meetMED

Mitigation Enabling Energy Transition in the MEDiterranean region

Together We Switch to Clean Energy

Market Survey

ON ENERGY EFFICIENCY AND RENEWABLE ENERGY SOURCES PROFESSIONAL TRAINING

meetMED is funded by the European Union

This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of MEDENER and RCREEE and do not necessarily reflect the views of the European Union.

Design by REVOLVE

Cover Image: meetMED

The meetMED project is a two-year project funded by the EU and jointly carried out by the Mediterranean Association of the National Agencies for Energy Management (MEDENER) and by the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE). Its main goal is to reinforce regional cooperation aimed at fostering the energy transition in Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine and Tunisia under the umbrella of the UfM REEE platform.

The meetMED team in Brussels coordinates the project partners and experts in implementing the project activities, in the following areas of work: assessing EE and RES strategies and policies; advancing vocational training and public awareness; attracting sustainable RE and EE investments; supporting the UfM Renewable Energy and Energy Efficiency Platform.

The meetMED activities target and benefit a wide range of stakeholders, including policy makers, public authorities, investors and financial institutions as well as local communities and final customers. meetMED supports regional cooperation by building the technical capacity and raising the public awareness necessary to implement RE and EE projects and solutions, while creating synergies with other initiatives targeting energy transition in the Mediterranean region.

MEDENER is an international non-profit organization gathering agencies from the northern and southern Mediterranean countries in charge of implementing public policies on energy efficiency and the promotion of renewable energy sources, by implementing regional projects facilitating the sharing of know-how and best practices among its members and international partners, as well as accelerating the transfer of skills, methods and technologies in the field of energy efficiency and renewable energy.

RCREEE is an intergovernmental organization aiming at enabling the adoption of renewable energy and energy efficiency practices in the Arab region. RCREEE brings together regional governments and global organizations to initiate and lead clean energy policy dialogues, strategies, technologies and capacity development in order to increase Arab states' share of tomorrow's energy. Its key work areas are capacity development and learning, policies and regulations, research and statistics, and technical assistance.

Foreword

This report represents another important brick in the bridge that the meetMED experts are building in the Mediterranean region to accelerate the energy transition.

Vocational training qualifications are an essential means to upgrade the competences and employability of the professionals in the energy sector. These qualifications are also key for the activation of energy markets that integrate the most advanced tools and technologies that foster the energy transition. This report focuses on vocational trainings as a key component that concretely builds the technical capacity of the Project as well as the energy managers that implement EE and RE measures and solutions in public institutions and enterprises, as well as of planners, manufacturers, installers, and maintainers.

The report collects the results of the comprehensive survey conducted by the meetMED experts under the leadership of the Greek Centre for Renewable Energy Sources and Savings (CRES), on the RE and EE professional training infrastructures and schemes that exist in Algeria, Egypt, Greece, France, Italy, Jordan, Lebanon, Libya, Morocco, Palestine, Portugal, Spain and Tunisia. Today, the quality of professional training schemes across the Mediterranean region is very diverse. Legal frameworks, solid infrastructures, innovative training solutions and proven trainers' qualification are needed to ensure accurate vocational trainings, which would concretely build the capacity of all the market players.

I would like to thank all the meetMED experts from the national energy agencies and ministries of 13 Mediterranean countries, who have coordinated and conducted this survey: they possess the consolidated skills and competences that are needed not only to improve vocational training across the meetMED target countries but also to carry out the training courses that foster the energy transition.

The conclusions and the recommendations of this survey need a careful follow-up: it is desirable that this report lead to vocational training in the field of the energy transition in the Mediterranean region.

Matteo Barra
meetMED Project Manager

Authors

The meetMED Survey on Energy Efficiency and Renewable Energy Sources Professional Training was elaborated by the following consortium members:

Authors	Organization	Country
Aristotelis Botzios-Valaskakis Efi Mavrou Georgia Veziryanni	Centre for Renewable Energy Sources and Energy Saving **Short Name:** CRES	**Greece**
Nadia Chioukh Nadia Djelouah Tahar Moussaoui	Agence Nationale pour la Promotion et la Rationalisation de l'Utilisation de l'Energie **Short Name:** APRUE	**Algeria**
Adel Mourtada Adnan Jouni	The Lebanese Association for Energy Saving and for Environment **Short Name:** ALMEE	**Lebanon**
Luis Silva Ines Mendes	Agencia para Energia **Short Name:** ADENE	**Portugal**
Rim Boukhchina	Regional Centre for Renewable Energy and Energy Efficiency **Short Name:** RCREEE	**—**
Alicia Tsitsikalis Romain Riollet	Agence de l'Environnement et de la Maîtrise de l'Énergie **Short Name:** ADEME	**France**
Anna Amato	Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile **Short Name:** ENEA	**Italy**
Nidal Abdalla	National Energy Research Center **Short Name:** NERC	**Jordan**
Virginia Vivanco Cohn	Instituto para la Diversificación y Ahorro de la Energía **Short Name:** IDAE	**Spain**

Authors	Organization	Country
Hassen Agrebi Helene Ben Khemis Nafaa Baccari Mohamed Ali Safi Afef Jaafar Abdelkader Baccouche Souhaeil Ksouri Nadia Bchini	National Agency for Energy Management **Short Name:** ANME	**Tunisia**
Alice Giallombardo	meetMED Project **Short Name:** meetMED	—

Acronyms

ADEME French Environment and Energy Management Agency
ADENE Portuguese Energy Agency
ALMEE Lebanese Energy Management and Environment Association
ANME Tunisian National Agency for Energy Management
APRUE Algerian National Agency for the Promotion and Rationalization of Energy Use
BAPVs Building Assisted Photovoltaics
BIPVs Building Integrated Photovoltaic
CCE Centre for Continuing Education
CD Capacity Development
CEEG Compagnie de l'Engineering de l'Electricite et du Gaz
CEN European Committee for Standardization
CTI Cooling Technology Institute
CVET Continuous Vocational Educational Training
CVT Continuing Vocational Training
EE Energy Efficiency
ENEA Italian National Agency for New Technologies, Energy & Sustainable Economic Development
ESF European Social Fund
IDAE Spanish Institute for Energy Diversification and Saving
ISCED International Standard Classification of Education
IVET Initial Vocational Educational Training
LLL Life Long Learning
LV Low Voltage
MEDENER Mediterranean Association of National Agencies for Energy Management
NERC Jordanian National Energy and Research Centre
PLC Programmable Logic Controllers
QA Quality Assurance
RCREEE Regional Center for Renewable Energy and Energy Efficiency
RER Region of Emilia Romagna
RES Renewable Energy Sources
SEMCs Southern and Eastern Mediterranean Countries
SKMK Sharikat Khadamet Mouhaouilet Kahrabaia
SKTM Shariket Kahraba wa Taket Moutadjadida
SPE Société Algérienne de Production de l'Eléctricité
TVET Technical Vocational Education and Training
VET Vocational Education and Training
VT Vocational Training
VTCs Vocational Training Centers

Table of Contents

Executive Summary

The meetMED project aims to strengthen the implementation of means and measures that enable the energy transition in the Mediterranean Region at national, regional and local levels. The project brings together more than 60 experts from national energy agencies and ministries whose main goal is to exchange best practices, train professionals and raise public awareness on sustainable energy choices and investments. Collectively, this reinforces the mutual exchange of expertise in the field of energy and helps to boost regional cooperation.

Under the project's capacity building activities, a market survey of the RES and EE professional training schemes in Algeria, Egypt, Greece, France, Italy, Jordan, Lebanon, Libya, Morocco, Palestine, Portugal, Spain and Tunisia was conducted by the meetMED experts. This was done in order to ascertain 1) the state of development of the training schemes for Renewable Energy Technologies and Energy Efficiency; 2) the number of available courses; 3) the status of the training institutions; and 4) the quality of the training schemes in each of these countries. In conclusion, a gap analysis was elaborated, lessons learnt and best practices highlighted, and recommendations made in order to improve these professional training schemes.

The national market surveys that were elaborated by the meetMED experts show that from the Northern Mediterranean countries that were assessed (France, Greece, Italy, Portugal and Spain), all have highly developed and institutionalized professional training schemes, which were found to be at the same level as the training schemes in Algeria, Egypt, Morocco and Tunisia. Lebanon is the only Southern Mediterranean country with a professional training scheme averagely developed. Jordan, Libya and Palestine all seem to have professional training schemes with a low level of development.

The development of the EE and RES professional and vocational training schemes is also reflected in the number of RE and EE related courses that are available to the general public. Most of the countries with highly developed professional training schemes also have a large number of courses that are avail-

able to the public. The training institutions that were examined in the member countries reflect either an equal share of public and private ownership or a scenario where the majority of institutions are public. Only Lebanon and Portugal seem to have a majority of private institutions among the training providers.

From the quality self-evaluation of the training schemes, the Southern and Eastern Mediterranean Countries (SEMCs) that deem to have poor quality training schemes for selected topics are: Algeria, Jordan, Libya and Palestine. Interestingly, although this is understandable for those countries with less developed training schemes (i.e. Jordan, Libya and Palestine), this is not the case for Algeria, which has a highly developed training scheme.

Several recommendations are presented to help improve the capacity development of the Vocational Education and Training (VET), which focuses on RES and EE in the relevant countries.

Firstly, the existence of a legal framework, defined schemes and training infrastructures are helpful for the continuous development of the training courses.

New trends in teaching methods and tools, such as e-learning, can also help in the implementation of training courses country-wide, despite the existing infrastructures. The example of Egypt, which has used distance learning and open courses in order to provide training to all residents, can be duplicated. Furthermore, the fact that these courses had been provided by universities, i.e. by institutions with proven knowledge and teaching experience, have led to high quality training courses.

The combination of private and public sector in the provision of courses enhances the capacity building of the vocational training. Associations or federations of workers with specific expertise (i.e. Federation of Building workers, of Electricians etc.) are able to build on their qualifications and experience through the training courses that they offer.

An important issue for the improvement of the capacity building in the RES and EE vocational programs is the qualifications of the trainers: trainers that are more experienced in the respective topic and specialized in adults' training provide more effective courses and use teaching methods and materials that lead to a better understanding of the trainees, and to a better quality of the final project.

By bringing in the national context of the training courses, the capacity building can be better contextualized and designed. Indeed, the market's needs define the context of the training courses: in the SEMCs, sun is one of the most powerful energy sources hence, most of the existing training courses are related to PV, solar systems and other solar energy-related issues. Since highly qualified technicians and engineers are essential to the result of a RES project, this trend should remain in the roadmap for the design and further development of the training courses. In order to further ensure quality control, it is also essential to start planning towards a future integration of all the RES and EE topics in the curriculums.

In some cases, however, there is a lack of practical training, compared to the tendency to cover theoretical or policy topics. For instance, in some countries, a lack of training in building installation or in energy audits or on EE issues has been noticed. All kinds of aspects of the training on EE and RES should be gradually included in the planning of the vocational training and of the capacity building.

This survey has underlined the gaps of each country in the context of the existing or past courses. It can therefore help define the new integrated professional training courses that can be developed in order to concretely improve the capacity building offered.

