



LIFELONG LEARNING PROGRAMME  
LEONARDO DA VINCI  
Transfer of Innovation Action

Work package 2:  
Professional competences in energy sector

# **The new professional skill NEEDS** *based on EC Directives and national RES/EE regulations for the countries involved in the project*

Due date of document: 11/11/2010  
Actual submission date: 15/12/2010

Executive document number *Do 2.3*  
Dissemination level: *Restricted to other programme participants*

Author: Wen Guo (ISNOVA), Amaia San Cristobal (ASIMAG), Eden Mamut (OUC)

Leader partner for this workpackage: ISNOVA

**All rights reserved.**

This document is proprietary of the COMPENER consortium members. No copying or distributing, in any form or by any means, is allowed without the prior written agreement of the owner of the property rights.

The document reflects only the authors' view. The European Community is not liable for any use that may be made of the information contained herein.

## INDEX

<b>ABBREVIATIONS AND ACRONYMS</b> .....	IV
<b>1 Introduction</b> .....	1
1.1 Background .....	1
1.2 Objectives of the executive document .....	1
1.3 Contribution of partners.....	
<b>2 Overview of the new professional skill requested by EC RES/EE directives</b> .....	2
2.1 Skills for Renewable energy (RES) .....	3
2.2 Skills requested for energy efficiency improvement (EE).....	6
<b>3 Professional skills related to national RES/EE regulations</b> .....	10
3.1 Italy .....	10
3.1.1 Professional figures related to renewable energy .....	10
3.1.2 Professional figures involved in EE improvement.....	13
3.1.2.1 Italian legislative decree 2006/311 and related professional figures.....	15
3.1.2.3 Italian legislative decree 2008/115 on Implementation of Directive 2006/32/EC and related professional figures .....	16
3.1.2.3 Ministry Decree 2008/37 and related professional figures .....	17
3.2 Spain.....	18
3.2.1 3.2.1 ....Spanish national measures promoted according to the Directive 2009/28/EC .....	19
3.2.2.2. Spanish National Energy Efficiency Action Plans (NEEAP) (Directive 2006/32/EC) .....	24
3.2.3 3.2.3 ....Royal Order 47/2007 on Basic procedure for Energy efficiency certification in building of new <b>construction</b> .....	25
3.2.4 3.2.4 ..... Royal Order 1027/2007 Regulation on Heat Installation in Buildings ( <b>RITE</b> ) .....	25
3.3 Romania .....	26
3.3.1 Professional figures involved in RES .....	26
3.3.2 Professional figures involved in EE improvement.....	28
3.3.2.1 Romanian Law 375/2005 on Implementation of Directive 2002/91/EC and related figures.....	29
3.3.2.2 Romanian Government Ordinance 22/2008 on Implementation of Directive 2006/32/EC and related professional figures .....	31

3.3.3 *Romanian Government Decision 29 from 30/08/2010 regarding the modification and completion of the law 220/2008 and implementing the Directive 2009/28/EC*

**BIBLIOGRAPHY** ..... 34

## **ABBREVIATIONS AND ACRONYMS**

COMPENER COMPetences for Sustainable ENERgy

EC European Commission

EU European Union

LdV Leonardo da Vinci

WP Work Package

WPL Work Package Leader

RES Renewable energy Sources

EE Energy efficiency

Qualicert Common quality certification & accreditation for installers of small-scale renewable energy systems (IEE project)

MS Member State

NREAP National Renewable Energy Action Plan

ESCO Energy service company

ESPCo Energy service providing company

NEEAP National Energy Efficiency Action Plans

RITE Regulation on Heat Installation in Buildings

## 1 Introduction

### 1.1 Background

In March 2000, the Heads of State and Governments at the Lisbon European Council set the European Union the strategic goal of becoming the most competitive and dynamic knowledge-based economy in the world. Key elements of this strategy are the adaptation of education and training systems to lifelong learning; the promotion of employability and social inclusion through investment in knowledge and competences; the creation of an information society for all and fostering mobility. This strategy was confirmed by the Barcelona summit in March 2002, where it was stated that European education and training systems should become world reference by 2010 and that closer cooperation should be promoted in the area of Vocational Education and Training (VET).

Moreover, the European Qualification Framework, published in April 2008, has underlined how important is to establish the knowledge, the skills and the competences which are needed in order to be considered “good professionals”.

COMPENER project, funded by the Commission through the LdV programme – action Transfer of Innovation, is perfectly in line with the aims of the abovementioned European treaties and declarations. Indeed the project intends to support the development of certifications and qualifications of professional skills based on the European qualification framework in the energy sector and meanwhile answers at another important goals established in EC Directive 2009/28/EC on the promotion of the use of energy from renewable sources, in Directive 2006/32/EC on energy end-use efficiency and energy services, as well as in Directive 2002/91/EC on the energy performance of buildings, to develop certification schemes for installers of small-scale renewable energy installations, and certification schemes for providers of energy services, energy audits and energy efficiency improvement measures.

The aim of LdV Multilateral Projects ‘Transfer of Innovation’ is to improve the quality and attractiveness of the European VET system by adapting and integrating innovative content or results from previous Leonardo da Vinci Projects, or from other innovative projects into public and/or private vocational training systems and companies at the national, local, regional, or sectoral level. As one of LdV ‘Transfer of Innovation’ projects, COMPENER project is focused on two complementary actions, the first one is a transfer of innovation within the same sector (energy) but addressed to a new target group, from energy managers to new professionals in RES sector; and the second one is a geographical transfer, the results obtained through Qualicert project will be transferred from Italy (one of Qualicert partners) to Spain and Romania.

### 1.2 Objectives of the executive document

The present document is one of three executive documents planned for WP2; as one of preparative activities of COMPENER, WP2 is addressed to identify and characterise professional competences in energy sector. The identification targets are those new professional figures emerged along with the issues of EC directives and national regulations related to RES use and EE improvement.

Although for achieving the targets established by the EC directives 2009/28/EC and 2010/31/EC, each Member State has introduced its own national laws and regulations,

accordingly; however, the emerged new professional figures in each country may have roles different from others because of a slight difference in national legislatives.

Therefore, this report will:

- give an overview on professional figures requested by EC Directives 2009/28/EC, 2006/32/EC, as well as by Directive 2010/31/EC
- identify new professional figures emerged on the basis of partner country national regulations (Italy, Spain and Romania)

It is expected that common professional figures will be identified in three partner countries, and based on those common figures certification/qualification schemes will be developed.

### 1.3 Contribution of partners

This report has been worked with the cooperation of different project partners; their contribution is shown in the following Table 1.

**Table 1 Partners involvement in the preparation of the present deliverable**

	ISNOVA	ENEA	OUC	ASIMAG
Definition of the content	√			
Overview of RES/EE in Europe	√			√
National reports	√		√	√

## 2 Overview of the new professional skill requested by EC RES/EE directives

In June 2001, the European Commission declared, in its Communication 'A Sustainable Europe for a better world — A European Union Strategy for Sustainable Development' presented at the Gothenburg European Council, climate change as one of the principal barriers to sustainable development and emphasised the need for increased use of clean energy and clear action to reduce energy demand.

The increased use of renewable energy sources and making primary energy savings through energy efficiency improvement in demand side could constitute an important part of the package of measures needed to comply with the Kyoto Protocol to the United Nations Framework Convention on Climate Change, and of any policy package to meet further commitments. In fact, later in the same year (2001), the Green Paper was published, which emphasised furthermore that security of energy supply is essential for a future sustainable development. The Green Paper concludes that the adoption of new measures to reduce energy demand is essential both in terms of reducing the import dependence and in order to limit greenhouse gas emissions.

Keeping in mind those principles, during the last decade year the European Commission's energy policy gave its priority on promoting RES and enhancing EE improvement. A number of related EC directives were issued, such as:

about EE improvement,

- Directive 2002/91/EC on the energy performance of buildings
- Directive 2004/8/EC on the promotion of cogeneration based on a useful heat demand in the internal energy market
- Directive 2006/31/EC on energy end-use efficiency and energy services
- Directive 2007/74/EC establishing harmonised efficiency reference values for separate production of electricity and heat
- Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products
- Directive 2010/30/EU on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products
- Directive 2010/31/EU on the energy performance of buildings (recasting of 2002/91/EC)

for RES,

- Directives 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market
- Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport established definitions for different types of energy from renewable sources
- Directive 2009/28/EC on the promotion of the use of energy from renewable sources (repealing the above two EC directives)

Moreover, inside those EC directives different professional figures have been requested for implementing the actions/measures indicated in the directives, related professional skills are mentioned as well.

## 2.1 Professional skills requested for Renewable energy (RES)

The present report gives its attention on the last European Commission's directive related to RES, analyzing professional figures requested by the Directive for promoting the use of RES.

Directive 2009/28/EC is part of a package of energy and climate change legislation which provides a legislative framework for Community targets for greenhouse gas emission savings. It encourages energy efficiency, energy consumption from renewable sources, the improvement of energy supply and the economic stimulation of a dynamic sector in which Europe is setting an example.

General objectives of the Directive are:

- to achieve a 20 % share of energy from renewable sources in the Community's gross final consumption of energy consumption by 2020
- to accomplish a 10 % share of energy from renewable sources in each Member State's transport energy consumption by 2020

At national level, the mandatory national overall targets and measures for the use of energy from renewable sources are:

1. each Member State (MS) shall ensure that the share of RES energy in gross final consumption of energy in 2020 (as set out in the third column of the table in part A of Annex I of the Directive) is at least its national overall target for the share of RES energy in that year.

