Energy Auditor: UNI CEI EN 16247-5.
- ✓ Poland - the Polish system of qualification the national register of qualifications is under development. The 2014 Regulation of the Minister of Labour and Social Policy defines two energy professionals figures: Energy Auditor and Energy Manager.
- ✓ Portugal - a national profile for the energy auditor has not yet been defined and at the moment the Portuguese market has 3 professional figures: expert on energy certification of buildings, local energy manager and SGCE auditor (facilities and installations with intensive energy consumption).

- ✓ Spain – within the national and regional Spanish professional system it is possible to define, although in a fluid and under-definition frame, 3 different professional profiles related to the energy auditing: energy auditor, energy manager and energy consultant or adviser. The professional figures are divided into five levels and for some of them a university degree is requested whilst others are defined and recognized by professional associations and universities through post-graduate studies.

The results of the professional figures in the four ENACT countries are summarised in the following table.

Table 1 The family of professional figures related to energy efficiency in the four countries

Italy	Portugal	Poland	Spain
Energy manager Expert in energy management	Local energy manager		Energy manager
Energy auditor	Qualified expert on energy certification of buildings SGCIE auditor	Energy auditor Energy efficiency auditor	Energy auditor
Energy Certifier		Energy certifier RES installer	Energy consultant or adviser

Although the similarity of the names of the professional profiles, there are two main issues to be addressed in order to define a common qualification and competences frame:

- ✓ the qualification architecture in the different countries in terms of professional and training standards taking into account that the EQF level of the professional figures may differ from country to country (with impact on both the training and labour markets);
- ✓ the overlapping of the professional figures, in some country (or region) the energy auditor profile overlaps with the energy manager profile on one side and with the certifier on the other side.

Consequently, in order to build a common European *ENACT Energy Auditor* professional profile (curriculum and ECVET based training program - second project output), the comparison of the various national profiles has been carried out going beyond the professionals labelling of the qualification. Consistently with the European methodological frame and tools, all the relevant profiles have been thoroughly analysed in terms of specific professional activities, expected outputs and learning outcomes / competences.

The analysis of the different National qualification frame has been carried out taking into consideration:

- ✓ the **legislative and regulatory frame**, as well as the **qualification** and accreditation bodies and rules;
- ✓ the existing training **standards and programs** for each profile and / or level as well as the required entry level **and the competences / profile** certification process, actors and rules;
- ✓ the National and regional qualification repertoires **of Energy Auditor** professional profiles.

The comparative analysis of the various National / Regional Energy Auditor qualification frames (and professional standards) was further structured taking into account the European norm UNI EN 16247-5 ("Competence of Energy Auditors") that specifies the competences of energy auditors to effectively implement the energy audit. This final chapter of the European norm UNI EN 16247 is progressively being adopted in the partners countries, as presented in the table below.

Table 2 - Timeline for the implementation in the various ENACT countries of the UNI EN 16247 Chapter 5 – Competence of energy auditors

UNI EN 16247 – chapter 5	Italy	Portugal	Poland	Spain
Competence of energy auditors	June 2015	N.A.	June 2015 (English version)	July 2015 (Spanish version)

5. O1A2: COMPARATIVE ANALYSIS ON EXISTING QUALIFICATION AND QUALIFICATION SCHEMES

The analysis of the different professional qualifications within the national qualification frames in the ENACT countries, enabled to identify the main common activities and sub activities of the various professional figures related to energy efficiency: auditing, monitoring, management, certification (energy performance certificates), implementation of regulations and measures and identification of measures for energy efficiency. The identified activities and sub activities represent the basis for the proposal of the qualification comparative matrix: Energy Audit Professional profile(s) Matrix - O1A2.