Finally, professional and vocational trainings should be aimed at all stakeholders. At the same time, topics of interest for policy makers, decision makers, project planners, project managers, engineers, technicians, economists, installers, maintainers etc. should be included in the planning of the vocational schemes for RES and EE. This would help with the formation of a skilled labor force and other relevant market actors that would be able to effectively manage the integration of RES and EE in the national energy markets.

1. Introduction

1.1. Definition of Professional and Vocational Training

The concept of professional (or vocational) training is a general concept that includes training that is designed to (better) prepare the individual for a vocation (profession) or a specialized occupation. Indeed, vocational training is directly related to – and interacts with – the productivity and/or the competitiveness of a nation or country. In practice, vocational training is an education and/or training that makes the individual able to meet his/her day-to-day duties performed in his/her specific trade, craft, profession, or role, in a more desirably efficient and improved way, equipping him/her with more numerous, better and sometimes more specialized targeted skills and competences.

Vocational training is most commonly used in the sense of Vocational Education and Training (VET). This comprises any educational or training scheme that may provide people with the necessary skills that are relevant for their occupation, and can either become 1) a robust means towards empowering adults when seizing better employment opportunities or 2) a way to equip them for self-employment. By continuously upgrading the skills of the workforce, decent work and a more equitable and inclusive growth can be fostered, which can help build a bridge between education/training and the labor market itself.

From a theoretical perspective, VET can be classified in the following categories (Grubb and Ryan, 1999):

- **Pre-employment VET:** prepares individuals for the initial entry into employment; in most countries, these are traditional programmes of VET in schools; they are found both in schools and workplaces as dual systems and are often operated by national Ministries of Education;
- **Upgrade training:** provides additional training for individuals who are already employed, or when their jobs change, or when the technology

and work environment become more complex, or as they advance within the company;

- **Retraining:** provides training for individuals who have lost their jobs so that they can find new ones, or for individuals who seek new careers to develop the necessary competences for employment; individuals in retraining programmes, by definition, have already had a labour-market experience, therefore, retraining may not have a direct connection with the occupation they already have;
- **Remedial VET:** provides education and training for individuals who are in some way marginal or out of the mainstream labour force; typically those who have not been employed for a long period of time or who do not have any labour-market experience; usually people depending on public income.

Cedefop (2008) offered a further categorization including the aforementioned types of VET: Initial and Continuous Vocational Educational Training (IVET and CVET).

IVET refers to general or vocational education and training carried out in the frame of the initial education system, usually before the individual enters the working life. Some training undertaken after entry into working life may be considered as initial training (e.g. retraining). Initial education and training can be carried out at any level in general or vocational education (full-time school-based or alternate training) pathways or apprenticeship. CVET, on a second level, is defined by the area of education or training that comes in after entry into working life and aims at helping individuals (1) improve or update their knowledge and/or skills, (2) acquire new skills for a career move or retraining and (3) continue their personal or professional development (Cedefop, 2008). CVET integrates lifelong learning and may encompass any kind of education, i.e. general, specialized or vocational, formal or non-formal, etc.

According to the official definition outlined by the International standard classification of education (ISCED), the IVET is defined as follows: “Vocational education is defined as educational programmes that are designed for learners to acquire the knowledge, skills and specific competences for a particular occupation or trade, or class of occupations or trades. Such programmes may have work-based components (e.g. apprenticeships). Successful completion of such programmes leads to labour-market-relevant vocational qualifications,

which are acknowledged as occupationally-oriented by the relevant national authorities and/or the labour market" (UNESCO, 2011, p. 11).

Another official definition (EU commission – NRDC, 2011) for Continuous Vocational Training suggests that it consists of a training process or activity, which has, as its primary objective, the acquisition of new competences or the development and improvement of existing ones. This is financed, at least partly, by the enterprises for their employees, who either have a working contract or who benefit directly from their work for the enterprise, such as unpaid family workers and casual workers. The training processes or activities must be planned in advance and must be organized or supported with the special goal of learning.

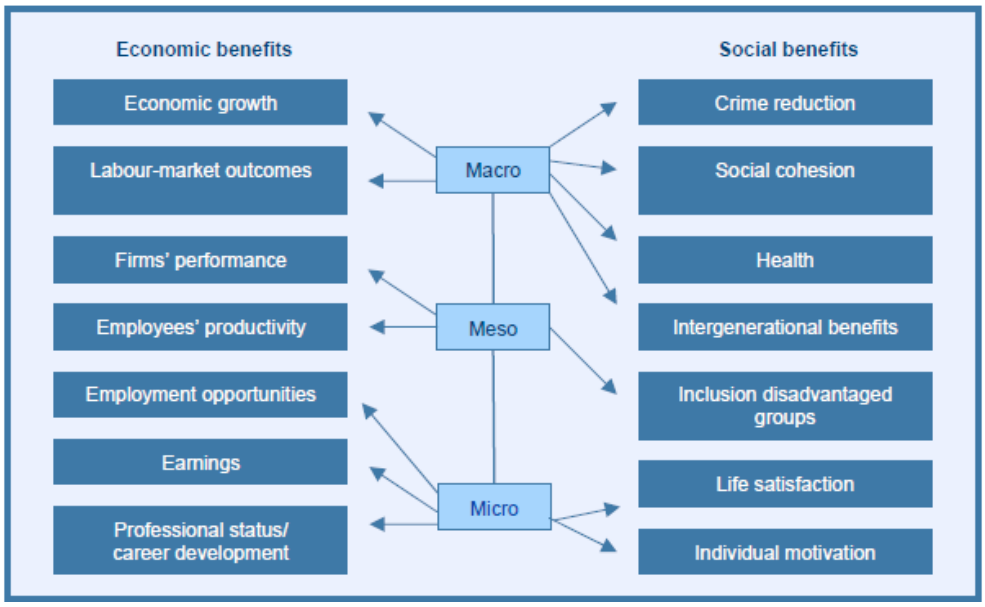
What is worth mentioning is that the role of Vocational Training as an organized form of education is differently formed and shaped across the different European countries. This is due to a wide range of differences as far as the culture, social structures and the economic status in each one of them are concerned. In spite of the different characteristics of VET among the European countries, what has to be underlined is the fact that, in all cases the vocational training is performed in the intermediate level, interacting between education and the professional world. Thus, all professional and vocational training programmes are designed and developed in a way so as to be able to meet both the educational / training needs of the person they are addressed to, but also the economic and social needs of each country.

Vocational education can take place at the post-secondary, further education, or higher education level and it may also interact with the apprenticeship system. At the post-secondary level, vocational education is often provided by highly specialized trade, technical schools, colleges, universities, and/or institutes of technology / polytechnic institutes. Prior to the very recent years, almost all vocational training courses took place traditionally in a classroom, or on the job site, with students learning trade skills and trade theory from accredited professors or established professionals. However, during the last years, online vocational training has also made its appearance, which enables further learning opportunities for professionals who cannot easily leave their job by offering time flexibility.

It is obvious that there are a variety of benefits arising from professional

and vocational training. These may be grouped in two main categories: economic and social benefits, both of which can, in their turn, be analyzed through three different subcategories (levels): 1) the micro level (benefits for the individuals), 2) the meso level (benefits for enterprises and groups) and 3) the macro level (benefits for society as a whole) (Source: CEDEFOP). In the following figure, some examples of VET benefits, according to the dimension (economic and social) and the level of analysis (micro, meso and macro), are presented (Source: CEDEFOP).

Figure 1: Vocational Education and Training Benefits on a macro, meso and micro level of analysis (Source: CEDEFOP).



Based on the results provided by research conducted by CEDEFOP on VET benefits in some European countries, the main findings showed that although the benefits may be divided in the three (micro, meso and macro) aforementioned levels, these levels do interact with one another, and are strongly interdependent. Thus, both the structure and the role of professional and vocational training in each country must be planned, so that, by taking economic and social factors into consideration, they can provide active professionals with an efficient and profitable upgrade of skills and competences, as well as more favorable career perspectives.

1.2. Methodology

In order to draft this report, it was essential to conduct a survey to gather the required information from the participating countries. Therefore, the following questionnaire was developed and sent to the partners, with the request to fill in the necessary data.

The idea behind the development of the questionnaire was to investigate the existing national or regional structures of EE and RES professional training in partner countries. This information turned out to be essential in order to better understand the past and current status of RES and EE training in the Mediterranean region, which is helpful to define the needs of future training in this domain. The scope was to map the existing level of RES and EE training, in order to prepare the context and educative material for the development of the three trans-national technical and vocational training packages that can cover the current training needs. The final goal has been the reinforcement of the public awareness as well as the awareness of the relevant stakeholders on financial, technical and administrative issues related to energy projects, energy audits in industry, and integration of EE and RES in buildings.

In order to achieve the above-mentioned goals and gather the respective information, two general categories were integrated into the questionnaire: first, a general overview of the education system in each country was documented and, second, a roadmap of the infrastructures for the available EE and RES trainings was outlined. More specifically, in the first chapter, the Adult Education System was briefly described to help obtain a general overview of the development status in each country; then, a review of the Technical Vocational Education and Training (TVET) system was conducted, to help identify the cases of interest.

After having obtained an overview of the state-of-the-art of the respective educational frameworks, a list of the training bodies/institutes (private and/or public) was then acquired, as well as some indicative TVET courses/seminars offered in each country regarding EE and RES. The purpose of this activity was to gather information on the training providers, including the title of the courses and their content, the certification given (if any), and other relevant information such as the duration, the number of people trained, the year and the way it was delivered. In that way, the duplication of known modules during

the designing of training packages was subsequently avoided and the different knowledge gaps were able to be filled.

Finally, the meetMED partners or their associate experts were asked to perform an estimation of the quality and the level of the existing trainings. The goal of this exercise was to keep track of the strengths and weaknesses of the training provision and consequently of the public awareness on EE and RES. This therefore helped to adjust the development of future training packages, smooth out any gaps, and reinforce awareness. However, it should be mentioned that the courses registered are indicative and that, most probably, more courses have been conducted or are ongoing in the countries. A detailed and thorough registration was not possible (some of the already delivered courses have no longer the relevant information available/online) nor was this the scope of this questionnaire. Furthermore, the evaluation of the table “Evaluation of the existing training” relies only on the ranking, critical eye and perspective of the reviewers, hence it is only indicative and cannot be used ultimately for deeper analysis.

2. Resume of the Results of the Survey

In the following sections, the conclusions derived from the analysis of the surveys for each country are presented (see Chapter 5 for the completed surveys).

2.1. Algeria

In Algeria, the national training system is made up of more than 1200 training structures under the Ministry of Vocational Education and Training, plus other relevant private structures and those that fall under other ministerial departments. This set of structures welcomes almost 600,000 trainees in all sectors each year, in addition to the Life-Long Learning of workers (LLL), which is particularly important. The technical training programs that have been set up by the education and vocational training sector include 23 branches of activities that are divided into 478 specialties. There are several types of training provided by the vocational training centres and institutes for in-house training: initial training (diploma), lifelong learning (diploma), evening courses (qualification), training for housewives (qualification) and conventional training. At the end of the training course, the successful trainees obtain a state diploma depending on the training: certificates of specialized vocational training, certificates of professional competence, certificates of professional management, licenses as technician or licenses as advanced technician.