For Italy, Spain and Romania, the target RES shares in their gross final energy consumption are 17%, 20% and 24%, respectively.

2. MSs shall introduce measures effectively designed to ensure that the share of RES energy equals or exceeds that shown in the indicative trajectory<sup>1</sup> set out in part B of Annex I.
3. each MS shall ensure that the share of RES energy in all forms of transport in 2020 is at least 10 % of the final consumption of energy in transport in that Member State.

Furthermore, according to the Directive MSs shall:

- ensure that certification schemes or equivalent qualification schemes become or are available by 31 December 2012 for installers of:
  - small-scale biomass boilers and stoves,
  - solar photovoltaic and solar thermal systems,
  - shallow geothermal systems and heat pumps.

Those schemes may take into account existing schemes and structures as appropriate, and shall be based on the criteria laid down in Annex IV of the Directive. Each Member State shall recognise certification awarded by other Member States in accordance with those criteria.

- make available to the public information on certification schemes or equivalent qualification schemes mentioned above; may also make available the list of installers who are qualified or certified.
- ensure that a guidance is made available to all relevant actors, remarkably for planners and architects so that they are able properly to consider the optimal combination of renewable energy sources, of high-efficiency technologies and of district heating and cooling when planning, designing, building and renovating industrial or residential areas.
- with the participation of local and regional authorities, shall develop suitable information, awareness-raising, guidance or training programmes in order to inform citizens of the benefits and practicalities of developing and using energy from renewable sources.

Relevant actors mentioned by the directive are:

- consumers,

<sup>1</sup> The indicative trajectory referred to in Article 3(2) shall consist of the following shares of RES energy:

- $S_{2005} + 0,20 (S_{2020} - S_{2005})$ , as an average for the two-year period 2011 to 2012;
- $S_{2005} + 0,30 (S_{2020} - S_{2005})$ , as an average for the two-year period 2013 to 2014;
- $S_{2005} + 0,45 (S_{2020} - S_{2005})$ , as an average for the two-year period 2015 to 2016;
- $S_{2005} + 0,65 (S_{2020} - S_{2005})$ , as an average for the two-year period 2017 to 2018,

Where

$S_{2005}$  = the share for that Member State in 2005 as indicated in the table in part A; for Italy, Spain and Romania, the target RES shares in 2005 were 5.2%, 8.7% and 17.8%, respectively  
and

$S_{2020}$  = the share for that Member State in 2020 as indicated in the table in part A.

- planners,
- builders,
- installers,
- architects,
- suppliers of heating, cooling and electricity equipment and systems,
- suppliers of vehicles compatible with the use of energy from renewable sources,
- national, regional and local competent authorities

Excepting the first and the last one, all remaining actors are professional figures who are involved in implementing the directive.

In relation with the Certification of installers, moreover, another important professional figure indicated in the Directive (Annex IV) is the **training provider** who is able to provide biomass, heat pump, shallow geothermal and solar photovoltaic and solar thermal installers with *accredited training programmes*; the training permits those installers to be certificated or qualified once installers will pass the related examination.

In its turn, the training provider shall be accredited as well; according to the Directive, the training provider may be the **manufacturer of the equipment or system, institutes or associations**.

Finally, Table 2 shows the professional skills of RES-related installers (**heat pump installers, solar photovoltaic or solar thermal installers and plumbers**) requested in Directive 2009/28/EC.

Table 2 Professional skills requested in Directive 2009/28/EC

RES-related professional figure	Skills/knowledge requested in Directive
biomass boiler and stove installer	<ul style="list-style-type: none"> <li>○ basic electrical and plumbing skills;</li> <li>○ knowledge of sanitary and heating or cooling equipments;</li> <li>○ having overview of the market situation of biomass and cover ecological aspects, biomass fuels, logistics, fire protection, related subsidies, combustion techniques, firing systems, optimal hydraulic solutions, cost and profitability comparison as well as the design, installation, and maintenance of biomass boilers and stoves</li> <li>○ having good knowledge of any European standards for technology and biomass fuels, such as pellets, and biomass related national and Community law</li> </ul>
heat pump installer	<ul style="list-style-type: none"> <li>○ having basic electrical and plumbing skills (cutting pipe, soldering pipe joints, gluing pipe joints, lagging, sealing fittings, testing for leaks and installation of heating or cooling systems)</li> <li>○ having an overview of the market situation for heat pumps and cover geothermal resources and ground source temperatures of different regions, soil and rock identification for thermal conductivity, regulations on using geothermal resources, feasibility of using heat pumps in buildings and determining the most suitable heat pump system</li> <li>○ having knowledge about technical requirements of heat pumps, safety, air filtering, connection with the heat source and system layout</li> <li>○ having good knowledge of any European standards for heat pumps, and of relevant national and Community law</li> </ul> <p><u>as key competences</u></p> <ul style="list-style-type: none"> <li>○ having a basic understanding of the physical and operation principles of a heat pump, including characteristics of the heat pump circle</li> <li>○ understanding the components and their function within a heat pump circle</li> <li>○ having the ability to choose and size the components in typical installation situations, including determining the typical values of the heat load of different buildings; determining</li> </ul>

RES-related professional figure	Skills/knowledge requested in Directive
	the capacity of the heat pump on the heat load for hot water production; determine buffer tank component and its volume and integration of a second heating system
solar photovoltaic or solar thermal installer	<ul style="list-style-type: none"> <li>○ plumbing, electrical and roofing skills, including knowledge of soldering pipe joints, gluing pipe joints, sealing fittings, testing for plumbing leaks, ability to connect wiring, familiar with basic roof materials, flashing and sealing methods</li> <li>○ having an overview of the market situation of solar products and cost and profitability comparisons, and cover ecological aspects, components, characteristics and dimensioning of solar systems</li> <li>○ having the ability to select accurate systems and dimensioning of components, determination of the heat demand</li> <li>○ having knowledge of fire protection, related subsidies, as well as the design, installation, and maintenance of solar photovoltaic and solar thermal installations</li> <li>○ having good knowledge of any European standards for technology, and certification such as Solar Keymark, and related national and Community law</li> </ul> <p><u>as key competences</u></p> <ul style="list-style-type: none"> <li>○ the ability to work safely using the required tools and equipment and implementing safety codes and standards</li> <li>○ identify plumbing, electrical and other hazards associated with solar installations</li> <li>○ the ability to identify systems and their components specific to active and passive systems</li> <li>○ the ability to determine the required installation area, orientation and tilt for the solar photovoltaic and solar water heater</li> <li>○ the ability to determine the appropriateness of the installation for the building or the climate and identify different installation methods suitable for roof types and the balance of system equipment required for the installation</li> <li>○ the ability to adapt the electrical design</li> </ul>

## 2.2 Professional skills requested for EE improvement

### 2.2.1 Directive 2010/31/EU on the improvement of energy performance of buildings

Buildings account for 40 % of total energy consumption in the Union. The sector is expanding, which is bound to increase its energy consumption. Therefore, reduction of energy consumption and the use of energy from renewable sources in the buildings sector constitute important measures needed to reduce the Union's energy dependency and greenhouse gas emissions.

Directive 2010/31/EU is the main legislative instrument at EU level to achieve energy performance in buildings. Its main objective is to promote the improvement of the energy performance of buildings within the Community, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness. Its main issues are described below.

#### 1) Minimum requirements

The Directive lays down the following requirements:

- (a) the common general framework for a methodology for calculating the integrated energy performance of buildings and building units;

- (b) the application of minimum requirements to the energy performance of new buildings and new building units;
- (c) the application of minimum requirements to the energy performance of:
  - o existing buildings, building units and building elements that are subject to major renovation;
  - o building elements that form part of the building envelope and that have a significant impact on the energy performance of the building envelope when they are retrofitted or replaced; and
  - o technical building systems whenever they are installed, replaced or upgraded;
- (d) national plans for increasing the number of nearly zero- energy buildings;
- (e) energy certification of buildings or building units;
- (f) regular inspection of heating and air-conditioning systems in buildings; and
- (g) independent control systems for energy performance certificates and inspection reports.

## 2) Common methodology for calculating

In particular,

- o MSs shall apply a methodology, at national or regional level for calculating the energy performance of buildings in accordance with the common general framework set out in Annex I.
- o when setting requirements, MSs may differentiate between new and existing buildings and between different categories of buildings; these requirements shall take account of general indoor climate conditions.
- o minimum energy performance requirements shall be reviewed at regular intervals which shall not be longer than five years and, if necessary, shall be updated in order to reflect technical progress in the building sector.

## 3) System for Energy Performance Certificates

Moreover, the Directive points out Energy Performance Certificates. According to the Directive, MSs shall lay down the necessary measures to establish a system of certification of the energy performance of buildings which shall include the energy performance of a building and reference values such as minimum energy performance requirements, as well as recommendations for the cost-optimal or cost-effective improvement of the energy performance of a building or building unit, in order to make it possible for owners or tenants of the building or building unit to compare and assess its energy performance.

An energy performance certificate is issued for:

- buildings or building units which are constructed, sold or rented out to a new tenant; and
- buildings where a total useful floor area over 500m<sup>2</sup> is occupied by a public authority and frequently visited by the public. On 9 July 2015, this threshold of 500m<sup>2</sup> shall be lowered to 250m<sup>2</sup>

When buildings or building units are constructed, sold or rented out, the energy performance certificate or a copy thereof is shown to the prospective new tenant or buyer and handed over to the buyer or new tenant.

The validity of the energy performance certificate shall not exceed 10 years.