The O1A2 matrix has been developed starting from the analysis of:

- ✓ National and regional (where relevant) qualification frameworks of each partner countries (Italy, Poland, Portugal, Spain);

- ✓ the European standards (EN norms) on Energy Auditor, the matrix building has taken into account the general indication of the European norm, UNI CEI EN 16247, on Energy Auditor activities and competences, providing added value to the project output on three main issues:
- 1) strategic information on the professional certifications (based on European standards) and on the job market. Although in the domestic building sector energy auditing is not yet compulsory, the laws approved in many countries make it compulsory for medium/big enterprises and public administrations;
 - 2) more clear base of comparison among the energy manager (and expert energy manager) profiles. The comparison of national and regional qualification frames often highlight an important confusion and overlap among these professional profiles which is even more relevant in the domestic sector, where the differences between the managerial (energy manager) and the specialist (energy auditor) profile are even more vague;
 - 3) relevant base for the definition of the competences (and training) system with reference to the buildings auditing methodologies (chapter 2 of the norm), activity carried out within the following project output.

With regard to the second point, the overlapping and vague borders between energy managers and energy auditors has represented a main research issues, both at national level (in each partner country) and at European level (comparison among the partners countries). To this extent, a deeper comparison between the Italian profiles of the Energy Manager Expert (defined by the Italian norm UNI CEI 11339) and the Energy Auditor (defined by the European norm EN 16247/5) has been carried out with the same approach and methodology as above - reporting activities and knowledge, skills and competences – as reported in the following table.



Table 3 - EME and EA professional standard profiles comparison

	EME	EA	
Standard and year of approval	UNI CEI 11339 - 2009	EN 16247/5 - 2015	
Application Area	Italy	33 European Countries	
Sub categories	2: EME in civil sector and EME in industrial sector		
Tasks	In depth analysis and continuous of energy system in which it operates	Application of principles and methodology within the scope of the energy audit as provided by EN 16247 (parts 1,2,3,4)	
	Promotion and implementation of an energy policy of the organization		
	Promotion and implementation of energy management systems		
	Energy accounting management, assessment of the savings made by energy saving projects and measures		
	Analysis of contracts for the supply and sale of energy		



Energy Auditors Competencies, Training and profiles



	Energy audits including the identification of improvements in relation also to the use of renewable energy sources		
	Technical and economic analysis of project feasibility and risk assessment		
	Optimizing facilities operation and maintenance		
	Management and control of energy systems		
	Design and implementation of business plans and management of involved personnel		
	Identification and implementation of programs to raise awareness and promote efficient use of energy		
	Defining the technical specifications of the energy aspects of contracts for the implementation of interventions and / or the supply of goods and services and the management of installations		
	Application of legislation and technical regulations in the energy and environment fields		
	Reporting and communication with senior management, staff and external stakeholders		



	Planning of energy systems		
	Financial planning activities		
	Project management		
Knowledge	Energy management systems and auditing techniques	Laws, policies, rules, regulations and standards	
	Traditional and innovative technologies for energy efficiency improvement and for the use of renewable sources	Physical principles related to energy (Thermal, electrical, thermodynamics, heat transfer, fluid mechanics, etc.)	
	Environmental implications of energy use (basic level)	Procedures, activities, energy uses and technologies related to sector (e.g. building, process, transport) of the energy audit	
	Market for electricity and gas , actors involved ,energy supply contacts , tariffs and current prices	Metering and measuring equipment	
	Methods of economic evaluation of the projects , the return on investment , the sources and means of financing	Energy supply (including availability of energy sources or carriers; energy production, transmission and distribution processes; energy unit conversion factors; greenhouse gas emissions factors; tariffs and tariff structures; general feature of the energy market)	
	Assessment techniques of achievable/achieved energy savings	Analysis methods, presentation and results reporting	



	Contractual arrangements for the purchase of goods / services with particular reference to the interventions aimed at improving energy efficiency and procedures for energy performance contracting	Energy efficiency improvements opportunities and possible different solution for implementation	
	Principles of project management		
	Legislation and technical standards relating to the environment and energy		
Skills	Be able to prepare and implement an energy management system , including an energy management program	Good communication skills (including moderation and presentation skills)	
	Be able to assess the risks of the project	Advise in an adequate manner on all aspects (technical, economic and others) of the energy audit	
		Capacity for observation, measurement, analysis and synthesis	Professional skills
		Ability to articulate concepts and ideas	
		Ability to adapt to encountered situations	
		Ability to make concrete proposal for improvements	
		Project management and methodology skills	
		Act in an impartial and objective manner	