Vocational training was first regulated in 2002, and in 2017 the Executive Decree No. 17/212 made new regulations and provided two new cycles of vocational training, which are sealed by the «BEP» vocational training certificate and the «BEPS» higher vocational training certificate. These two certificates are issued after classroom attendance in public vocational schools. Furthermore, LLL for workers is enhanced by legislation, requiring employers to organize courses for their employees to follow. Companies have a financial obligation on training activities of at least 1% of their payroll.

Concerning infrastructures, the education and vocational training sector has an extensive network of institutions and training facilities throughout the

country. Most of the registered Training Institutes are public, however, the private sector organizes trainings upon request and often in the form of supportive measures (e.g. practical trainings provided by companies installing solar panels, dealing with solar pumping and related services).

There are plenty of registered courses concerning RES in Algeria, mainly focusing on technologies, auditing, sizing, installation procedures and management, and less concerning EE. However, the quality of trainings in the Evaluation Table is characterized as “Poor” for most cases, except for Energy audits (Good) and Installation of RES (adequate).

2.2. Egypt

In Egypt, the Law on Literacy and Adult Education established the General Authority for Literacy and Adult Education (1992), which is managed by a Board of Directors (chaired by the Prime Minister) and is responsible, through Executive Councils for Literacy, for the planning and implementation of literacy and adult education programs, problem-solving and financial issues. The Arab Organization for Education, Culture and Science (ALECSO) and the General Authority for Adult Education (EFA) embraced the definition “Lifelong Learning (LLL)” instead of “illiteracy”. The financing of LLL is provided by the government or private entities.

Since the mid-1980s, Egyptian universities have played an important role in this field, particularly by providing open learning and distance learning and through the use of an educational satellite channel as well as closed circuit TV and video conferencing.

TVET is provided through secondary education in technical and commercial schools and post-secondary education in training institutions. Other forms of training include: training through industry attachments (such as dual systems and apprenticeships), in-service training, and the re-training of professionals. There are long-term and short-term public and private vocational training centers (VTCs) and institutes and NGO-administered VTCs focused on disadvantaged groups.

Egypt has implemented a cooperation protocol with private firms to imple-

ment the 'Egypt Makers' initiative, and other programmes, in cooperation with the Federal Ministry for Economic Cooperation and Development of Germany (BMZ). This initiative focuses on technical education, training and employment, qualification of both trainers and trainees and the improvement of SMEs. In addition to the Ministries of Education, of Higher Education and of Trade and Industry, which are the main TVET institutions, there are also 15 public and private public and private entities that provide RES and EE training.

There is a great variety of RES and EE courses in Egypt, mainly provided by universities, research centers and associations. The level of most courses is 'adequate' or 'high', whilst the training on RES technologies, and the market size for both RES and EE are evaluated as 'very high'.

2.3. France

In France, the domain of vocational training is under the responsibility of the regional councils, as far as apprenticeships and vocational training for unemployed, young people and adults are concerned. Moreover, training schemes are also eligible for State co-funding. Many stakeholders are also involved in the provision of vocational training in several different topics. Over recent years, France has emphasized the enhancement of the skills of workers in the building sector. With the help of national or European initiatives, this has been done by carrying out consistent work which aims to diagnose the building sector's training needs.

Although the information concerning the training institutes that are responsible for the provision of the various courses in the field of RES and/or EE is not provided in full detail, and only a list of some indicative ones. ADEME seems to be the main training provider based on the quantitative information presented in France's questionnaire. Based on an extended list of performed courses, the majority of them are of a higher level than conventional CVET courses and thus cannot be considered as such. Energy management and energy efficiency as well as the energy performance of buildings (electricity demand, energy audits, energy consumption) are deemed to be the most popular topics, with ADEME being the dominant course provider. The topics of RES technologies - namely, wind energy, PV systems and geothermal heat pumps – then follow. It is clear, therefore, that France has in force a vocational training scheme focused on the energy efficiency and performance of buildings.

Finally, and as far as the qualitative self-evaluation of all the existing courses on RES and EE is concerned, meetMED experts assessed the courses on all the examined ten topics as adequate. This more general and unanimous approach was based on the grounds that it seemed rather difficult to register an estimation for a global overview, in view of the fact that each estimation would really depend on the sector, technologies, type of works, etc. (e.g., in the offshore wind energy sector, industrials will not take the risk of not having skilled workers, so the training level is quite high, but in the general retrofit works on isolation, despite the important existent offer of trainings, not all enterprises are trained enough).

2.4. Greece

In Greece, the VET sits under the Ministry of National Education and Religious Affairs (YPEPTH), and the National Organization for the Certification of Qualifications and Vocational Guidance (EOPPEP), through the Greek National Vocational Education and Training System. The Vocational Training in the country is provided under two basic forms, i.e., the Formal (Initial) VET and the non-formal VET, which includes the Initial Vocational Training, the Continuous Vocational Training and Adult Learning.

The status of the Continuing Vocational Training in Greece in the field of RES and EE is at a very satisfactory and quite developed level. As per the information provided in the country's questionnaire (Annex 5.4. Greece), there is a large number of training courses that cover renewables and energy efficiency, and which are well attended by technicians, engineers as well as individuals who are generally interested in these specific issues. A plethora of training institutes are mentioned in the questionnaire, both public and private, such as trade and/or industry associations, professional chambers, and producers. In the case of the professional associations as training providers, the courses are more tailor-made to the needs of their members and cover part of the skills required in specific areas that are related to EE and RES.

The forty indicative courses, which address the subject of renewable energy is mentioned, while the prevailing topics cover PV installations and geothermal heat pumps, with wind energy, biomass and cogeneration systems being characterized by a much lower frequency of appearance. The largest percent-

age of the seminars are/have been offered by private training providers, while there are also some examples of the more recently implemented method of e-learning courses. In the majority of cases, the duration of the seminars was an average of two days, except for three of them. It should also be noted that the trainees are usually engineers and/or scientists and professionals actively involved in the RES sector, rather than installers or technicians.

Equally high and encouraging is the number of courses offered for professionals in the field of energy efficiency in Greece. More than thirty courses are offered by both private and public training providers, which are most frequently treating the issues of energy efficiency and conservation in buildings, comprising the subtopics of legislative procedures, standards, energy audits, optimization of energy performance, as well as maintenance of electrical and heating installations issues. The duration of these courses is short to medium and traditional learning in classrooms is the most frequently applied method.

Overall, it seems that the quality of the training in Greece is either of adequate or high-level. It is clear that both RES and EE technologies, as well as their integration in buildings, are at the highest level together with the energy audits topic. As a more general comment, it can be noted that the level of the courses offered in Greece in the field of RES and EE is at a more than satisfactory level.

2.5. Italy

In Italy, there seems to be a highly developed RES and EE Vocational Training Scheme, accompanied by a large number of available courses that address the topics of renewables and energy efficiency.

Many different actors are involved in the vocational education and training planning, e.g. ministries, regions and autonomous provinces. Social partners in the corresponding regions, such as trade unions, representatives of enterprises and professionals, also play a crucial role in the financing of the training strategy and planning at a company level. According to the Italian CVET system, training may be offered by either sectoral training funds or by the Regions and the Autonomous Provinces.

An extended number of courses on RES and EE is available in Italy, each with different duration, costs, groups of beneficiaries and released certificates. Indeed, training on “green jobs” is often considered as a market opportunity for companies. In addition, and under the framework of structural funds or EU-funded project, there are many courses available for free although are project-based.

A considerable number of renewable energy related courses are provided, most of which focus on thermal solar or PV systems, wind energy and cogeneration but less on biomass and geothermal energy. Hundreds of courses in energy management are offered each year, as well as in energy audit, energy performance of buildings, technical solutions for the improvement of the building performance (e.g. insulation techniques). Some courses that are provided by the National Craftsmen Association (CNA), are devoted to installers and designers and have been mentioned as a mere example of the variety of the provide courses as they have a short duration.

Conversely, courses that require regional qualifications foresee a longer duration. For example, the ENEA “School of Energies” for RES installation and maintenance in the Lazio Region requires 500 hours of attendance.

2.6. Jordan

Although Jordan does not have any formal vocational and educational training schemes, the Vocational Education Corporation has 42 training centers across the country. These centers only provide training programmes that are related to RES and/or EE and are only given to the students that have failed in obtaining a High School Certificate. Furthermore, a private college offers an educational programme in renewables. These options have not been considered as structures in RES/EE training schemes yet, although there is a perspective for such development in the future.

Finally, according to the evaluation of the existing trainings in Jordan, and in spite of the small number of courses offered, their quality has been characterized as ‘high’ to ‘very high’, with a clear emphasis on RES technologies and applications.

2.7. Lebanon

In Lebanon, the Technical and Vocational Education and Training (TVET) is administered by the Directorate General of Vocational and Technical Education (DGTVE) of the Ministry of Education and Higher Education (MEHE), but the provision of the vocational education and training is performed by several different providers, albeit the low level of coordination between them, such as the Ministry of Agriculture (MOA), the National Centre for Vocational Training (NCVT), and the National Employment Office (NEO). Local and international NGOs, as well as the private sector are also involved. As far as the Continuing Vocational Training (CVT) is concerned, in the country there are many private Higher Education institutions – particularly those that follow a North American approach – which have already engaged in CVET initiatives for their settings or their curricula. More specifically, some institutions have clearly underlined CVT in their mission statement. In 1993, a Centre for Continuing Education (CCE) was established as a division of Haigazian University.

The majority of the training institutes in Lebanon that provide either EE or RES professional training are private: out of the four mentioned, only one public body is referred to as a training provider of technical/vocational education and/or training.

The number of courses or seminars listed for Lebanon, during the last decade, is rather limited. Only five of the courses address issues of RES technologies which mainly include theoretical content on solar technologies (solar thermal systems and PVs) and only four focus on energy policy and planning or energy management issues. It is worth noting, however, that all courses that are provided were targeting mechanical and/or electrical engineers, which is an encouraging aspect since it concerns those with an higher educational background. In addition, the courses lasting more looked at “Solar Thermal/ Cooling Systems”, whilst the other courses were of shorter duration. Only one out of the nine courses offered was provided by a public institution, whilst the remaining were provided by the private bodies, with ALMEE and IRI being the dominating institutions.

Finally, and as far as the level of training is concerned in Lebanon for the ten topics provided, experts assessed 6 courses as ‘poor’ and the remaining four as ‘adequate’. The vocational training structure seems to lack a more advanced

level, mainly with respect to energy policy/legislation, energy planning and energy audits, including RES/EE systems installation and integration in buildings. Conversely, RES and EE technologies as well as the corresponding market status are in a slightly better situation, the latter being characterized as having an adequate level. Thus, it is clear that the more theoretical areas of RES and EE are somehow more effectively addressed, while the more practical issues (installation, integration in buildings) still need a more intensive approach.