#### 4) Regular inspection of heating systems

In addition, the Directive requires MS to lay down the necessary measures to establish a regular inspection of the accessible parts of systems used for heating buildings which includes an assessment of the boiler efficiency and the boiler sizing compared with the heating requirements of the building. Inspected boilers have an effective rated output for space heating purposes of more than 20 kW.

Different inspection frequencies can be set, depending on the type and effective rated output of the heating system; however, heating systems with boilers of an effective rated output of more than 100 kW shall be inspected at least every two years. For gas boilers, this period may be extended to four years.

#### 5) Regular inspection of air-conditioning systems

According to the Directive, Member States shall define the necessary measures to establish a regular inspection of airconditioning systems with an effective output more than 12 kW. The inspection shall include an assessment of the air-conditioning efficiency and the sizing compared to the cooling requirements of the building. Inspection frequencies may be different depending on the type and effective rated output of the air-conditioning system.

#### 6) Reports on the inspection of heating and air-conditioning systems

Similar to Energy Performance Certificate, an inspection report shall be issued after each inspection of a heating or air-conditioning system, showing the result of the inspection performed. The report includes recommendations for the cost-effective EE improvement of the inspected system. The inspection report shall be handed over to the owner or tenant of the building.

#### 7) Qualified independent experts

For implementing the Directive, especially for issuing Energy Performance Certificates and Reports on the inspection of heating and airconditioning system, **independent experts** are needed. According to the Directive, however, those experts (whether operating in a self-employed capacity or employed by public bodies or private enterprises) shall be **qualified and/or accredited**. MSs shall make available to the public information on training and accreditations; control systems established for energy performance certificates and reports on the inspection of heating and air-conditioning systems shall be independent.

Therefore, **professional skills of independent experts are those related to Building Energy Performance certificates and the inspection reports of heating and airconditioning system.**

### 2.2.2 Directive 2006/32/EC on energy demand management (energy service)

Since human activities attributed to the energy sector cause as much as 78 % of the Community greenhouse gas emissions, the Communication from the Commission on the implementation of the first phase of the European Climate Change Programme listed the Directive 2006/32/EC on energy demand management as one of the priority climate change measures to be taken at Community level. Improved energy end-use efficiency will make it possible to exploit potential cost-effective energy savings in an economically efficient way. Energy efficiency improvement measures could realise these energy savings and thus help the Community reduce its dependence on energy imports. Furthermore, a move towards more energy-efficient technologies can boost the Community's innovativeness and competitiveness as underlined in the Lisbon strategy.

The most important elements of the Directive are summarized in the following three points.

#### 1) Scope and targets

Directive 2006/32/EC has its main scope not only to continue to promote the supply side of energy services, but also to improve energy efficiency on the demand side (energy end-use).

An overall national indicative energy savings target of 9 % until 2016 has been established by the Directive, and shall be reached by the ninth year of its application, through energy services and other energy efficiency improvement. However, according to the Directive Member States may set themselves a target higher than 9% in order to achieve their national indicative target.

The Directive requires all EU countries:

- to make National Energy Efficiency Action Plans (NEEAP)
- The national energy savings in relation to the national indicative energy saving targets shall be measured from 1 January 2008
- each MS shall draw up programmes and measures to improve energy efficiency, establishing an intermediate national indicative energy savings target for the third year of application of the Directive.
- to create conditions to promote and development the energy services market

#### 2) White certificates

'White certificates' has been mentioned in the Directive, for developing the market approach in energy efficiency improvement. The Directive defines 'White Certificates' as the certificates issued by independent certifying bodies confirming the energy savings claims of market actors as a consequence of energy efficiency improvement measures.

#### 3) Related professional figures

Keeping in mind the scope of COMPENER, it is necessary to remark qualification, accreditation and certification schemes mentioned in the Directive; according to its requirement, MSs shall ensure, wherever necessary, the availability of appropriate **qualification, accreditation and/or certification schemes** for providers of energy services, energy audits and energy efficiency improvement measures, for ensuring them to achieve a high level of technical competence, objectivity and reliability.

In other words, professional figures mentioned by the Directive and to be dealt with by COMPENER are **providers of energy services, energy audits and energy efficiency improvement measures**, such as **independent energy advisors, energy auditors, installers**, etc.

### 3 Professional figures related to national RES/EE regulations

Along with the issue of each European Commission's directive, each MS is requested to bring into force its own laws, regulations and administrative provisions necessary to comply with the directive. The emerged professional figures for implementing EC directives in each country may have roles different from others because of a slight difference in national legislatives.

#### 3.1 Italy

##### 3.1.1 Professional figures related to renewable energy use

As requested by Directive 2009/28/EC, the Italian National Renewable Energy Action Plan (NREAP) was worked out and published by Italian Ministry for Economic Development on June 2010. Regarding to Italian national energy policy, for some time, the development of renewable energy sources has been one of the priorities of Italy's energy policy, together with the promotion of energy efficiency. Numerous support mechanisms are already available, ensuring remuneration for investment in various renewable energy and energy efficiency operations, and encouraging the growth of related industries.

According to the NREAP, renewable energy use in Italy will reach a 17% share in the national gross energy end-use by 2020 through actions in three following sectors:

- space heating and cooling: 15.83%
- electricity: 28.97%
- transport: 10.06%

All policies and measures to promote the use of energy from renewable resources are summarised in the NREAP and reported in the following Table 3.

Table 3 Italian policies and measures for promoting renewable energy

Name of reference of the measure	Type of measures	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
Measures relating to the heating and cooling sector					
Energy efficiency credits scheme	regulatory	6 Mtoe of energy saved by 2012	Energy service companies, electricity and gas distributors, parties which have taken steps to appoint an energy manager	Existing (to be extended)	Jan 2005 –
55% tax relief for building refurbishment projects	Financial	N. A.	End users who own existing buildings	Existing (to be revised)	Jan 2007 – Dec 2011

Name of reference of the measure	Type of measures	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
Min. quota of 50% of domestic hot water to be produced by using RES	Regulatory	% share of consumption	End users who own newly-constructed buildings or buildings to be refurbished	Planned	N. A.
Tax credit for district heating by using geothermal or biomass energy	Financial	N. A.	End users who connect their buildings to district heating networks supplies by plants using geothermal or biomass energy	Existing	Jan 1999 -
<b>Measures relating to electricity sector</b>					
Solar PV feed-in tariff	Financial	3000MW by 2016	Investors/end users	Existing	Aug. 2005-
Solar thermal feed-in tariff	Financial	2,000,000m <sup>2</sup> of panels installed by 2016	Investors	Existing	May 2008-
Green certificates	Regulatory	Feeding electricity from RES into the grid (in 2012, 7.55% of the energy from fossil fuels fed into the grid in the previous year)	Investors	Existing	Apr 1999 -
All inclusive tariffs	Financial	N. A.	Investors / end users	Existing	Jan 2008 -
Min. quota for electrical capacity installed using RES	Regulatory	N. A.	End users who own newly constructed buildings or buildings to be refurbished	Planned	Jan 2011 -
<b>Measures relating to the transport sector</b>					
Min quota for transport biofuel use	Regulatory	4.5% of transport biofuels fed in the network in 2012	Parties which make fuels available for consumption for automotive purposes	Existing	Jan 2007 -
Reduction in excise for biofuels	Regulatory	N. A.	investors	Existing	1995 - 2010
<b>Transverse measures</b>					
Interregional operational plan on energy	Financial	Creation of RE plants, operations to increase energy efficiency	Investors /end users / public authorities	Existing	Jan 2007 – Dec 2015
Kyoto Fund	Financial	Creation of RE plants, operations to increase energy efficiency and reduce emissions	Investors /end users/ public authorities	Planned	N.A.
International cooperation mechanisms	Financial	Availability of RE equal to approx. 1.1 Mtoe by 2020	Other countries, investors, TSOs	Planned	Jan 2016 -
Further simplification of authorization procedures	regulatory	N. A.	Investors/ end users/ public authorities	Planned	2010 - 2020

Name of reference of the measure	Type of measures	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
Definition of technical specifications (e.g. performance standards for biomass fuels)	Regulatory	N. A.	Investors/ end users	Planned	2010 - 2020
Support for the creation of district heating –cooling network	Regulatory	N. A.	Manufacturing areas/ residential areas	Planned	2010 - 2020
Training and informative campaigns	Soft	Changes in behavior	Operators, designers, regions, local authorities, citizens, companies, etc.	Planned	2010-2020
Support for the development of the electricity grid	Regulatory	N. A.	AEEG, TSOs, electricity grid operators, distributors	Planned	2010-2020
Support for the integration of biogas into the natural gas network	Regulatory	N. A.	Agro-industrial system, gas transmission and distribution network operator	Planned	2010-2020
Sustainability criteria for bioliquids and biomass	Regulatory	N. A.	Operators	Planned	2010-2020

N.A. : Not available; AEEG: L'Autorità per l'energia elettrica e il gas (the Regulatory Authority for Electricity and Gas) ; TSOs: the Transmission System Operators

For implementing the measures reported in the above table, different target groups/operators will be involved. Except electricity network operators & distributors, gas transmission & distribution network operators and related public authorities, other professional figures mentioned in the Italian NREAP are **manufacturers, planners, designers, architects and installers, maintenance technicians** and etc.

Concerning certification or equivalent qualification schemes for installers according to Article 14(3) of the Directive 2009/28/EC, the Italian national regulations in force are principally found within the more general context of Ministerial Decree No 2008/37 for the reorganization of the provisions relating to equipment installation activities inside buildings.