Energy Auditors Competencies, Training and profiles



		<p>Be able to apply energy audit principles and methodology including: classify and highlight relevant energy uses within the scope of the energy audit; focus on matters of priority with reference to the scope, aim and thoroughness of 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 organisation)</p>	Energy audit process skills
		<p>Be able to manage the complete energy audit process including: planning the energy audit in cooperation with the organisation; 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 cooperate 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; documenting energy audit findings and preparing appropriate energy audit reports)</p>	Project management skills



		Be capable of making a measuring/metering plan for the data collecting activities	Technical skills
		Be able to identify and manage the equipment necessary to conduct the energy audit	
		Be able to verify and validate the measurements of all data and test results and to draw conclusions	
		Skills in analysis methods, presentation and results reporting (including identify suitable calculation and simulation tools; summarize findings and data supplied and analyse them to produce suitable recommendations; confirm the sufficiency and appropriateness of the information ; assess those factors that may affect the reliability of the energy audit findings and conclusions; understand the appropriateness and consequences of using sampling h for energy auditing)	Analysis methods skills
		Be able to quantify and analyse energy consumption and uses	Energy performance skills
		Be able to calculate energy savings and/or energy efficiency improvements and to explain the calculation and assumptions upon which they are based	
		Be able to estimate the interactions between energy efficiency improvement opportunities	



Energy Auditors Competencies, Training and profiles



		Be able to propose and calculate suitable energy performance indicators to quantify the energy performance and to make comparisons to references	
		Skills to recommend energy efficiency improvement opportunities and possible different solutions for implementation	
		Be able to propose an action plan to the organisation enabling it to monitor the energy performance	
		Be able to make suitable economic assessment of the energy efficiency improvement opportunities (i.e. LCCA, payback period, rate of return of the investment; discounted cash flow, net present value)	Economic assessment skills
Experience / competence	Competences in the field of industrial applications and production processes (EME for industrial sector)	Experience in communicating with technical and non-technical persons at various levels within the organisation	
	Competences in the field civil and public administration (EME for civil sector)	Competence to understand and apply energy audit principles and methodologies described in EN 16247 (parts 1,2,3,4)	
		Experience in the economic assessment	

Further In Italy, the regional repertoires with reference to the qualifications related to the (buildings) energy auditing. According to the project aims (and its further valorization) as well as to the Regional level of the institutional qualification system in Italy, the qualification definitions for the Italian Energy Auditor have been analysed within 9 regional repertoires, as summarised below¹⁹:

1. **Lazio** - Technician expert in energy management; Technician for energy solutions of integrated building system;
2. **Lombardy** - Energy manager;
3. **Tuscany** - Technician of design and development of energy-saving systems;
4. **Apulia** - Technician of design and development of energy-saving system;
5. **Sardinia** - Technician of design and development of energy-saving systems;
6. **Emilia Romagna** - Technical expert in energy management; Technician for energy solutions of integrated building system;
7. **Piedmont** - Technician of energy efficiency in the sustainable buildings system; Technician for the management and assessment of the energy system, Technician for the energy supply and plant construction;
8. **Liguria** - Technician of energy efficiency of existing buildings; Expert in Energy Management;
9. **Campania** - Project Manager of Renewable Energy.

ENERGY AUDIT PROFESSIONAL PROFILE(S) MATRIX

The results of the analysis and comparison of all the mentioned issues (National and regional qualification frameworks; European and national standards; Regional repertoires in Italy) have led to the building of the Energy Audit Professional profile(s) Matrix. The matrix reports the activities and KSC²⁰ matrix of the various energy efficiency professional figures in an harmonised and integrated manner. The matrix enables to:

- ✓ furnish a common base of comparison, based on a modular approach, allowing to share, integrate and harmonise the energy auditing related profiles (and qualifications) among European countries / regions and thus:
 - provide a most relevant impact of the project thanks to its alignment to both skills demand and supply,
 - valorise project results, at each regional / National level as well as at European level;
- ✓ define the operative frame for developing the ENACT profile.

¹⁹ The complete description of each Regional qualification system is annexed to the Italian country report.