2.8. Libya

In Libya, the VET field is an important subsector of the public educational system, having been one of the main pillars of the governmental strategy, especially in recent years. More specifically, CVET and the provision of relevant courses are subject to the responsibility of the Ministry of Labour. In view of the considerable changes that the country has undergone in the timeframe of the three recent decades following the Libyan Revolution, noticeable progress has been made in the structure of the TVET systems. This has led to a considerable increase in the number of Libyan technical institutes, which aim at meeting the continuously growing needs of both engineers and technicians. This quantitative evolution has not been accompanied by an effective strategic approach.

Nevertheless, there is no specific information concerning the indicative training courses offered in Libya and this is due to the political situation, which prevents access to similar information. Consequently, the mere information about the status of CVET is limited to the qualitative self-evaluation, as described in Annex 5.8: the highest level seems to be experienced by the RES technologies, while the EE technologies, RES systems installation and the market size for both RES and EE are evaluated as ‘adequate’ as far as quality is concerned. The more theoretical energy issues (policy/legislation, planning) as well as the more practical audits, the EE systems installation and the integration of technologies in buildings topics remain at the lowest level (i.e. ‘poor’). It is obvious, then, that the RES technologies are addressed with the more efficient approach, according to the experts evaluation, whilst the theoretical procedural aspects of energy, together with systems installation and their integration in buildings definitely need to be enhanced in order to be able to meet the needs of the growing national market and industry as well as of the engineers and technicians employed.

2.9. Morocco

In Morocco, the TVET system is regulated by the Ministry of National Education and Vocational Training (MNEVT) and the Ministry of Labour and Social Affairs (MEAS), while the Vocational Training Department (DFP), in consultation with other stakeholders, is responsible for defining and assessing the direction of the national TVET policy. The Vocational Training Establishments include Vocational Qualification Centers, Applied Technology Institutions and the Higher Applied Technology Institutions. The non-formal TVET in the country is offered in the form of residential and alternative learning programmes. The alternative training methods (e.g. apprenticeship training schemes, evening classes, distance learning) have been mainly introduced by the public sector and, despite being still in an experimental phase, they have an expanding potential. Conversely, the residential training is provided by public/private entities and takes place in educational institutions that provide short-term business courses. In addition, the government of Morocco is currently implementing a very dynamic policy in the field of vocational training to enable economic operators, with the appropriate profiles and skills, to benefit from resources adapted to their needs.

A noticeable number of eighteen CVET courses are presented in the country's questionnaire. More analytically, during the period 2012 to 2018, eleven courses addressing RES issues, and seven courses addressing EE issues are mentioned. All of them are characterized by a duration of one to three days, with only a few having lasted four to five days. Regarding the renewables sector, a particular focus has been given to solar energy, either in the form of concentrated solar systems, solar pumps or PV systems. Some of these courses have been performed in the framework of European projects or with the support of service providers in the field of international cooperation for sustainable development and international education (e.g. GIZ), whilst others have been carried out by local authorities and/or local educational institutions. A lower, but yet considerable number of courses that deal with the issues of energy efficiency - mainly in buildings - have also been offered, where topics of heating systems or the integration of EE in buildings have been covered.

The overall evaluation of the performed courses/seminars seems far from satisfactory since two core subjects - being RES technologies and systems installations – have been characterized as a 'very high' quality, in spite of the fact that – at least based on the mentioned seminars – solar energy is the

only RES addressed. The theoretical energy subjects (policy, legislation and planning) and the RES market knowledge follow, with an equally satisfactory 'high' level of quality. In terms of the other topics provided, such as the EE technologies and systems installation, the energy audits, the EE market and the topic on the integration issue of both EE and RES in buildings, these were evaluated at an 'adequate' level.

2.10. Palestine

The main stakeholders for adult education in Palestine are the Ministry of Education and Higher Education (MoEHE), the General Directorate of General Education, through the Division of Non- formal Education (and other Educational Directorates), as well as the Ministry of Labour (MoL), the Ministry of Social Affairs, the Ministry of Women Affairs, universities, local and international NGOs and women's organizations. Initiatives have also been conducted by the United Nations Development Programme (UNDP), the West Bank, as well as European and national universities and research centers.

More specifically concerning TVET, a National TVET Strategy has been developed and a Higher Council for Technical and Vocational Education and Training has been established, chaired in rotation by MoEHE and the MoL. This demonstrates how important it is for the State to create a knowledgeable and competent workforce in Palestine. The Executive Board, which also proposes regulations, procedures and standards, is in charge of the implementation of the National TVET Strategy. However, there is no specific law governing the TVET system. The main bodies that provide the TVET training are public institutions, international associations (through the United Nations), NGOs and private companies. Despite the lack of a legal framework, there are 10 public and private training institutes/bodies focusing on RES and EE, mainly in research and development, assessments and studies, policy making and capacity building. Only a few courses on EE and RES have been registered in the survey, while the level of existing training has mainly been described as 'poor' or 'adequate'. However, the market size for RES has been ranked as 'high', whilst for EE as 'adequate'.

2.11. Portugal

Portugal has a well-established National Qualifications System (NQS) which was set up in 2007, with the aim of integrating the educational system with the labour market. The National Qualifications Catalogue (NQC) is the instrument of the NQS, which helps to set up the relevant offer of initial and continuing training, and is adjusted to the needs of companies and the labour market. The NQC provides an occupational profile, a classification for the training according to the National Qualifications Framework (NQF) [see section 7.11] and a standard for the recognition, as well as a validation and certification of (educational and professional) competences for each qualification. After the successful completion of a NQC qualification pathway, a qualification certificate and a diploma are issued.

The National Agency for Qualification and Vocational Education (ANQEP) is a government body, which is jointly supervised by the Ministry of the Economy and the Ministry of Education and Science, both of which are responsible for coordinating the network structure and for following up, monitoring, evaluating and regulating the system, in close cooperation with the other member institutions of the NQS. It sets up the Sectorial-Councils for Qualification with the aim of updating the NQC. These councils are technical-consultative groups in charge of permanently identifying the updating needs of the qualifications included in the NQC, with the aim of keeping the training updated with technological progress and sector-required competences in both initial and lifelong learning.

The Directorate General for Employment and Labor Relations (DGERT) provides certifications for the private and public educational entities and runs the Certification System for Training Entities which, together with other mechanisms, is one of the instruments for assuring the quality of the NQS.

Concerning the quantity and variety of courses related to RES and EE, the survey demonstrates that the courses provided cover most of the range of subjects, including legislation, management, audits, technologies, etc. Based on the evaluation of the existing trainings, it can be stated that in most domains the quality of the trainings is ‘high’, except for the Integration of EE and RES in buildings (evaluated as ‘adequate’) and the Market size of EE and RES, where there is no experience registered.

2.12. Spain

In Spain, the State Foundation for Training at Employment (FUNDAE) is the body which is responsible for managing the funds for vocational training for employment, which is managed by the Ministry of Work, Migrations and Social Welfare. It is focused on helping entrepreneurs and workers to improve the skills that will prepare them for changes in the labour market as well as in the productive sectors. It also promotes access to free quality training for all workers.

The National Qualification Framework through the National Catalogue of Professional Qualifications (CNCPF) of the Ministry of Education, Culture and Sport sets the basis for the elaboration of education and training paths. It provides Vocational training, which leads to vocational Certificates (not diplomas) and which are mainly focused on the practical part of the trade. However, there is also training which is not referred to as the CNCPF and does not usually include official accreditation as such. In fact, the institution participating in the permanent training system is used to issuing its own certificate that accredits the participation of the person in the training course. Paradoxically, accredited training is usually most demanding by companies and individuals.

The Spanish National Catalogue of Professional Qualifications (CNCP) is an instrument of the Spanish National System for Qualifications and VET, which arranges the professional qualifications according to the necessary competences for an occupational performance. Some of the main objectives of the CNCP are to integrate the existing programs on VET in order to adapt them to the characteristics and demands of the Spanish productive system and to be a reference point to assess the professional competences.

There are two responsible authorities for CVET: 1) the State Training Plan, funded by the Public Service of Employment and managed by the State Foundation for Training and Employment and 2) the Regional Training Plans, funded and managed by each Spanish region. The CVET certification can be given either through Vocational Certificates or Working Experience, after examination. There are many public training institutes and only one private center for vocational training and professional certificates.

There has been a variety of training courses for EE and RES, mainly focusing on technical issues, but it seems that there is a lack of training in audits, integration in buildings and legislation/ policy. However, the level of the trainings in the evaluation table on the issues of policy/ legislation and planning is characterized as 'high', although there are no respective courses.

2.13. Tunisia

Until recently, technical education in Tunisia has been a branch of the curriculum in the secondary cycle of basic education, which takes up just a few hours per week. Starting in 2002, Vocational Training and Basic and High school education became part of the Ministry of Education and Vocational Training (Decree No. 2002-2057 of 10 September 2002). Thanks to the foundation of the new Ministry (Decree No. 2002-2950 of 11 November 2002), a link between vocational training and basic education, as well as higher education has been established. After 2011, the European Commission launched the Governance for Employability in the Mediterranean (GEMM) project, which is also concerning the vocational training in Tunisia. Now the Ministry of Vocational Training and Employment (MFPE), along with four other public agencies – the Tunisian Agency for Vocational Training (ATFP), the National Center for Training of Trainers and Training Engineering (CENAFFIF), the National Center for Continuing Education and Professional Promotion (CNFCPP) and the National Agency for Employment and Self-Employment (ANETI) – are responsible for the vocational training system in the country. Furthermore, some other ministries and the private sector have specialized training institutions.

In terms of the coordination of activities for all these agencies and the involvement of the social partners, a permanent commission has been created: the Senior Human Resources Development Council, which has an advisory role and brings together ministries in charge of education and training and the social partners at least once a year.

The major issues of the VT system are:

- the absence of a common global vision that clearly defines the objectives of the VT and its place within the system

- low reactivity of the system to changes in the needs of companies, individuals and society
- shortcomings in the steering of the national VT system

Concerning the RES and EE training more specifically, there is a variety of relevant courses in the country, delivered both by private and public training institutes. Most of the registered courses, found in the survey conducted for this project, are organized by ANME within the framework of the international cooperation projects, and in collaboration with the key players in the sector (professional, academic, private sectors etc.). In the RES sector, most of the courses are concerning PV systems. There is also a good number of training concerning the building sector and EE. There are also training courses which focus on energy efficiency technologies, as well as EE in the industry, energy audits, financing and management tools. The level of the training courses in most of EE and RES subjects is valorized as ‘high’ or ‘very high’, except the RES and EE technologies which is valorized as ‘adequate’.

3. Conclusions and Recommendations

This market survey is meant to be a significant source of information for energy policy makers and to assist in the future planning of energy policy and capacity building activities at a national, regional and local level.

3.1. State of Development of the RES and EE Training Schemes

The analysis of the individual country surveys on EE and RES Professional and Vocational Training and the self-evaluation elaborated by the national experts seems to indicate that the countries that were analyzed can be categorized into three separate categories: 1) those countries that have a highly developed and institutionalized scheme, 2) those with a fairly developed scheme and 3) those with a less developed scheme.