The decree applies to building service systems, regardless of their uses, and in particular: a) systems for electricity production, transformation, transport, distribution and use and c) all kinds of systems for heating, cooling, air-conditioning and refrigeration; and identifies the qualified companies and technical and professional requirements necessary for carrying out installation activities to above-mentioned systems.

However, no specific scheme is mentioned in the decree. For those companies/firms who are allowed to install the plants defined in art. 14 of the EU directive 2009/28, at least one of their employees must have one of the five following professional requirements:

1. university technical degree
2. high school technical degree together with two years of experience in plant installations
3. other qualification together with four years of experience in plant installations
4. three years of experience as specialised installer

5. six years of experiences as owner of an installing company

Finally, emerged RES-related professional figures identified are given in Table 4.

Table 4 Emerged RES-related professional figures identified

Sector	Emerged profession	
	Number	Professional figure
Solar thermal & PV	16	1. Solar energy engineer; 2. PV energy managerial engineer; 3. PV generation system engineer; 4. engineer specialised in installation of small PV plant; 5. PV lab researcher; 6. technical expert in PV system; 7. technician specialised in PV cell production and testing; 8. technical expert of solar thermal heater; 9. PV system designer; 10. PV cell designer; 11. electrician specialised in installation of residential PV system; 12. electrician specialised in installation of commercial PV system; 13. technical installer of PV; 14. sale consultant of residential-commercial PV system; 15. sale consultant of PV; 16. energy manager in PV sector
wind	14	1. designer of wind farm; 2. project leader of wind powder stations; 3. manager in wind sector for commercial applications; 4. electrical engineer of wind turbine; 5. mechanical technician of wind turbine; 6. electrical technician of wind turbine; 7. mechanical engineer on wind turbine; 8. technician in wind sector; 9. installer of wind generation; 10. operator of wind turbine; 11. works of metallic plates for wind turbine; 12. designer of wind plan; 13. seller of wing plant; 14. environmental biology
Biomass	12	1. civil engineer, expert for agricultural thematic and agricultural supply system; 2. operator of biogas collection system; 3. technician of biogas system; 4. technician of LGE (Landfill Gas to Energy) plant; 5. responsible person for collection, separation and selection of biomass ; 6. responsible person for function, engineering and maintenance of biomass plant ; 7. technician of colleting system of bio-methane gas; 8. analyser of marketing; 9. intermediary of biomass; 10. energy manager in biomass sector; 11. environmental chemists; 12. biomass producer
Transversal professional figures	11	1. manager in renewable energy; 2. expert in renewable energy planning; 3. environmental surveyor or ecologic technician; 4. environmental geology; 5. environmental guarantor; 6. environmental lawyer; 7. expert in legal aspects and trading of renewable energy; 8. expert in renewable energy planning/design; 9. manager of energy plan; 10. smart grid engineer; 11. operator of electrical station.
Total	53	

### 3.1.2 Professional figures involved in EE improvement

Although the EE improvement in Italy is slow compared to EU average due to the negative performance in industry, especially in years 1990s, there are various EE policy and measures in force (see Table 5).

Table 5 Various EE policies and measures for EE improvement

Name of measure	sector	Status	Type	Start date of the measure
Regulations for the design, installation, operation and maintenance of heating installations in buildings to reduce consumption of energy ( IT decree 1993/412)	buildings	In force	• Regulatory Instruments	1993
Implementation of Directive 2004/8/EC on the promotion of cogeneration (IT decree 2007/20)	Multi-sectors	In force	• Regulatory Instruments	2007
Fund for Greenhouse Gas Emissions Reduction, Energy Efficiency and Sustainable Energy	multi-sectoral policy	in force	• Financial • Policy Processes	2001
White Certificate Trading for End-Use Energy Efficiency	industry	in force	• Regulatory Instruments • Tradable Permits	2005
Implementation of the EU Emissions Trading Scheme in Italy	industry	in force	• Regulatory Instruments • Tradable Permits	2006
Implementation of EU Energy Performance of Buildings Directive (EPBD) (IT decree 2006/311, replacing decree 2005/192)	buildings	in force	• Education and outreach • Incentives/Subsidies • Policy Processes • Regulatory Instruments	2006 (amended 2009)
Energy Audits in Public Buildings	buildings	in force	Regulatory Instruments	2006
Financial Law 2007 (55% tax deduction for energy requalification in buildings) (Laws n. 296/06)	• buildings • industry	in force	• Incentives/Subsidies • RD & D • Education and Outreach • Policy Processes • Regulatory Instruments	2006
The national action plan to achieve an energy savings of 9% in 2016 (directive 2006/32/EC)	all	in force	Policy Processes	2007
Implementation of EU Directive on the promotion of cogeneration	industry	in force	Regulatory Instruments	2007
Implementation of EU Directive on energy end-use efficiency and energy services (decree 2008/115)	• buildings • industry • multi-sectoral policy	in force	• Incentives/Subsidies • Policy Processes • Public Investment	2008
Reorganization of the provisions relating to equipment installation activities inside buildings (decree 2008/37)	buildings	in force	• Policy Processes • Regulatory Instruments	2008
Limited values of annual primary energy demand for space heating and thermal transmittance values (IT decree 11 March 2008)	buildings	In force	• Regulatory Instruments	2008
National Guidelines for Energy Certification Scheme of buildings (Ministerial decree 26 June 2009)	Buildings	in force	• Education and Outreach • Policy Processes • Regulatory Instruments	2009
Tax deduction (20%) for high efficiency appliances	appliances	In force	Financial	2009

The present report will analyse in below more significant Italian national regulations and the related professional figures.

### 3.1.2.1 Italian legislative decree 2006/311 and related professional figures

In terms of policy priorities, the building sector has been considered an important sector in which it is crucial to reduce energy consumption and related emissions. The Italian Government transposed the Directive 91/2002/EC on the energy performance of buildings, through the Italian legislative decree 2005/192 published on 19 August 2005 which has been replaced later by the decree 2006/311. In line with the provisions of 91/2002/EC, the Italian decree has introduced several novelties in comparison with the former legislative framework, as for design methodology, minimum requirements, boilers and space heating/cooling systems inspection, and also introduced the energy certification of buildings.

The decree introduces the following measures:

- Obligation of Renewable Energy systems for at least 50% of hot water demand
- Obligation of photovoltaic plants for new buildings
- Introduction of the “Energy Certificate” for buildings
- Simplified procedures for the substitution of old boilers with more efficient ones
- Obligation to introduce “sun protection systems” for new and restored buildings
- Obligation for all new buildings to carry out all necessary works related to the connection to the district heating network, if this is located nearby
- Introduction of sustainable energy criteria in urban planning

The minimum requirements shall be applied to:

- the design and construction of new buildings, as well as equipments installed in those new buildings;
- new facilities installed in existing buildings;
- renovation of buildings and existing facilities;
- operation, control, maintenance and inspection of thermal equipments in buildings, even old ones.
- total or partial renovation, maintenance, enlarging extraordinary volume of the buildings

The requested certification and inspection include:

- energy performance certificate for buildings in the case of a value transfer, and for buildings where a total useful floor area over 1000 m<sup>2</sup> is occupied by a public authority and frequently visited by the public.
- regular inspection and maintenance of space heating (with or without the generation of hot water) and cooling systems.

About the experts called to issue the Energy Certificates for Buildings and the technicians for inspection of heating and cooling system, however, the Decree 2006/311 gives only a general indication: certified/qualified and independent experts; the proper requirements are indicated in Decree 2008/115 on implementation of Directive 2006/32/EC on energy end-use efficiency and energy services.

According to Decree 2008/115, persons qualified for issuing energy certification of buildings must meet one of the following criteria:

- *being a technical professional, working either as an employee of a public organisation or a public utility, or a private company (including engineering firm), or as a freelance professional or the member of a professional registration who has the competence requested by the related legislation and is permitted to practice the design of buildings and building service facilities.*
- *if a technician is not competent in the fields mentioned above (or if some of those are outside of her/his professional competence), she/he must work in cooperation with other qualified technician so that the group formed is able to cover all work areas on which the expertise is required.*
- *for the lone purpose of energy certification, the qualified technicians can be also those persons in possession of technical and scientific qualifications, identified at a local level by regions and autonomous provinces, and enabled by those governments as a result of specific training courses for energy certification of buildings by passing the final exams.*

### 3.1.2.2 Italian Ministerial Decree 21/12/07 and related professional figures

In terms of policy priorities, the building sector has been considered an important sector in which it is crucial to reduce energy consumption and related emissions. The Italian

### 3.1.2.3 Italian legislative decree 2008/115 on Implementation of Directive 2006/32/EC and related professional figures

For implementing European Commission's directive on energy end-use efficiency and energy services, the Italian legislative decree 2008/115 has been put in force. In accordance with Directive 2006/32/EC, the decree:

- defines the indicative targets, mechanisms, incentives, as well as the institutional-financial-legal framework, necessary to eliminate the barriers and existing market imperfections which impede the efficient end-use of energy.
- creates the conditions for the development and promotion of a market which will provide both energy services and the measures to improve energy efficiency for end-users.