²⁰ Knowledge / Skills / Competences

Table 4 – Energy Audit Professional profile(s) Matrix

	Activities Area	Activities	EA (UNI CEI EN 16247)	EME (UNI CEI 11339)	Knowledge	EA (UNI CEI EN 16247/5)	EME (UNI CEI 11339)	Skills	EA (UNI CEI EN 16247/5)	EME (UNI CEI 11339)	Competences	EA (UNI CEI EN 16247/5)	EME (UNI CEI 11339)		
Management	Promotion of energy efficiency measures (including the renewable)	Assessment of available alternatives (including renewable resources)	X	X	Knowledge of "traditional" and renewable energies	X	X	Technical expertise	X (UNI EN 16247 - 1,2,3,4)	X	Perform a technical-economic analysis of energy efficiency measures implementation	X	X		
					Knowledge of market performance in the different rates and existing costs sections	X	X	Development of technical-economic study	X	X	Determine effectiveness improvements Analyse and compare energies	X	X		
					Knowledge of technical solutions			Technical skills in calculation of useful energy; calculation of savings	X	X					
		Energy costs definition / calculation	X	X	Knowledge of energy measures/solutions and costs	X	X				Financial assessment	X	X		
											Definition (and agreement with client) of the energy and economic savings	X	X		
		Energy measures, solutions and costs	X	X	Knowledge on how the energy market (and suppliers), of the retail companies and the methodology to switch between companies	X	X	Compare the different energies or companies	X	X	Simulate economic savings between the different energies and companies	X	X		
		Elaboration of energy saving plans and systems	X	X		X	X								
		Planning energy efficiency measures													
		Energy / costs saving definition / calculation	X	X	Knowledge on energy measures/solutions	X	X	Reporting	X	X	Business orientation		X		
		Definition of the measures to improve the integrated energy performance Set up the technical solutions for the integrated energy performance improvement	X	X	Basic knowledge of technical solutions applicable to all areas	X	X	Skills to determine the best available techniques (amongst those existing) to suit the client's needs according to the implementation and location techniques, and performance. Ability to propose and receive from the client objectives for the energy and economic savings	X		Evaluate current installations and compare them with viable solutions	X	X		
		Communication (plan and tools) definition	X	X	Marketing knowledge	X	X	Negotiation and communication skills	X	X	Definition of appropriate strategy	X	X		
					Knowledge of marketing based on energy savings and sustainable solutions	X	X	Use of IT communication tools Communicate technical solutions	X	X	Plans and results communication	X	X		
		Evaluation of the incentives/law			Knowledge of verbal and physical communication methodologies			Verbal and non verbal communication methodologies							

			X	X	Knowledge of local, regional, national and European institutions that provide grants or subsidies Knowledge of procedures to request subsidies Knowledge of advantages and disadvantages of possible grants Knowledge of legislation applicable to each energy and application	X (not specify in a direct manner, but it can be included in knowledge of policies/ rules/ regulations)	X	Detect the most interesting grants to execute or implement one or several solutions Interpret regulations and their applicability in each case	X	X	Grants requests and management (including administratives and technical aspects) Monitoring the evolution of regulations and their impact on energy consumption, sustainability, costs and safety	X	X
Auditing	Technical and economical auditing	Collection of energy historical consumptions	X	X	Knowledge of technical issues, regulations and legislation	X	X	Equipment and ICT	X (EQUIPMENT IN GENERAL; ICT IS NOT MENTIONED)	X	Analyse data from monitoring systems Analyse energy bills		X
		Monitoring the existing facilities Diagnosis of energy context Representation of the energy situation of the integrated building system	X	X	Knowledge of production, control, communication, circulation, lighting, ventilation systems Knowledge of technical tools to conduct an audit or data registry Ability to assimilate energy consumption habits Ability to estimate consumption behaviours and cost	X (Included in technical knowledge)	X	Interpretation of data collected Simulation of consumption and cost according to the data collected and current energy costs Comparison between different ratios (from the client and the sector)	X	X	Define energy consumption indicators	X	X
		Compare tecnical performance indicators	X	X	Knowledge of technical issues, regulations and legislation	X	X	interpretation of indicators, standards and rules / regulations / legislation	X	X	Analyse the results of simple energy audits	X	X
		identification of energy efficiency measures and the use of renewable energy	X	X	Energy measures / solutions	X	X				Financial assessment	X	X
		Energy costs definition / calculation and energy saving	X	X	Energy measures/solutions and costs	X	X	Reporting	X	X	Business orientation		X
		Identification of opportunities to reduce energy expense (incentives)	X	X	knowledge on the incentives and technical knowledge	X	X	Incentive application	X (not specified directly but deducible)	X			
Planning	Economics And Performance Planning and Control	Verification of the budget availability against the costs		X	Knowledge on economical, financial and organisation planning			Technical expertise on plan and analysis of energy audits results, as well as equipment and ICT			Economical and financial assessment	X	X
		Collection of information on external conditions	X	X							project management		