From the analysis of the national market surveys elaborated by the meetMED experts, it is evident that the Northern Mediterranean countries (France, Greece, Italy, Portugal and Spain) all have highly developed and institutionalized professional training schemes as do Algeria, Egypt, Morocco and Tunisia from the Southern Mediterranean.

Lebanon is the only Southern Mediterranean country with a professional training scheme that can be considered averagely developed.

On the other hand, Jordan, Libya and Palestine all seem to have professional training schemes poorly developed.

3.2. Number of Available RE and EE Related Courses

The state of development of the EE and RES Professional and Vocational Training scheme is also reflected in the number of available RE and EE related courses that are available to the general public. More specifically, the majority of the countries with highly developed professional training schemes also have a large number of courses that are available to the public (France, Greece, Italy, Portugal, Egypt, Morocco and Tunisia).

The only exception is Spain, which has a more limited number of courses for energy efficiency related subjects, despite having a large number of available courses for renewable energy sources related topics.

Lebanon, which has neither a highly developed nor a lowly developed state of development of training schemes seems to follow the rule as they have an average amount of training courses.

Similarly, those countries with a professional training scheme with a low level of development (Jordan, Libya and Palestine) have few courses available to the public. The only exception being Palestine, which has a higher – but still limited – number of courses for Renewable Energy related subjects, although there are few available courses for Energy Efficiency related topics.

3.3. Status of Training Institutions

Concerning the ownership status of the training institutions (i.e. public or private) in the member countries that were examined, it is evident that the majority of the countries (Jordan, Palestine, Morocco, Tunisia, Greece, France and Italy) seem to prefer having an equal share of public and private institutions.

On the other hand, in Egypt and Spain the majority of the training institutions are public, whilst in Lebanon and Portugal, the majority of the training institutions are private.

Algeria seems to be the only country which has only public training institutions. No country has opted to have only private training institutions.

3.4. Evaluation of the Quality of the Training Schemes

Regarding the self-evaluation of the quality of the training schemes, it seems that most of the countries have either an adequate or good-level. The training areas deemed to be of a poor quality are displayed in the Table 1 below.

Table 1: Training topics deemed to be of poor quality according to self-evaluation.

Topics	Countries
Energy Policy	Algeria, Jordan, Libya
Energy Planning	Algeria, Jordan, Libya, Palestine
RES Technologies	Algeria
EE Technologies	Algeria, Palestine
RES Installation	Jordan
EE Installation	Algeria, Jordan, Libya
RE Market Size	Algeria, Spain
EE Market Size	Algeria, Spain
Integration of RE and EE in buildings	Algeria, Jordan, Libya, Palestine, Spain
Energy Audits	Jordan, Libya, Spain

Evidently, the South Eastern Mediterranean Countries (SEMCs) that have 'poor' quality training schemes for selected topics are: Algeria, Jordan, Libya and Palestine. Interestingly, although this is understandable for those countries with less developed training schemes (i.e. Jordan, Libya and Palestine), this is not the case for Algeria which has a highly developed training scheme.

However, among some of the EU countries (e.g. Spain), and for the selected topics provided, the training courses were found to be of not sufficient quality.

3.5. Gaps

Among the countries under examination, the gaps in the training schemes can be identified more clearly in Jordan, Libya, Lebanon and Palestine.

The Jordanian case is a bit unique, since training courses are available in the country, but there is not a formal vocational and educational scheme in the country. However, these few courses on RES and EE are characterized as of "high" or "very high" quality.

Palestine also has a bit of a unique status, since there are official national structures for VET, but there is no specific law governing the system: thus, there is a gap in the legal framework. Furthermore, VET is provided additionally by International Associations and NGOs to national and private institutes, a fact which has not been detected in any other country in the assessment. Unlike Jordan, in this case the few registered courses concerning RES and EE are not evaluated of high quality. However, the country has an increasing market size for RES.

In the other countries, there are some similarities. In Lebanon, there are official structures for VET administrated by national bodies , but there is a gap in the number of courses or seminars on RES and EE in the country. The research underlines an important gap in the training on RES-related practical issues (installation and integration in buildings), given the energy capacity of the region and the potential energy production from RES. Similarly, Libya has a well-structured VET system, with a serious gap in training courses and seminars on RES and EE. Again, the major gaps are noticed in the knowledge/ training that is offered on the practical implementation of RES technologies, systems installations and integration in buildings. This is a serious gap, which has resulted in a contradiction expressed in the status of the current demands of the growing national market and industry as well as in the existing skills, competences and knowledge of the available engineers and technicians.

In Algeria, a gap in the quality of the existing RES and EE training courses is registered, despite the quantity of the courses and the well-structured VET national system and regulation. In Portugal, a gap in the courses related to the market size of EE and RES is noticed, since there is no experience registered. In Morocco, the existing training courses focus specifically on solar energy,

leaving a gap in the training in the other RES. Spain has a gap in the training on Energy Audits and in the integration in buildings.

3.6. Lessons Learnt and Best Practices

In relation to the quality and quantity of the RES and EE training offered in the Mediterranean countries, an overarching lesson learnt that has been obtained through the research conducted, is that the local/national market needs are usually related with the training courses provided. Covering the local market needs, with a focus on practical implementations of RES and EE, could be a starting point for gradually expanding in the context of the training and direction provided, potentially into related fields as well. An example could be the off-shore wind energy, or geothermal, or biomass, or concerning other phases of a RES project (energy market, energy audits etc.), although these domains may not be familiar or necessary yet to the countries markets. However, this type of planning would ensure a well-trained labor force in all the RES and EE related specializations/ sectors with an integrated and spherical perspective, up to the level of the needs of the international market.

An existing VET legal framework and system provides assistance for the further development of trainings and the spread of the required knowledge, competences and skills, especially if the necessary infrastructure networks are available. However, high quality training courses can be also provided without the above-mentioned frameworks (see the case of Jordan for example). The opposite case can be noticed in Algeria, which seems to have a very strong and well-established national training system. Whilst several types of training are provided, there is not a sufficient amount of courses on RES and EE. This means that Algeria is a country with great potential for further development of high quality RES and EE courses, since there is an existing legal framework as well as an extensive network of institutions and training facilities throughout the whole country. Nonetheless, there is a lack of high quality RES and EE courses.

The VET system in Tunisia seems to have dealt with some practical issues in the last years, since some structural changes have been taking place which do not seem to affect the high quality and variety of the RES and EE training in the country. Still, most of the RES courses are concerning the most popular sector for the Mediterranean countries: the solar (PV, more specifically) systems.

Countries like France, Italy, Portugal, Spain, Morocco seem to have different but well-structured VET systems integrated in the education system and the markets, providing a variety of courses and seminars in all the RES and EE fields. However, there are some sectors, like offshore wind energy or geothermal energy, which have yet to be significantly implemented in the national markets, hence, the training is not so extended as in PV, wind or solar systems. Each country, respectively in different sectors (see also respective sub-chapter above), seems to have a gap in the trainings provided: this might demonstrate that the market needs define the context of the given training, since there is an increased need for respectively qualified technicians and engineers.

In Greece, the VET is included in the national educative system which, in addition to the active role of the public sector, is also giving space to the private sector for the development of training courses which aim to enrich the skills, competences and knowledges of the labour market force in the country. Since RES and EE have a significant potential and share in the energy market, the need of trained engineers and technicians has increased in the past years and this gap has been successfully covered by the respective offering of high quality training courses from associations as well as from the private and public sector.

With respect to the implementation of VET and training courses, the example of Egypt can be categorized as a 'best practice' due to the existing and well-functioning structures that have been in place since the mid- 80s, which also offer open and distance learning courses and are coordinated by Egyptian universities. This example, among other initiatives like the 'Egypt Makers' initiative, concluded with a great variety of RES and EE high quality courses, which are mainly provided by universities, research centers and associations.

3.7. Qualification and Certification

The concept of the Vocational Training Qualifications consists of a key parameter for all individuals who are active in their professional life, since the qualifications are the tool and the merit-based means for them to proceed with finding a higher quality employment in the labour market, as well as way for them to progress in their vocational education and training.

In the recent years, an increasing shift towards learning outcomes in differ-

ent and multiple knowledge fields has been noticed and, in combination with the continuous evolution of the national qualification systems established in almost all European countries, this has led to a status where qualifications may be acquired via multiple learning paths. However, it is also important that the holders of any qualification obtained through vocational training should inspire confidence, so as to be able to attract even more potential employers. This situation also enhances the continuous and growing need for a procedure through which the potential employee has the possibility to confirm and prove all the necessary skills, knowledge and competences that he/she holds for a certain job position in the labour market.

Thus, the certification of the qualification obtained through vocational training consists of a particularly critical process in this context, since it can be characterized as a "passport for employability", documenting who the person is, as well as what he or she knows and is able to do.

More analytically, a typical qualification procedure often consists of the following elements:

- assessment, meaning the process of identifying the extent to which a learner has attained particular knowledge, skills and competences;
- verification and grading, meaning the process following assessment and confirming that certain assessed learning outcomes that are achieved by the trainee correspond to specific learning outcomes that may be required for a qualification or at least part of it;
- awarding (of a qualification), i.e. the issuing of a certificate officially attesting that an individual has achieved identified learning outcomes.

It should be underlined that in order to increase and reinforce the credibility of the certification, it is essential for the potential learners/trainees, on the one hand, to be assessed against a set of clear reference points expressed in terms of learning outcomes and, on the other hand, that the certifications are comparable across the VET system within a particular institution or at country level. In this way, the certification of Vocational Training Qualifications could demonstrate a linking/bridging role between VET and the labor market.

According to some research led by CEDEFOP[1], the Vocational Education and Training (VET) Ministers for the European Union (EU) Member States acknowledged, in June 2015, the importance of encouraging transparency, comparability and recognition of VET qualifications to facilitate the mobility of students and workers in Europe. The certification process becomes particularly important in this context and quality assurance mechanisms are essential to ensure that these processes effectively generate credibility and trust: 'it is essential that the players in certification systems are subject to quality assurance standards. This ensures consistency across the systems and helps to maintain the legitimacy and value of the system for the individuals participating in it and for the wider society' (OECD, 2005 cited in Cedefop, 2009a, p. 16).

3.8. Recommendations

From the research conducted, several recommendations have been elaborated for improving the capacity development of the VET focusing on RES and EE in the assessed countries.

Firstly, it seems that the existence of a legal framework, defined schemes and training infrastructures are helpful for the development of the training courses. However, in some cases and subjects, new trends in teaching methods and tools, such as e-learning, can also help with the implementation of country-wide training courses, despite the existing building infrastructures. The example of Egypt, which has used distance learning and open courses in order to provide training to all residents, can be replicated. Furthermore, the fact that these courses have been provided by state universities, hence by institutions with proven knowledge and teaching experience, has ensured the high quality of the training courses.

The combination of private and public sector in the provision of courses seems also to enhance the capacity building of the VET. Associations or federations of workers with expertise in related fields (i.e. Federation of Building workers, of Electricians etc.) have also proved to empower the labour force in the market through the seminars that they can offer.