The decree must be applied to:

- providers of energy efficiency improvement measures (such as, ESCOs, energy management experts, ESPCo, etc.)
- energy distributors,
- distribution system operators and
- retail energy sale companies.
- final customers
- the armed forces and Guardia di Finanza (Financial Guard )

The certifications or qualifications requested by the decree are:

- White Certificates (a market tradable Energy Efficiency Certificates which confirm the achievement of energy savings through energy efficiency improvement measures, and usable to fulfill the obligations indicated in Article 9, paragraph 1, of Legislative Decree 1999/79, later amended in Article 16, paragraph 4, of Legislative Decree 2000/164.) obliged for energy distributors, retail energy sales companies.
- Energy audits of public buildings or buildings for public use, in case of interventions of the thermal systems, including the replacement of generators, or retrofitting of buildings when the restructured part corresponds at least 15% of the external surface of the building envelop of the gross heated volume.
- Energy Performance Certification of public buildings o buildings for public use with a surface bigger than 1000m<sup>2</sup>.

Moreover, the decree defines the qualifications of both energy service providers and energy services, by approving a voluntary certification procedure for ESCOs and energy management experts and a certification procedure for energy management systems and energy audit; and by determining the content of energy service contracts in detail.

In relation to COMPENER, the most important aspect dealt with by the decree is the qualifications of professional figures. For the issue of energy certification of buildings, the proper requirements for professionals are reported in the above section.

Regarding to the technical professionals qualified for implementing energy services like electrical plants, space heating and airconditioning, hydro sanitary plants and gas plants, according to the decree, they shall have the professional skills defined in law 1990/46 and have the certifications issued by competent Industry, Handicraft, Agriculture and Commerce Chambers. While, for providing other energy services, technicians/experts shall meet the requirements established in president decree 1993/412.

### 3.1.1.2.3 Ministry Decree 2008/37 and related professional figures

Ministry Decree 2008/37 was issued on 22 January 2008 and entered into in force on 27 March of the same year, aiming at reorganizing the provisions relating to equipment installation activities inside buildings.

The decree applies to all building services equipments located inside buildings which include:

- power production, transformation, distribution plants, electricity utilisations, protection devices against lightning, as well as systems for the automation of doors, gates, barriers
- space heating, air conditioning, any kind refrigeration systems, and ventilation systems
- any kind of water and hot water systems
- any kind of gas distribution and gas use devices
- lifting system for persons or for goods like elevators, escalators and similar equipments
- fire protection systems.

Both qualifications of installing companies and of technical professionals are given in the decree. Particularly, persons qualified for installing, maintaining, transforming building service equipments must meet one of the following five professional requirements:

- university technical degree
- high school technical diploma together with two years of experience in plant installations
- other qualification together with four years of experience in plant installations
- three years of experiences as specialized installer
- six years of experiences as owner of an installing company

The certifications, reports requested by the decree are:

- declaration of conformity and test certification at the conclusion of activities
- project preparation in the case of ordinary maintenance of equipments.

Finally, emerged EE-related professional figures identified are shown in Table 6.

Table 6 EE-related professional figures identified in Italy

Sector	Emerged profession	
	Number	Professional figure
Households, Services (Buildings)	12	1. architect specialised in energy saving of buildings; 2. engineer specialised in building EE; 3. technical expert in building EE; 4. expert in energy audit of buildings; 5. energy manager in building sector; 6. expert in energy performance certification of buildings; 7. experts qualified for issuing energy certification of buildings; 8. installer of building thermal insulating materials (including high insulating doors / windows) ; 9. installer of high efficiency airconditioning system; 10. installer of high efficiency boilers; 11. controller of boilers; 12. installer of high efficiency energy system (such as power and heat cogeneration)
Industry	6	1. engineer specialised in energy saving of industrial sector / industrial subsector (measures like high efficiency co-generation, the mechanical compression of steam, the use of high efficiency electrical engine and inverters, high efficiency boilers); 2. technical expert in energy audit of industry; 3. energy manager in industrial sector; 4. experts in White Certification (including White Certification trading) ; 5. installer of high efficiency industrial boilers; 6. controller of industrial boilers.
Total	18	

### 3.2 Spain

Currently there is not an official certification of qualifications for the RES installers in Spain. Some regulations (mainly those adapt the European directives to national legal framework) have introduced new profiles that have to be developed according to the national qualification framework.

However, considering the EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources, and other previous directives about the promotion of different mechanism for energy efficient and the exploitation of RES, in the next paragraphs we will report:

- the influence of the European legislation on the Spanish national policy (with special regards to the development of the professional profiles)
- the state of the art of the development a certification for RES installers in Spain

For that, we will analyse the implementation level of three directives as such as:

- Directive 2009/28/EC on promotion of the use of energy from renewable sources
- Directive 2006/32/EC on energy end-use efficiency and energy services
- Directive 2002/91/EC on the energy performance of buildings

and their influence in the definition of new professional certificates on RES.

### 3.2.1 Spanish national measures promoted according to the Directive 2009/28/EC

According to the Directive, the Spanish government (in collaboration of the stakeholder in the field of Energy) has defined the National Action Plan for RES 2011 – 2020 (PANER), in which the main recommendations stabled in the directive are developed.

#### 1) Energy Targets

The PANER established the energy targets till 2020 as following:

- total RES: 22,7%
- RES Heat: 18,9 %
- RES Transport: 13,6%
- RES Electricity: 40%

#### 2) Measures for getting the objectives

The Plan establishes a set of measures for the fulfillment of the objectives. Thus, the PANER distinguished among a set of general measures and some specific activities.

Regarding to general measures, in short, the PANER promoters the following Table 7:

Table 7 General measures promoted in the PANER

Name and reference of the measure	Type of measure	Expected result	Targeted group and/or activity	Existing or planned	Start and end dates of the measure
1. Develop a suitable framework whereby to simplify, standardise and unify administrative procedures for the authorisation of renewable energy installations, including simple notification.	Regulatory	Ease administrative burden, reduce red tape for administrative authorisation	Public administrations	Existing and planned	2010 - 2020
2. Develop a simplified regulated procedure whereby to secure administrative authorisation for renewable energy projects for thermal applications.	Regulatory	Expedite the issue of administrative authorisation	Public administrations	Planned	Not defined
3. Support R&D-Innovation in energy storage systems. Financial Enhanced capacity for the integration of renewable energies in the electricity system.	Financial	Enhanced capacity for the integration of renewable energies in the electricity system.	Public administrations Technological centres	Planned	2012 - 2020
4. Maintain active public participation in R&D-Innovation in the renewable energies sector by setting up annual support programmes for priority industrial technological development initiatives designed to reduce generation costs, mainly in the wind and solar sectors.	Financial	Enhance the competitiveness of the more mature renewable energies. Full competitiveness in the case of wind energy.	Public administrations	Existing and Planned	2011-2020
5. Develop lines of scientific research and innovation which promote the technological development of prototypes to harness marine renewable energies	Regulatory	Achieve commercial implementation of the technology	Technologists, development of national prototypes	Planned	Not defined
6. Develop specific marine technologies especially targeting deployment of projects to harness renewable energies on the high sea (wind, wave energy, etc.).	Financial	Increase the potential of marine renewable energies	Technologists, technological centres	Planned	2011-2020
7. Financial support for the implementation of high-level and very specialised experimental platforms at national level with international recognition.	Financial	Provide incentive for R&D Innovation and enhance technological competitiveness	Public administrations	Planned	2011-2020

Regarding to specific measures the PANER propose a series of key activities in different areas as:

- measures in the field of electricity generation using renewable energies
- measures in the field of thermal renewable energies
- specific measures in the hydroelectric sector
- specific measures in the geothermal sector
- specific measures in the solar sector
- specific measures in the marine energy sector
- specific measures in the wind sector
- specific measures in the biomass, biogas and waste sectors

For each of these measures, the National Action Plan develops specific activities and set up other measurable tools, as

- identification of the activities: a brief description of the specific activity;
- kind of measures (regulatory / financial);
- direct results;
- target collective of the activity;
- status;
- implementation data.

### 3) Professional figures

In addition, the PANER regulates some specific measures regarding the art. 13 and 14 of the Directive. One of these measures is the “Installers certification”.

At national level in Spain, installers of RES systems can be classified into two groups: professionally qualified installers and authorised installers - companies.

#### Professionally qualified installers

Professionally qualified installers are those who have accredited professional installation skills acquired through vocational and continuing training, training and employment programmes and apprenticeship contracts. The occupation of professionally qualified installer is regulated by a proficiency certificate under Royal Decree 34/2008 of 18 January 2008 on regulating proficiency certificates. Today, proficiency certificates are the direct responsibility of the Ministry of Labour and Social Affairs, the Ministry of Education and analogous bodies at regional level.

It is important to note that with the exception of installers of solar thermal and photovoltaic systems, the National Catalogue of Professional Qualifications<sup>2</sup> does not provide for a

---

<sup>2</sup> The National Catalogue of Professional Qualifications (CNCP) is an instrument of the National System for Qualifications and Vocational Education and Training (SNCFP), which lists the professional qualifications according to the appropriate

specific professional qualification for small-scale biomass boilers and stoves, shallow geothermal systems or heat pumps. However, other more general qualifications which totally or partially cover the skills needed to work as an installer are laid down in Article 14(3) of Directive 2009/28/EC.

The National Catalogue of Professional Qualifications thus specifies, through Royal order 114/2007, the following professional qualifications for professionals with recognised skills to work as installers within the framework established by Directive 2009/28/EC.