		Elaboration of energy saving plans (UC 288)	X	X	Knowledge of processes for the implementation of technical solutions			Define and evaluate the attainable savings levels			Design of energy efficiency plan based on savings, investment and importance for the client		
		Design of energy saving systems (UC 289)	X	X	Knowledge of processes for amortization according to the savings and investment	X	X	Define and select measures applicable within the optimal period of amortisation			Organisation of actions according to priorities (economic, technical, social,...)	X	X
		Planning energy efficiency measures											
		Planning of the energy efficiency measures implementation	X	X									
		Definition of the measures to improve the integrated energy performance	X	X									
		Set up the technical solutions for the integrated energy performance improvement											
		Implementation		X									
Monitoring	Monitoring	Verification of the energy consumption		X	Knowledge of technical and technological solutions to perform a monitoring process of electric and thermal consumption		X	Utilization of equipment and ICT		X	Energy Management Plan implementation monitoring		
					Knowledge of the applications to act on monitoring systems and data collection			Interpretation of results from monitoring processes			Creation of behaviour profiles		
		Support and supervision		X	Knowledge on the interpretation of results according to the logical, real and proposed consumption			Interpretation of deviations on the functioning of consumption and logical or desired cost			Selection of applicable measures to bridge the gap between current and desired (or more efficient) profiles		X
								Creation of profiles for optimal functioning					X
		Statement of the improvement performance energy plan (and report the actual EE and cost reduction)		X	Knowledge of technical issues, monitoring processes, regulations and legislation	X	X	Equipment and ICT	X	X	Energy Management Plan implementation monitoring		
								Monitoring and reporting skills			social, team working, performance management/assessment		X
								Monitoring of processes or action necessary to achieve the objectives set-up			Project management		X

6. CONCLUSIONS

According to the analysis of the overall situation, at institutional level the European Directive on Energy Efficiency and the obligation to develop energy efficiency plans have determined the following **common situation and initiatives** in the ENACT countries:

- ✓ **energy certification of buildings is transversal and special attention is being dedicated to this theme,**
- ✓ **the need of defining common professional frames and related training schemas, certifications and so on** is strongly felt.

The National qualification and training framework analysis have highlighted also the following **barriers**:

- ✓ lack of a common skills certification system,
- ✓ lack of a clear definition of “green sector” and “green employment”,
- ✓ lack of a common professional and training standards,
- ✓ lack of clear regulation in the area of training for energy efficient professionals,
- ✓ lack of a single educational framework.

In order to define a common European based Energy auditing profile, an in depth comparative analysis of institutional, programmatic and qualifications frame has been carried on, including the application of the European standards and norms. The two matrixes built represent the conceptual and operative frame for defining the next project outputs (O2 ENACT Program and Learning Resources; O3 ENACT integrated system); more specifically, as regarding:

- ✓ the perimeter of the **ENACT energy auditor professional profile and curriculum**, within the ENACT Program and Learning Resources (O2);
- ✓ an **ECVET based modular learning program, system and resources** within the ENACT Program and Learning Resources (O3), thanks to the analytical definition of learning outcomes, expected performance and evaluation system for each component (activity and sub-activity) of the professional profile. This approach will also allow to implement a multiplier impact and valorisation at each regional and national level (as well as cross-sectorial), allowing a clear definition and comparison of “curriculum” bricks of the *Enact Energy Auditor*;
- ✓ consistently with the two points above, a common energy auditing and management **European job market and learning space** for all the relevant sectors (residential, public building, companies) within ENACT recommendation (O4).