(1) Research Paper 51 - Ensuring the quality of certification in vocational education and training, 2015

Other relevant elements for the improvement of the capacity building in the VET RES and EE programmes are the qualifications of the trainers: it has been proven that those trainers experienced in the respective topic and who are specialized in adult training provide more effective courses. This is usually due to the fact that they use teaching methods and materials that lead to a better understanding of the adult trainee and hence, to better outcomes of the project.

Concerning the context of the training courses and how this can result to a better capacity building, this research concludes that in the first place the market's needs define the content of the provided courses: in the Southern countries, the sun is one of the most powerful energy sources, hence most of the existing training courses are related to PV, solar systems and other issues related to solar energy. Since highly qualified technicians and engineers are essential to the high quality results of a RES project, this trend should remain in the roadmap for the future design of training courses and should be an area that is be further developed. However, it is also essential to start planning a future integration of all the RES and EE topics in the curriculums.

Furthermore, it seems that, in some cases, there is a lack of practical training, whilst there is a tendency to cover more theoretical or policy topics. In some countries, a lack of training on building installation or energy audits or on EE issues has been noticed. All kind of aspects of the training on EE and RES should be gradually included in the planning of the capacity building for the studied area. This study has underlined the gaps of each country in the contexts of the existing or past courses; hence, it can help define new courses that should be eventually developed as well as ensure the implementation of integrated professional training programmes, which will result in the improvement of capacity building.

Finally, training for all the related stakeholders should be provided: topics of interest for policy makers, decision makers, project planners, managers, engineers, technicians, economists, maintainers etc. should be eventually included in the planning of the VET schemes for RES and EE experts. This would lead to the formation of a powerful labour force and a network of relevant actors that are able to manage effectively with RES and EE market intrusion.

4. References

4.1. General

- CEDEFOP. (2014). *Vocational Education & Training in Greece – Short description*. Luxembourg: Publications Office of the European Union. Retrieved from https://www.cedefop.europa.eu/files/4130_en.pdf
- European Centre for the Development of Vocational Training, www.cedefop.europa.eu (Date accessed 03 February 2020)
- Grubb, W. N. and Ryan, P. (1999). *The Roles of Evaluation for Vocational Education and Training, Plain Talk on the Field of Dreams.* Geneva, Switzerland: International Labour Office.
- *Ίδρυμα Νεολαίας και Διά Βίου Μάθησης*, https://www.inedivim.gr/ (Date accessed 03 February 2020)
- National Centre for Public Administration & Local Government, www.ekdd.gr (Date accessed 03 February 2020)
- National Organisation for the Certification of Qualifications & Vocational Guidance, https://www.eoppep.gr/index.php/en/home-en (Date accessed 03 February 2020)
- UNESCO-UIS (2012). ISCED 2011 glossary. Retrieved from http://uis.unesco.org/

4.2. Algeria

- *Agence Nationale pour la Promotion et la Rationalisation de l'Utilisation de l'Énergie* (APRUE), available here: http://aprue.org.dz/presentation.html
- *Chambre Algerienne du Commerce et de l'Industrie*, available here: https://www.commerce.gov.dz/chambre-algerienne-de-commerce-et-d-industrie-caci
- *Institut de Formation en Electricite et Gaz (IFEG)*, available here: http://www.ifeg.dz/
- *Ministère de la Formation et de l'Enseignement Professionnels,* available here: http://www.mfep.gov.dz/fr/acceuil/
- *Unité de Developpement des Équipements Solaires*, available here: http://udes.cder.dz/

4.3. Egypt

- Cairo University website, available at http://ou.cu.edu.eg/ (Date accessed 10 February 2020)
- German – Arab Chamber of Industry and Commerce. (2018). *The future of Technical and Vocational Education and Training in Egypt,* Vol. 69 No. 1, available at: https://aegypten.ahk.de/fileadmin/AHK_Aegypten/Publication/GAT_Magazine/2018/Gat_January_February_2018.pdf
- SEKEM, *Education is More than Learning*, available at https://www.sekem.com/en/cultural-life/education-schools/ (Date accessed 10 February 2020)

- UNESCO-UNEVOC. (2012). World TVET Database, available at https://unevoc.unesco.org/go.php (Date accessed 20 February 2020)

4.4. France

- EAEA (2011), Country Report on Adult Education in France: Helsinki, https://eaea.org/wp-content/uploads/2018/01/france_country-report-on-adult-education-in-france.pdf (Date accessed 15 November 2019)
- FEEBat, *Les Modules de Formation*, http://www.feebat.org/modules (Date accessed 15 November 2019)
- French Ministry of Education (2010), National Education and Vocational Education in France, http://cache.media.eduscol.education.fr/file/dossiers/61/8/formation_professionnelle_VA_151618.pdf (Date accessed 15 November 2019)
- French Ministry of Labour, home page, https://travail-emploi.gouv.fr/formation-professionnelle/ (Date accessed 15 November 2019)
- *Formation Environnement*, home page, www.e-formation-environnement.com (Date accessed 15 November 2019)

4.5. Greece

- BUILD UP Skills. (2013). *Greece Analysis of the National Status Quo.* Available at: http://www.buildup.eu/sites/default/files/bus_projects/d2.3_build_up_skills-greece_status_quo_report_en_0_0.pdf
- CEDEFOP. (2014). *Vocational Education & Training in Greece – Short Description.* Luxembourg: Publications Office of the European Union. Retrieved from https://www.cedefop.europa.eu/files/4130_en.pdf
- *CEDEFOP. (2015). Research Paper 51 - Ensuring the quality of certification in vocational education and training*
- CEDEFOP. (2017). *GREECE-European inventory on NQF 2016.* Available at: http://refernet.gr/wp-content/uploads/2018/07/GREECE-European-inventory-on-nqf-2016.pdf.
- European Centre for the Development of Vocational Training, www.cedefop.europa.eu (Date accessed 03 February 2020)
- General Secretariat for Lifelong Learning. (2012). *Lifelong Learning in Greece 2012-Executive Summary National Report.* Available at: http://www.gsae.edu.gr/images/ekthesi/2-FYLLO__2013%201.pdf
- Greek General Secretariat for Lifelong Learning, http://www.gsae.edu.gr (Date accessed 03 February 2020)
- Grubb, W. N. and Ryan, P. (1999). *The Roles of Evaluation for Vocational Education and Training, Plain Talk on the Field of Dreams.* Geneva, Switzerland: International Labour Office.
- Ίδρυμα Νεολαίας και Διά Βίου Μάθησης, https://www.inedivim.gr/ (Date accessed 03 February 2020)

- LAW NO: 3879 *Development of Lifelong Learning and other provisions.* OFFICIAL GOVERNMENT GAZETTE OF THE HELLENIC REPUBLIC, Issue No: 163, 21/09/2010. Available at: http://www.gsae.edu.gr/images/nomothesia/nomoi/Law-3879-LifeLongLearning.pdf
- National Centre for Public Administration & Local Government, www.ekdd.gr (Date accessed 03 February 2020)
- National Organisation for the Certification of Qualifications & Vocational Guidance, https://www.eoppep.gr/index.php/en/home-en (Date accessed 03 February 2020)
- The Hellenic Qualification Framework, https://nqf.gov.gr/ (Date accessed 03 February 2020)
- UNESCO-UIS (2012). ISCED 2011 glossary. Retrieved from http://uis.unesco.org/
- https://www.minedu.gov.gr/

4.6. Italy

- Build Up Skills – BRICKS project - Building Refurbishment with Increased Competences, Knowledge and Skill (BUILD UP Skills PILLAR II) http://www.bricks.enea.it/. (Date accessed March 2019)
- Build Up Skills –Italy (2012), Analysis of the national status quo, 2012, BUILD UP- The European Portal of Energy Efficiency https://www.buildup.eu/en/skills/bus-projects/IT (Date accessed March 2019)
- Cedefop (2017). Apprenticeship review: Italy. *Building education and training opportunities through apprenticeships.* Luxembourg: Publications Office Thematic country reviews. (https://www.cedefop.europa.eu/files/4159_en.pdf) (See pag4)
- Cedefop ReferNet VET in Europe reports (2016).
- EAEA (2011): Country report Italy. (Helsinki). www.eaea.org/country/italy. Date of Access March 2019
- EQAVET National Reference Point of Italy (2016) Report of Italy Autumn 2016 (https://www.eqavet.eu) (https://www.eqavet.eu/Eqavet2017/media/Documents/2-IT-final_template-for-updating-info-on-the-EQAVET-website.pdf)
- European Commission/EACEA/Eurydice,2018. *Structural Indicators for Monitoring Education and Training Systems in Europe – 2018. Eurydice Report.* Luxembourg: Publications Office of the European Union.
- Eurydice Monitoraggio (2017), INDIRE. Available at: http://www.indire.it/tag/eurydice/
- INAPP et al. (2016). *Vocational education and training in Europe – Italy.* Cedefop ReferNet VET in Europe reports; 2016. http://libserver.cedefop.europa.eu/vetelib/2016/2016_CR_IT.pdf (pag 2)

4.7. Jordan

- Vocational Training Corporation / Public Administration. Available at: https://unevoc.unesco.org/go.php?q=UNEVOC+Network+-+Centre&id=351

4.8. Lebanon

- ALMEE: http://www.almeelebanon.com/ (Date accessed 03 February 2020)
- EACEA. (2017). *Overview of the higher education system Lebanon – Erasmus - February 2017.* Available at: https://eacea.ec.europa.eu/sites/eacea-site/files/countryfiches_lebanon_2017.pdf
- ETF. 1999. *Overview of vocational training and education in Lebanon.* Available at: https://www.etf.europa.eu/sites/default/files/m/C12578310056925BC125700D004005FA_MED_VET_Lebanon_00_EN.pdf
- World TVET database Lebanon (November 2012)
- ETF. (2014). *Mapping vocational education and training governance in Lebanon European training foundation.* Available at: https://www.etf.europa.eu/sites/default/files/m/0C8A874BE7A19FC9C1257D93005B8750_Lebanon_mapping%20VET%20governance.pdf
- IRI, http://www.iri.org.lb/index.html (Date accessed 03 February 2020)
- LCEC: www.lcec.org.lb (Date accessed 03 February 2020)
- *Lebanon - Education system institution types & credentials.* Available at: www.higher-edu.gov.lb
- LIBNOR, www.libnor.gov.lb (Date accessed 03 February 2020)
- LSES: http://lses-lb.org/ (Date accessed 03 February 2020)
- Ministry of education & higher education. *National strategic framework for technical vocational education and training in Lebanon 2018-2022.* Available at: https://planipolis.iiep.unesco.org/sites/planipolis/files/ressources/lebanon_strategic_framework_tvet_2018-2022.pdf

4.9. Libya

- GEMM. (2014). *Mapping Vocational Education and Training Governance in Libya,* available at: https://www.etf.europa.eu/sites/default/files/m/424678AAE60C0A3BC1257D93005BCFFB_Libya_mapping%20VET%20governance.pdf
- RCREEE. (2015). *Capacity Development in the Arab Region: Market Investigation and Analysis Report*

4.10. Morocco

- RCREEE. (2016). Capacity development Program 2014-2016.
- RCREEE. (2013). Capacity Development Program Report - RCREEE Internal Data.
- RCREEE. (2015). Capacity Development in the Arab Region: Market Investigation and Analysis.
- RCREEE. (2018). Training Centres list - RCREEE Internal Data.