- Royal Order 114/2007, about the establishment of four professional qualifications in the professional family of water and energy (Table 8)

Table 8 Professional qualifications in the professional family of water and energy

References	Professional qualification	General competence	Units of competence
Vocational family: Energy and Water • Level: 2 • Code: ENA190	Assembly and maintenance of thermal solar installations	Perform the assembly, commissioning, operation and maintenance of thermal solar installations, to required quality and safety standards and in accordance with current regulations	UC0601_2: Laying-out of thermal solar installations UC0602_2: Assembly of collectors, equipment and hydraulic circuits of thermal solar installations UC0603_2: Assembly of electrical circuits and equipment of thermal solar installations UC0604_2: Start-up and operation of thermal solar installations UC0605_2: Maintenance of thermal solar installations
Vocational family: Energy and Water • Level: 2 • Code: ENA261	Assembly and maintenance of photovoltaic solar installations	Perform the assembly, commissioning, operation and maintenance of photovoltaic solar installations, to required quality and safety standards and in accordance with current regulations	UC0835_2: Laying-out of photovoltaic solar installations UC0836_2: Assembly of photovoltaic solar installations UC0837_2: Maintenance of photovoltaic solar installations
Vocational family: Energy and Water • Level: 3 • Code: ENA264	Organisation and projects for thermal solar installations	Promote installations, implement projects and administer the assembly and maintenance of thermal solar installations, monitoring the results, applying the requisite techniques and procedures in each case, and optimising the available human and material resources, to the requisite quality standards, in compliance with current regulations and in conditions of safety	UC0842_3: Determine the viability of solar installation projects UC0846_3: Implement thermal solar installation projects UC0847_3: Organise and control the assembly of thermal solar installations UC0848_3: Organise and control the maintenance of thermal solar installations

competences for the professional exercise, which comprises the most important professional qualifications of the Spanish productive system.

References	Professional qualification	General competence	Units of competence
Vocational family: Energy and Water •Level: 3 •Code: ENA263	Organisation and projects for photovoltaic solar installations	Promote installations, implement projects and administer the assembly and maintenance of isolated and grid-connected photovoltaic solar installations, applying the requisite techniques and procedures in each case, and optimising the available human and material resources, to the requisite quality standards, in compliance with current regulations and in conditions of safety	UC0842_3: Determine the viability of solar installation projects UC0843_3: Implement photovoltaic solar installation projects UC0844_3: Organise and control the assembly of photovoltaic solar installations UC0845_3: Organise and control the maintenance of photovoltaic solar installations

- o Royal Decree 182/2008 of 8 February 2008 and Royal Decree 1375/2009 of 28 August 2009 supplement the National Catalogue of Professional Qualifications by introducing professional qualifications of the installation and maintenance vocational family (Table 9)

Table 9 Professional qualifications of the installation and maintenance vocational family

References	Professional qualification	General competence	Units of competence
Vocational family: Installation and Maintenance  Vocational Area: Refrigeration and Air Conditioning  •Level: 2 •Code: IMAR0108	Assembly and maintenance of cooling installations	Perform the assembly, maintenance and repair of cooling installations, to required quality standards, in compliance with current regulations and in conditions of safety and respect for the environment	UC0114_2: Assembly of commercial and industrial cooling installations UC0115_2: Maintenance of commercial and industrial cooling installations
Vocational family: Installation and Maintenance  •Level: 3 •Code: IMAR0308	Implementation of projects for fluid distribution networks and systems	Implement projects for fluid distribution networks and systems, determining their characteristics, drawing up the plans, planning and specifying the assembly and the intermediate or final test protocols required for reception, on the basis of a preliminary project and in accordance with established specifications, techniques, standards and procedures, assuring the viability of the project, its quality, safety and respect for the environment in such installations	UC1278_3: Determination of the characteristics of fluid distribution networks and systems UC1279_3: Determination of the characteristics of auxiliary electrical installations for fluid distribution networks and systems. UC1280_3: Implementation of plans for fluid distribution networks and systems
Vocational family: Installation and Maintenance  Vocational Area: Cooling and Heating	Assembly and maintenance of air conditioning and ventilation /extraction installations	Carry out assembly, maintenance and repair operations on air conditioning, ventilation/extraction and air filtering installations, in	UC1158_2: Assembly of air conditioning and ventilation/extraction installations

References	Professional qualification	General competence	Units of competence
<ul style="list-style-type: none"> <li>· Level: 2</li> <li>· Code: IMAR0208</li> </ul>		accordance with the assembly and maintenance processes and plans, to the requisite quality standard, in compliance with current rules and regulations, in conditions of personal and environmental safety	UC1159_2: Maintenance of air conditioning and ventilation/ extraction installations
Vocational family: Installation and Maintenance  <ul style="list-style-type: none"> <li>· Level: 1</li> <li>· Code: IMAR0108</li> </ul>	Domestic plumbing and heating / air conditioning work	Carry out installation of piping, preparing, cutting and joining pipes made of different kinds of materials according to the type of installation, and assemble and/or disassemble domestic sanitary apparatuses, radiators and air conditioning apparatuses, to requisite standards of quality and safety, in compliance with the established norms	UC1154_1: Carry out installation of piping, preparing, cutting and joining pipes for water and drain conduits  UC1155_1: Carry out basic installation and maintenance work on domestic sanitary apparatuses, radiators and air conditioning apparatuses

### Installation companies

An installation company is any natural or legal person who, on the basis of theoretical-practical knowledge and in accordance with applicable law, is authorised to render services and perform works in a specific sector (electricity, climate control, plumbing, etc.). The professional activities required for certain industrial installations are recognised by installer licenses issued by the regional authority competent in matters of industry. An authorised installer's license is an administrative authorization that is required for anyone to install, and in some cases design, certain industrial installations.

An installation company authorised to install small-scale biomass boilers and stoves, solar thermal systems, shallow geothermal systems and heat pumps shall mean a natural or legal person who assembles, repairs and maintains thermal installations within the scope of the RITE, while an installation company authorised to install photovoltaic systems shall mean a natural or legal person who assembles, repairs and maintains electrical installations within the regulation of the Red Eléctrica e Baja Tensión (Low voltage power grid).

Once companies have met the requirements, the competent body of the Autonomous Community will issue the attendant registration certificate to the authorised installation company.

### 3.2.2 Spanish National Energy Efficiency Action Plans (NEEAP) (Directive 2006/32/EC)

The purpose of the Energy Service Directive (Directive 2006/32) was intended to improve energy end-use efficiency using cost effective improvements. A key element in the directive is a 9% energy efficiency target until 2016 for all EU countries.

The Directive has been adopted by Spanish government since 2006; however, the transposition of the Directive doesn't have any application in the field of professional certification.

### 3.2.3 Royal Order 47/2007 on Basic procedure for Energy efficiency certification in building of new construction

The regulation Royal Order 47/2007 establishes a basic procedure for certifying the energy efficiency in buildings. This procedure will be applied in two specific cases, as following:

- in new construction buildings; and
- in modifications of more of 1.000 m<sup>2</sup>.

The certificate will contain:

- building identification;
- identification of regulations on Energy;
- building characteristics identification;
- energy Efficiency label; and
- description of the procedure developed to demonstrate the certification.

Moreover, the certificate could be signed by:

- in the case of the project certificate of energy efficiency: Expert (Master builder)
- in the case of the building certificate: construction supervisor.

### 3.2.4 Royal Order 1027/2007 Regulation on Heat Installation in Buildings (RITE)

The Regulation on Thermal Installations in Buildings, jointly sponsored by the Ministry of Industry, Tourism and Trade and the Ministry of Housing, has been enacted by Royal Decree 1027/2007 issued on 20 July 2007. It was drafted in response to the need to transpose European Directive 2002/91/EC on the Energy Performance of Buildings and to Spain's approval of the 2006 Technical Building Code.

The new Regulation, which came into force on 29 February 2008, revokes and replaces the previous Regulation on Thermal Installations in Buildings, hereafter RITE, passed by Royal Decree 1751/1998 and subsequent amendments thereof in Royal Decree 1218/2002.

The Regulation on Thermal Installations in Buildings lays down the energy efficiency and safety requirements which must be met by thermal installations in buildings designed to meet personal well-being and hygiene standards. It applies to their design, size, operation, maintenance and use and lays down procedures whereby compliance can be accredited.

As for the scope of the Regulation, it covers fixed climate-control installations (heating, cooling and ventilation) and hot water, designed to meet personal well-being and hygiene standards.

The order regulate (art 41 and art. 42, and Annex 3) the Professional card for Heat Installation in Building. This card is the administrative document that demonstrates the capacity for developing activities intended to install and maintain of heat installation in buildings.

The requirements for obtaining the professional card are the following:

- to be more than 18 years old;
- to have the theoretical and practical knowledge about heat installation in buildings.
- to approve a examination about RITE.

### 3.3 Romania

#### 3.3.1 Professional figures involved in RES

According to the Directive 2009/28/EC, the Romanian National Renewable Energy Action Plan (NREAP) was worked out and published by the Ministry of Economy, Commerce and Business - Directorate General for Energy, Oil and Gas on June 2010.

Corresponding to the NREAP, the energy potential of RES in Romania is estimated at 14718 ktoe. This potential does not take into account the economic, environmental and market restrictions. In order to reach the target established by Directive 2009/28/EC for 2020, Romania shall use 50% of the value of this potential which will imply a consistent investment effort.

Table 10 National overall target for the share of energy from renewable sources in gross final consumption of energy in 2005 and 2020

Share of energy from renewable sources in gross final consumption of energy in 2005 (%)	17.8
Target of energy from renewable sources in gross final consumption of energy in 2010 (%)	24
Expected total adjusted energy consumptions in 2010 (ktoe)	30278
Expected amount of energy from renewable sources corresponding to the 2020 target (ktoe)	7267

According to Article 4(1) of Directive 2009/28/EC, Member States are required to set their targets for the share of energy from renewable sources in 2020 in the following sectors:

- heating and cooling - 22.05%;
- electricity - 42.62%;
- transport - 10%.