4.11. Palestine

- Committee of the Regions, *Division of Powers, Palestine - Vocational Training,* available at https://portal.cor.europa.eu/divisionpowers/Pages/Palestine-Vocational-training.aspx (Date accessed 20 February 2020)
- ETF. (2010). European Training Foundation: https://www.etf.europa.eu/en/regions-and-countries/countries/palestine

- UNESCO-UNEVOC. (2012). World TVET Database Palestine. Palestine: UNESCOUNEVOC International Centre for Technical and Vocational Education

4.12. Portugal

- Academia ADENE, http://academia.adene.pt (Date accessed 11 December 2018)
- ADENE, ANQEP, DGEG, LNEG, (2012) *Build up Skills – Portugal Analysis of the National Status Quo 2012*
- CEAC – Cursos, https://www.ceac.pt/cursos-categorias/ (Date accessed 11 December 2018)
- CICCOPN – *Formação de Adultos*, http://www.ciccopn.pt/2017/formacao_adultos.aspx (Date accessed 11 December 2018)
- ISQ - Formação, https://formacao.isq.pt/formacao/catalogo/listagem.asp?id_areaFormacao=176 (Date accessed 11 December 2018)
- SGS – Cursos. http://www.sgsacademy.pt/?s=energia&post_type=product (Date accessed 11 December 2018)
- Sifomate – *Formação Profissional* http://www.sifomate.pt/index.php?pag=formacaoprofissional (Date accessed 11 December 2018)

4.13. Spain

- Fundacion Estatal para la Formacion en el Empleo (FUNDAE), https://www.fundae.es/ (Date accessed 03 February 2020)
- Fundacion Laboral de la Construccion (FLC), https://www.fundacionlaboral.org/ (Date accessed 03 February 2020)
- Intelligent Energy Europe Project (IEE), "Build up Skills Spain", https://ec.europa.eu/energy/intelligent/projects/en/projects/build-skills-es (Date accessed 03 February 2020)
- Intelligent Energy Europe Project (IEE) "Construye 2020", https://ec.europa.eu/energy/intelligent/projects/en/projects/build-skills-construye2020 (Date accessed 03 February 2020)
- National Catalogue of Professional Qualifications from the Ministry of Education, Culture and Sports. https://incual.mecd.es/documents/35348/0/folleto_incual_2015_ingles.pdf/3763b486-bc7e-4c3c-8382-a3842e4a6e19 (Date accessed 03 February 2020)

4.14. Tunisia

- Ecopark Technopole Borj Cedria. www.ecopark.tn (Date accessed 03 February 2020)
- *Ministère de l'enseignement supérieur et de la recherche scientifique – Université de Tunis El Manar.* www.enit.rnu.tn. (Date accessed 03 February 2020)
- *Société tunisienne de l'électricité et du gas.* www.steg.com.tn (Date accessed 03 February 2020)
- *Institut national des sciences et techniques nucléaires.* http://www-instn.cea.fr/ (Date accessed 03 February 2020)
- ABS, AUDIT & BUSINESS SERVICES. https://www.ctmccv.ind.tn/index.php (Date accessed 03 February 2020)

- *Centre Technique des Industries Mécaniques et Electrique.* www.cetime.ind.tn (Date accessed 03 February 2020)
- *Organisme de certification Système en Tunisie,* available at : www.iqmaghreb.net/fileadmin/user_files/pdf/evaluation/Tunisie/Organisme_de_certifcation_Systeme_en_Tunisie.pdf
- *Ordre des architectes de Tunisie* www.oat.tn/ (Date accessed 04 February 2020)

5. Country Surveys

5.1. ALGERIA

1. Country Overview

1.1. Adult Education System

In Algeria, vocational education and training is one of the three segments of the national education system which is comprised of the Ministry of National Education, Ministry of Higher Education and Scientific Research and Ministry of Education and Professional Training.

The country's adult education system constitutes an important and strategic sector for the economic and social development of the country which has a twofold objective:

1. Ensuring that the training of a qualified workforce meets the requirements and needs of the labour market, particularly through in-house and apprenticeship training;

2. Providing both regular and advanced training, as well as reconversion and the retraining of workers through ongoing training.

The national training system has a huge potential, since it is made up of more than 1200 training structures that fall predominately under the Ministry of Vocational Education and Training. They also fall under other ministerial departments and some private structures, including a network of private vocational training institutions. This set of structures welcomes almost 600,000 trainees each year across all sectors. This does not include the management of workers, in the context of continuous learning, which is of particular importance.

The technical training programmes that have been set up by the Education and Vocational training sector in Algeria, include 23 branches of activities which have been divided into 478 specialties. They are organized according to various formulas (face-to-face, apprenticeship, evening and long distance courses). These numerous schemes are also adapted to specific socio-profes-

sional categories (young people without a required school level, rural women and housewives, handicapped people, citizens in prison, etc.).

This is how education for skilled workers and middle managers in all fields is ensured. If corporate executives complain about the deficit of workers in certain areas of expertise, this can be in part due to the lack of enthusiasm of young people as well as the general societal mindset, which underestimates certain areas of expertise and jobs compared to others.

There are several types of training that are provided by the vocational training centres and institutes for in-house training. These include:

- initial training (diploma)
- lifelong learning (diploma)
- evening courses (qualification)
- training for housewives (qualification)
- conventional training (diploma or qualification)

The initial training, under the first diploma, is undertaken by the trainee in order to learn a basic profession and to obtain the corresponding qualification.

The minimum age required to complete an initial in-house training is 16 years old. It is important to note here that the upper limit age is not defined; a candidate over 30 can register to take an initial in-house training course and obtain the corresponding diploma at the end of the traineeship.

For each profession, the level of education that is required and the duration of the initial training are both fixed by the list of corresponding sectors and the areas of expertise of vocational training. This list was revised and updated in 2018.

In order to have access to technical and highly technical professions, the candidates' studies are taken into account as is their age and their educational level.

At the end of the training course, the trainees who pass the course obtain a state diploma corresponding to their chosen profession. The diplomas that are prepared for the in-house training are:

- the certificate of specialized vocational training (CFPS, level 1)
- the certificate of professional competence (CAP, level 2)

- the certificate of professional management (CMP, level 3)
- the license as technician (BT, level 4)
- the license as advanced technician (BTS, level 5)

As part of the reform of Algeria's National System of Education and Training, vocational training came in during 2002, with the aim to diversify and enrich the Algerian educational system. It had to accommodate approximately 30 to 40% of the 4th year of students in middle school (*4ème année moyenne*) as well as students who were admitted to the post-compulsory cycle.

The orientation of the students towards this vocational education curricula is regulated by Article 13 of the Framework Act on Education and Vocational Training, and by Article 52 of the Framework Act on National Education.

The primary purpose of vocational training is to prepare students for employment. The secondary purpose is to provide access to higher level trainings which are an extension of the course that students have already attended.

Since its creation in 2002, vocational training has not been able to attract much interest from students and their parents. To tackle this issue, the Algerian energy sector, in 2017, set up a new qualification structure for this curriculum, which replaced an older structure, established in 2008, with the intention of improving the programme's attractiveness as well as its integration into the national educational system.

Since September 2017, this new structure, which is regulated by the provisions of Executive Decree No. 17/212 of 20 July 2017, provides for two (02) cycles of vocational training, which are sealed by the «BEP» vocational training certificate and the «BEPS» higher vocational training certificate. These two certificates are prepared in person within public vocational schools.

With regard to the lifelong vocational training within enterprises, this is covered by legislation. Indeed, the law n. 90-11 of April 21st, 1990 relating to labour relations, which has been recently modified and completed, stipulates that:

- Each employer is required to carry out learning activities and advanced trainings for employees, as well as organize learning activities which enable young people to acquire the theoretical and practical knowledge necessary for the required job;

- Every worker is required to take courses, learning cycles or training activities organized by the employer, in order to update, deepen or increase their general, professional and technological knowledge. Plus, the employee who enrols in learning activities and vocational training courses can adapt his working schedule accordingly or ask for a special leave, by keeping his/her job.

Regarding the funding, the applicable legislation imposes a financing obligation for the companies on training activities of at least 1% of their payroll.

1.2. Technical and Vocational Education and Training (TVET)

Algeria devotes a quarter of its national budget to education, which includes vocational training. Vocational training needs are important and the priority sectors are: construction, oil companies, water resources, information and communication technologies (ICT), computer science, electricity and electronics.

Since 2013, and in order to keep pace with the job market, as well as encourage and support the achievement of the objectives of the National Programme for the development of energy efficiency and renewable energies by 2030 - a programme which was adopted by the Algerian government in 2011 (updated in 2015) - the vocational training sector has been developing and validating study programmes for both the installation and maintenance technicians of Solar Photovoltaic and Thermal Systems as well as for renewable energy technicians (Level 4). Likewise, programmes have been developed for jobs in the building sector (thermal insulation, energy optimization in buildings, rehabilitation and renovation of housing).

In terms of infrastructures, the education and vocational training sector has an extensive network of institutions and training facilities throughout the country. According December 2013 figures, the vocational training sector has 1,207 establishments distributed as follows: 732 vocational training and apprenticeship centres (CFPA), plus 342 secondary institutions, and 92 specialized national vocational training institutes (INSFP) plus 20 secondary institutions and 7 vocational training institutes (IFP).

Vocational training is offered in new facilities. These are called Institutes for

Vocational Training (*Instituts d'Enseignement Professionnel - IEP*). Five different types of Institutes for Vocational Training have been created by grouping jobs of the same family:

- **IEP** type **IND,** industrial jobs
- **IEP** type **AGR,** agricultural jobs
- **IEP** type **HRT,** jobs in the hotel, catering and tourism sectors
- **IEP** type **BTP,** jobs related to buildings and public works
- **IEP** type **TER,** secretarial, accounting and sales jobs

In addition to the training system that concerns education and vocational training, there are a large number of institutions that are under the supervision of other ministries. Most of the training offered in this context is focused on advanced training and redeployment of employees.

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes	
Public	**Private**
• Training Institute for Electricity and Gas (IFEG) – Division of the Sonelgaz Group • National Agency for the Promotion and Rationalization of the Use of Energy (APRUE), under the authority of the Ministry of Energy • National Centre for Integrated Research and Studies on Buildings (CNERIB), under the authority of the Ministry of Housing • Centre for the Development of Renewable Energy (CDER) • Vocational training institutes (IEP). • Vocational training and apprenticeship centres (CFPA) • National Company for the marketing and distribution of oil products (NAFTAL) • Chambers of Commerce and Industry (CCI) offering training courses for solar panel installers	In general, the private sector organises trainings à la carte or upon request and often in the form of: • supportive measures • practical trainings which are provided by companies that install solar panels • dealing with solar pumping and related services.