The total renewable energy use assumed by Romania will reach a 24% share in the national gross energy end-use by 2020. In Table 11 there are presented the national targets according to the NREAP.

Table 11 National 2020 target and estimated trajectory of energy from renewable energy sources in heating and cooling, electricity and transport

	2005	2010	2015	2020
<b>Heating and cooling</b>	18.72	17.86	17.07	22.05
<b>Electricity</b>	30.08	27.48	41.86	42.62
<b>Transport</b>	1.39	5.82	8.11	10.00
<b>Overall RES share</b>	17.90	17.5	20.13	24.00

All policies and measures to promote the use of energy from renewable resources are summarized in the Romanian NREAP and reported in Table 12.

Table 12 Overview of all policies and measures to promote the use of energy from renewable resources

Name and reference of the measure	Type of measure	Expected result	Targeted group and or activity	Existing or planned	Start and end of the measure
1. Drawing up and approval of the RES Valuation Strategy (Government Decision 1535/2003)	Not normative	Increase by 2015 energy production from RES up to 23.37 TWh electricity and 3527.7 thousand toe thermal energy	Production of energy from RES at national level	Existing	Start date 2003 End date: 2015

Name and reference of the measure	Type of measure	Expected result	Targeted group and or activity	Existing or planned	Start and end of the measure
2. Drawing up and approval of the Energy Strategy of Romania for the 2007 – 2020 period (Government Decision 1069 – 2007)	Not normative	Increase by 2020 of the E-RES production to 38% of consumption (32.5 TWh)	Production of energy from RES at national level	Existing	Start date:2007 End date: 2020
3. Carrying out Joint Implementation type projects (according to Kyoto Protocol)	Financial	Reduction of CO <sub>2</sub> emission by increasing the energy production from RES	Government authorities from partner states and investors	Existing	Start date:2000 End date: not specified
4. Implementation of the mandatory shares system combined with GC trading for E-RES	Regulation	Increase by 2020 of the E-RES production for which a GC is granted to 20% of the internal consumption, also cumulated with the effect of other measures promoting E-RES	Production of electricity in hydro- electric power stations of maximum 10 MW, wind farms, solar plants	Existing	Start date:2005 End date: after 2020
5. Organisation and operation of the competition GC exchange within OPCOM	Regulation	Increase by 2020 of the E-RES production for which a GC is granted to 16.8% of the internal consumption (1033 thousand toe) also cumulated with the effect of other measures promoting E-RES	Production of electricity in hydro- electric power stations of maximum 10 MW, wind farms, solar plants	Existing	Start date:2005 End date: not specified
6. Issuance of origin guarantees for electricity produced from RES	Information campaign	Increase by 2020 of the E-RES production up to 38% of the internal consumption (2337 thousand toe) also cumulated with the effect of other measures promoting E-RES	E-RES production	Existing	Start date:2004 End date: not specified
7. Use of biofuels and other renewable fuels in combination with conventional fuels	Regulation	Increase by 2020 of the biofuels share in the total consumption of fuels up to 9.18% (472 thousand toe)	Production of biofuels	Existing	Start date:2007 End date: not specified
8. Regional state aid scheme on RES valuation	Financial	E-RES production: 1800 GWh Thermal energy production from RES: 200 GWh	Investors	Existing	Start date:2007 End date: 2013
9. Co-financing scheme without applying the state aid rules	Financial	E-Res production: 1GWh Thermal energy production from RES: 200 GWh	Local public administration	Existing	Start date:2007 End date: 2013
10. National programme for the increase of energy efficiency and RES use in the public sector for 2009-2010	Financial		Local public administration	Existing	Start date:2009 End date: 2010
11. Programme on the production of energy from RES: wind power, geothermal and solar energy, biomass and hydro-energy	Financial		Investors	Existing	Start date:2009 End date: not specified
12. State aid scheme "Regional development stimulation by making investments for the processing of agricultural and forestry products with a view to obtain non-agricultural products"	Financial	Increase of the biofuels production	Investors	Existing	Start date: 23.12.2009 End date: 31.12.2010

In order to implement the measures listed in the above table the new categories of professional mentioned in NREAP are: *installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps, energy auditors.*

Regarding the certification or equivalent qualifications schemes for installers, according to the Directive 2009/28/EC, the Romanian national regulations in force are included in the Government Ordinance 29/30/08.2010.

### 3.3.2 Professional figures involved in EE improvement

Table 13 EE policy and measures in force

Name of measure	Target group	Status	Category	Start date of the measure
Improvement of Energy Efficiency amongst industrial operators through the signing of long-term agreements (LTAs)	Representatives of industry (industrial operators and/or professional and employers' associations)	In force	- Voluntary agreements and instruments for cooperation - Industrial companies	2008-2010
The improvement of energy efficiency in industrial operators through the management of demand for energy and the drawing up of energy balance sheets ( <i>Law No 199/2000 regarding the efficient use of energy</i> )	Energy consumers in the industrial sector	In force	- Information and legislative measures - Information campaigns - Energy balance sheets	2000
The improvement of energy efficiency through financial support for investment projects designed to reduce energy demand	Industrial and public sectors	In force	- Financial instruments - Subsidies - EE measures and other combinations of sub-categories - Energy efficiency funds and trusts	2003
Improvement of energy efficiency in industrial operators through the implementation of investment projects co-financed by community funds ( <i>Approval of Operational Sectoral Programme by the government, 20/04/2006.</i> )	Industrial operators with high potential for energy savings	In force	- Measures to support energy efficiency funds - Community funds - Financial Instruments - Loans	2003
Heat insulation and ventilation of multi-storey residential buildings constructed in the period 1950-1990 ( <i>Law No 372/2005; Government Special Ordinance No 174/2002, approved by Law No 211/2003</i> )	Residents of multi-storey residential buildings	In force	- Regulations: a) Methodology Mc 001/2007 for the calculation of buildings' energy performance b) Minimum energy efficiency standards in buildings  - Information and legislative measures a) Specialised information campaigns b) City Hall Information Centres c) Energy Audits d) The carrying out of pilot projects  - Financial instruments a) Subsidies – The carrying out of the energy audit and the planning of works b) Tax breaks on the granting of construction permits for the carrying out of heat insulation work. c) Cofinancing of work – see "Effectiveness of EE measures"	2007
The improvement of energy efficiency in heating/cooling systems in individual homes (- <i>Government Decision No 574/2005 regarding the establishment of efficiency criteria for new liquid-fuel or gas boilers; - Government Decision No 1871/22.12.2005 regarding the establishment of criteria concerning energy labelling upon the introduction on the market of new household air conditioning equipment.</i> )	Individual residences in the residential sector	In force	- Regulations a) Minimum performance standards for boilers designed for heating and the supply of hot water and for household air conditioning devices.  - Information and legislative measures a) Information campaigns	2008

Name of measure	Target group	Status	Category	Start date of the measure
The promotion of highly efficient co-generation ( <i>The provisions of Directive 2004/8/EC (which modifies Directive 92/42/EEC) regarding the promotion of co-generation on the basis of demand for useable heat energy in internal energy markets were transposed into national legislation by Government Decision No 219/2007.</i> )	Central and local authorities	In force	- Legislative measures - Financial instruments	2007
The promotion of the development of Energy Service Companies (ESCO)	Central and local public authorities Industrial sector	In force	- Energy services designed to produce energy savings - One-third financing - Energy efficiency contracts	2007
Use of renewable resources	Individual households, public buildings, centralised heating systems, the industrial sector	In force	- Information and legislative measures a )Information campaigns -Financing instruments a) Subsidies	2006
Modernisation of rail transport	Passenger/freight rail transport sector	In force	National level	2004
Promotion of the use of biofuels for transport ( <i>Government Decision No 1844/2005, which fully transposes the provisions of Directive 2003/30/EC, regarding the promotion of biofuels and other renewable fuels for use in transport;</i> - <i>Government Decision No 456/2007, which amends and updates Government Decision No 1844/2005;</i> - <i>Special Government Ordinance No 125/2006 for the approval of direct and indirect national complimentary subsidies to agriculture starting from 2007, approved with modifications and extensions through Law No 139/2007</i> )	Producers and importers of biofuels	In force	- Rules - Financing - Subsidies	2007

### 3.3.2.1 Romanian Law 375/2005 on Implementation of Directive 2002/91/EC and related figures

Starting with 1st of January 2007, entered into force the Law 375/2005 regarding the building energy performance, fully transposing Directive 2002/91/EC of the European Parliament and Council on the building performance energy in the national legislation, that for the new buildings with a total net area over 1000 sqm, the authority of the local or county public administration, through the urban planning certificate granted with a view to issuing the building permit according to the law, requires the drawing up of a technical, economic and environmental feasibility study on the possibility of using other alternative energy production system such as:

- combined heating and electricity production;
- district or block heating or cooling systems;
- heat pumps in certain conditions.

However there are no specific measures promoting the renewable energy technologies in buildings. Such technologies are promoted by the aid schemes for the promotion of the use of energy renewable sources.

On 21st of February 2007 entered into force the Order Nr. 15/2007 from 01/02/2007 of the Ministry of Transports, Buildings and Tourism, document that settles the calculation methodology on the energy performance of buildings, from technical point of view.

According to the Article 12 from the Law 372/2005: “for the new buildings being built, the energy performance certificate is the duty of the investor/owner and it is included in the documentation for the reception of building at the completion of work”. Moreover, Article 13 of the sale law stipulates that: “the energy performance certificate for buildings is elaborated according to the legislation in force for the buildings provided by the Article 7 (single-family houses, blocks of flats, offices, educational buildings, hospitals, restaurants, gyms, building trade services and other consuming buildings) that are built, sold or rent.

In this respect, every building owner, if he wants to sell or to rent the building, must have an energy performance certificate for the building. This certificate contains details related to the energy performance of the building that helps to estimate the future maintenance costs.

The energy performance certificate of the building is issued by a certificated energy auditor, based on a energy expertise and it is valid for ten years from the issuing date.

The energy auditors are independent experts, certified by the Ministry of Regional Development and Tourism for execution of expertise, certificates and energy audits. This specialization is relatively new in Romania (from 2003) and it was introduced in Romanian Occupancies Classification on 12 January 2011.

The courses for the certification system of energy technical experts and auditors for buildings and electrical and thermal installations are offered by UTCB (Technical University of Civil Engineering Bucharest) (post-graduate courses – 3 months) for energy audit for buildings and certification with MLPTL – Ministry of Regional Development and Tourism according to Order 550/3003 up to 1083/2009.

The energy audit and certification courses are offered in cooperation with UPB - Power Engineering Faculty (post-graduate electrical energy, thermal energy and energy management audit courses) and ARCE - National Agency for Energy Conservation (currently within ANRE).

The conditions that must be fulfilled by a specialist that requires certification for energy auditor are the followings:

- *citizen of Member States of the European Union or of the European Economic Space;*
- *construction engineer, graduate of an Institute or Faculty of Construction Engineering*
- *Architect, graduate from an Architecture Institute or a Faculty of Architecture and Civil Engineering;*
- *Installation engineer, graduated from a Faculty of Installations*
- *Power engineer or mechanic engineer, graduate from a Power Engineering Faculty or Mechanical Faculty*

*The specialists that apply for certification as energy auditor, 1st class, must have at least 10 years of experience in education, research, design or execution architecture, systems engineering or similar specializations.*

*The specialists that apply for certification as energy auditor, 2nd class, must have at least 6 years of experience in education, research, design or execution architecture, systems engineering or similar specializations.*

The age criteria, for the both categories, can be reduced with maximum 2 years by the certification commissions, in the case that the specialists prove, through their activity.

### 3.3.2.2 Romanian Government Ordinance 22/2008 on Implementation of Directive 2006/32/EC and related professional figures

In order to implement in the Romanian legislation Directive 2006/32/EC, the Government adopted GO 22/2008 on energy efficiency and promotion of RES to end consumers. According to the ordinance, the promotion of RES to end consumers forms integral part of the national energy efficiency policy.

All economic operators with an annual consumption of over 1 000 toe, as well as the local public administration authorities with a population of over 20 000 inhabitants shall be obliged to draft energy efficiency programmes including promotion actions for the use of RES to end consumers. According to NREAP 2010, such programmes shall be transmitted to ARCE (currently ANRE). Among the ARCE's duties and responsibilities we may mention:

- Monitoring energy programmes and the resulting energy economies;
- Granting free advisory services for projects drafting and application;
- Promoting the use of RES to consumers by actions complementary to the energy market regulation;
- Drafting, including by co-financing from the state budget or by its own resources, studies on the foundation of energy efficiency national programmes and participation in projects declared as eligible within energy efficiency and renewable energy programmes initiated by international organizations.

The Ordinance provides that the Ministry of Regional Development and Tourism technically coordinates the actions related to the increase of building energy performance by:

- drafting specific technical regulations;
- certification of energy auditors for buildings;
- monitoring technical performance of buildings and establishment of a specific databank.

Such actions shall implicitly refer to the promotion of RES in buildings.

Having regard to the fact that the necessity for the public sector to represent an example on promotion of energy efficiency, the Government has approved by GD 1661/2008, the national programme on the increase of energy efficiency and use of RES in the public sector for 2009-2010. This programme shall ensure financial support through non-refundable co-financing from the state budget for the following types of investment objectives:

- Rehabilitation and modernization of thermal energy centralized supply systems, including the change of the type of fuel for energy combustion installation (for example, the replacement with biomass);
- Thermal rehabilitation of public buildings and use of local RES potential for the supply of electric and/or thermal energy;
- Modernization of indoor and outdoor public lightning.

### 3.3.3 Romanian Government Decision 29 from 30/08/2010 regarding the modification and completion of the law 220/2008 and implementing the Directive 2009/28/EC

The Law No. 220/2008 enacted by the Parliament of Romania on October 27, 2008 is implementing the provisions of the Directive 2009/28/EC. The articles of the Law 220/2008 is regarding the electricity produced in small hydro power plants that have an installed power less than 10 MW, the electricity produced from wind and solar electricity, geothermal energy and associated combustible gases; biomass; biogas; and waste fermentation gas; and fermentation gas from sludge in waste water treatment plants, all of which is delivered to the electric power network.

The European Directive 2001/77/EC was transposed in the Romanian legislation by this GD 1892/2004 (amended by GD 958/2005 and GD 1538/2008) that introduced the obligatory quota system combined with green certificates trading as support mechanism for the promotion of RES electricity production. In order to accelerate the production of E-RES, the Romanian Parliament adopted Law 220/2008 on the establishment of the promotion system of the energy produced from RES. The law modifies the annual target level and the number of GCs issued for the electricity produced from RES by introducing differentiations per types of sources.

Table 14 The annual obligatory shares of green certificates for the period 2008-2020

Year	Annual obligatory share according to Law 220/2008 %	Annual obligatory share according to Law amending and supplementing 220/2008 (%)
2008	5.26	
2009	6.28	
2010	8.30	8.3
2011	8.30	10.0
2012	8.30	12.0
2013	9.00	14.0
2014	10.00	15.0
2015	10.80	16.0
2016	12.00	17.0
2017	13.20	18.0
2018	14.40	19.0
2019	15.60	19.5
2020	16.80	20

According to NREAP, The law 220/2008 introduces a differentiated support per RES technologies both in terms of the number of allocated GC and of the support period. From the point of view of the number of GC for each 1 MWh electricity delivered to the grid and/or consumers:

- the hydro-electric power plants of maximum 10 MW either started up or retrofitted after 1 January 2004 receive 1 GC;
- the hydro-electric power plants of maximum 10 MW, other than the plants specified above, receive 0.5 GC;
- the hydro-electric power plants with a capacity lower than 1 MW receive 2 GC;
- the wind power plants receive 2 GC until 2015 and 1 GC as from 2016;

- the power plants using geothermal energy, biomass, biogas, bioliquids, landfill gas, similar gas receive 3 GC;
- the photovoltaic power plants receive 4 GC.

Related to the professional figures, it was adopted the Government Decision 29 from 30/08/2010 regarding the modification and completion of the law 220/2008. It states that the public authorities, under the coordination of the Resort Ministry, will elaborate and will make certification schemes or equivalent qualification systems, available for the installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps.

According to NREAP 2010, the authorization systems or the equivalent qualification schemes for installers lay down, among other things, that installers are required, in advance, water and sewer installer and/or electrician training. These two qualifications are currently included in the List of Occupations which is periodically approved and updated by Joint Order of the Minister of Labour, Family and Social Protection and the Minister of Education, Research, Youth and Sports.

The Romanian Energy Regulatory Authority is the competent authority to certify electricians carrying out activities of design/installing electrical installations connected to NES.

The installers carrying out activities in the field of installations under pressure are authorized by the competent authority, ISCIR (State Inspection for the Control of Boilers, Pressure Vessels and Hoisting Equipment).

On 12 January 2011, the following professional categories were included in the Romanian Occupancies Classification:

- Energy Auditors for buildings;
- Building maintenance electrician;
- Installer for solar photovoltaic system;
- Installer for solar thermal systems;
- Assembler for solar systems;
- Operator for renewable energy sources.

The professional training providers shall request the National Adult Training Board to acknowledge the courses. The National Adult Training Board shall verify whether the proposed course complies with the requirements of Directive 2009/28 and of the occupational standard and on the basis of this assessment, the course shall be accredited. On the basis of the accreditation, the professional training providers shall offer the courses the graduation of which shall be attested by the certificates required by the Directive.

Special courses for installers for renewable energy systems shall be introduced by non-governmental organizations such as: SUNE - Employers Association Renewable Sources of Energy, in cooperation with the accreditation bodies ANRE and ISCIR.

In addition, there is also the certification system of energy technical experts and auditors for buildings and electrical and thermal installations, which was previous mentioned.

## BIBLIOGRAPHY

- CEDEFOP (European Centre for the Development of Vocational Training), "Skills for green jobs", 2010
- [www.edf.org/cagreenjob](http://www.edf.org/cagreenjob), "Green Jobs Guidebook"
- [www.greenenergyjobs.com/career-guide/](http://www.greenenergyjobs.com/career-guide/), Green energy career guide
- Romanian National Renewable Energy Action Plan (NREAP) – 2010
- RES 2020 Monitoring and Evaluation of the RES directives implementation in EU27 and policy recommendations for 2020 - Reference Document on Renewable Energy Sources Policy and Potential
- [www.anre.ro](http://www.anre.ro)
- [www.audit-energetic.com/legislatie.html](http://www.audit-energetic.com/legislatie.html)
- [instalatii.utcb.ro/site/auditfebr.htm](http://instalatii.utcb.ro/site/auditfebr.htm)
- [rogbc.org/Downloads/Cum\\_sa\\_devii\\_auditor\\_energetic\\_in\\_Romania.pdf](http://rogbc.org/Downloads/Cum_sa_devii_auditor_energetic_in_Romania.pdf)