2.2. Indicative CVET Courses/Seminars for RES

CVT Provider: IFEG

Title of the Training/Seminar:

INTEGRATION WITH SOLAR PHOTOVOLTAIC ENERGY

Target Group:

Project promoters

- Solar photovoltaic plants;

- Environment and sustainable development

Methodology (in class, on-site, e-learning):

In class

Plants for generating electrical energy

Content/Training Modules:

1. Sustainable development
2. Solar field
3. Principle of operation of the components of photovoltaic solar systems
4. Notions on the sizing of photovoltaic solar installations
5. Energy management

Duration:

5 days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

INSTALLER, MAINTAINER OF INDIVIDUAL SOLAR WATER HEATING SYSTEM

Target Group:

Subcontractors

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Update on individual solar water heating (cauffe-eau solaire individuel -CESI) market
2. Importance of individual solar water heating
3. Solar Techniques
4. Provisioning
5. Installation
6. Diagnosis of malfunctioning
7. Monitoring of individual solar water heating
8. Environmental site management
9. Safety rules for accessing the roof and installation of solar collectors
10. Activation and maintenance of the installations
11. Regulation

Duration:

5 days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

"SOLAR CALC" SOFTWARE APPLICATION FOR THE SIZE-UP OF HIGH-POWER PHOTO-VOLTAIC POWER PLANTS CONNECTED TO THE NETWORK

Target Group:

Subcontractors

Individuals

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

1. Solar PV conversion

2. PV power plant components

- The PV generation
- The central inverters.
- The subsidiary services
- Evacuation systems

3. PV systems configuration

4. Criteria to choose applied components and standards

5. Practical use of the solar CALC software

- Presentation of the software interface
- Determination of the characteristics and configurations of the PV generator according to the power of the plant.
- Determination of the characteristics of the suitable inverter
- Characteristics of the evacuation system

6. Applied exercises

Duration:

10 days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

SIZING OF PHOTOVOLTAIC PLANTS

Target Group:

Researchers on photovoltaic systems

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

- Solar field
- Photovoltaic conversion
- Components of a photovoltaic system
- Legal Standards
- Sizing techniques
- Tools for generating weather data
- Handling the sizing software
- Sizing of an autonomous system
- Sizing of a system connected to the network
- Sizing of a pumping system

Duration:

10 Days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

RENEWABLE ENERGIES

Target Group:

Senior staff and management

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Sustainable Development

- Objectives
- Kyoto Protocol
- Development of renewable energy
- Legislative and regulatory framework
- Main actors

2. Solar Radiation

- Radiation emitted by the sun
- Propagation of solar radiation in the atmosphere
- Solar radiation received on the ground
- Parameters influencing the intensity of a flux, which is incident on a flat surface
- Solar potential at the global and Algerian level

3. Solar Thermal Energy

- Solar Thermal Energy; principles and applications
- Solar concentration technologies

- Operation principle of concentrated solar power plants
- Hybridization of CSP plants
- State of the art of CSP plants in the world

4. Wind energy

- Wind farm
- Definition and classification of the different types of wind turbines
- The potential of energy conversion
- The functioning of different subsystems

5. Solar Photovoltaic Energy

- The photovoltaic effect
- Principle of operation of solar PV system components
- RE standards and laws
- Visit to solar PV farms

6. Sizing of PV Solar System

- Sizing procedures
- Identification of the parameters influencing the sizing
- Energy needs assessment
- Sizing system components
- Practical use and case studies

7. Security Measures

- General risks
- Risk assessment
- Analysis of the different risks
- Risk management
- Organization of the site.
- Safety instructions: ladders, scaffolding, and working at heights
- Maintenance and interventions on the equipment of the solar PV systems, EPI and EPC safety equipment
- Preventive measures
- The applicable laws in this sector

8. Cabling Solar Photovoltaic Kits

- Background information on the different electrical parameters
- Background information on the electrical scheme and tracking
- Photovoltaic connectors (specifications and types)
- Interconnection and cabling of the components
- Earthing system

9. Maintenance of Autonomous Solar Systems

- Maintenance definitions and types
- Maintenance and care of components and their environments
- Checkpoints and frequent breakdowns
- The logbook of the plant

10. Impact and National RE Projects

- Environmental impacts
- Social impact
- Technical and economic impacts
- Impact study and test
- Impacts of renewable energies
- The key numbers
- The national RE project

Duration:

15 days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

PHOTOVOLTAIC SYSTEMS CONNECTED TO THE NETWORK

Target Group:

—

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

- Background info on solar photovoltaic
- Systems connected to the network (constitution and characteristics)
- The different configurations of a solar system connected to the network
- The appropriate standards for the components of the systems connected to the network
- Maintenance of solar systems connected to the network

Duration:

40 days

Trainees per Cycle:

REMOTELY

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

STANDARDS OF PHOTOVOLTAIC SOLAR POWER PLANTS CONNECTED TO THE NETWORK

Target Group:

SKTM, CEEG, SPE

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Background on the obligations and requirements of network operators
2. Purpose of interconnection studies.
3. Potential impacts of PV plants
4. Main impacts generated by PV plants.
5. Local increasing of the voltage level
6. Fast variations of harmonic power of electrical current
7. DC injection
8. Contribution to short-circuit currents
9. Impact of PV on network investments
10. Impact of PV on losses in distribution networks
11. Residual voltage AC rating
12. Consequences of a high density of PV inverters
13. Local voltage increasing
14. Imbalance between phases
15. Interactions between inverters
16. Origin of the phenomena influencing the operation of PV plants

17. Neutral regime and leakage currents
18. Network voltage level
19. Variation of the impedance of the network
20. Tension dips and performance of PV systems
21. Presence of DC components and voltage harmonics

Duration:
5 days

Trainees per Cycle:
—

Certificate/Diploma:
certificate

Courses per Year:
—

CVT Provider: IFEG

Title of the Training/Seminar:
INSTALLER, MAINTAINER OF AUTONOMOUS PHOTOVOLTAIC SYSTEMS

Target Group:
-Subcontractors
-Individuals

Methodology (in class, on-site, e-learning):
In class at the plants

Content/Training Modules:
1. Background information on electricity
2. Radiation and solar conversion
3. Description and operating principle of the components of autonomous photovoltaic systems
4. Safety measures to be adopted in the plants of autonomous photovoltaic systems
5. Installation and cabling of panels and components of autonomous photovoltaic systems
6. Maintenance of autonomous photovoltaic systems

Duration:
10 Days

Trainees per Cycle:
—

Certificate/Diploma:
Certificate

Courses per Year:
—

CVT Provider: IFEG

Title of the Training/Seminar:

POWER SUPPLY OF REMOTE SURVEILLANCE SYSTEMS USING PHOTOVOLTAIC SOLAR ENERGY

Target Group:

SKMK, Individuals

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Background information on electricity
2. Radiation and solar conversion
3. Description and operating principle of the components of autonomous photovoltaic systems
4. Safety measures to be adopted in autonomous photovoltaic systems plants
5. Installation and cabling of panels and components of autonomous photovoltaic systems
6. Maintenance of autonomous photovoltaic systems
7. Case study: Powering a remote surveillance system with a solar PV system

Duration:

10 Days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

INTRODUCTION TO RENEWABLE ENERGY

Target Group:

Senior and executive staff

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

- The solar field
- PV energy
- Solar thermal energy
- Wind energy
- Elements of sustainable development
- Impacts & National RE Projects

Duration:

20 days (1h / day)

Trainees per Cycle:

Remotely

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

HYBRID PLANTS: DIESEL / PHOTOVOLTAIC

Target Group:

SKTM, SPE, CEEG

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Configuration of hybrid PV DIESEL systems

- Series type systems
- Switching type system
- Parallel type system

2. Hybridization rate

3. Management and control of the hybrid plant

- Load curve
- Simulation of the functioning of a hybrid plant

Duration:

5 days

Trainees per Cycle:

—

Certificate/Diploma:

certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

APPLICATION OF PV SYST SOFTWARE FOR THE SIZING OF PHOTOVOLTAIC PLANTS

Target Group:

Researchers on photovoltaic systems

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Configuration of hybrid PV DIESEL systems

- Series type systems
- Switching type system
- Parallel type system.

2. Hybridization rate

3. Management and control of a hybrid plant

- Load curve
- Simulation of the operation of a hybrid plant

Duration:

5 days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

TECHNICAL SPECIFICATIONS AND CRITERIA FOR THE CHOICE OF SOLAR PHOTOVOLTAIC EQUIPMENTS

Target Group:

Technical Senior and Executive staff

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Technologies related to solar photovoltaic energy
2. Devices constituting a photovoltaic solar plant (panel, charge controller, stationary batteries, inverter, cabling, meteorological station and instrumentation, LV protection (arrester, circuit breaker, fuse, etc.)
3. Criteria for the choice of photovoltaic solar equipment
4. Legal standards for solar photovoltaic equipment

Duration:

7 days (42h)

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

SOLAR PHOTOVOLTAIC ENERGY

Target Group:

Technical Senior and Executive staff

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Radiation and solar conversion
2. Configuration of solar photovoltaic systems
3. Description and operating principle of the components of the different photovoltaic systems
4. Criteria for choosing photovoltaic components
5. Maintenance procedure for photovoltaic solar systems
6. Legal standards applicable to solar photovoltaic plants
7. Safety measures to be adopted in PV plants

Duration:

28 days (28h – 1h per day)

Certificate/Diploma:

Certificate

Trainees per Cycle:

Remotely (e-learning via the IKRAA platform: https://ikraa.sonelgaz.dz)

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

RISK AND SAFETY AWARENESS IN PHOTOVOLTAIC PLANTS

Target Group:

Security and protection officers

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

- Introduction to solar photovoltaic energy
- General risks related to electricity
- Specific risks related to photovoltaic plants: risks related to photovoltaic panels

1. Risk of electrocution by:

- The electrical circuit connecting the photovoltaic panels to the inverter remains energized with direct current even if the main electrical panel (part AC) has been cut
- The destruction of the panel by the use of forcing tools and cuttings could cause the intervener to come into contact with an energized component
- The projection of water by means of a spear, by the firemen, on a bare conductor
- Isolation loss of the cabling carrying DC power from the PV panels to the inverter

2. Risk of electrification in case of immersion of the elements kept under tension due to the presence of light

3. Risk of fire caused by:

- Malfunctioning or electrical shortage (electric arcs, short circuit, earth faults and DC reversal faults) at PV plants
- The breakage of a panel and a bad connection can lead to hot spots that could cause a fire
- DC/AC inverters improperly installed or defective
- Photovoltaic plants emit high heat: between 50 and 80 °C, therefore increasing the temperature of the top floor

4. Risk of collapse due to the added weight of rooftop PV panels, if the integrity of the structure is already compromised in a fire

5. Risk of explosion: if the plant is close to explosive or flammable products

6. Risk of asphyxiation due to toxic fumes emitted by the thermal decomposition of the constituent materials of the panels

7. Risk of injury due to the debris of PV panels that may be cutting and sharp

8. Risk of burning during the day due to solar panels exposed to the sun

Duration:

—

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

BIOMASS

Target Group:

Senior and executive staff

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

I. General information:

1. Introduction

2. Overview of biomass resources

-The wood-energy sectors

-The agri-energy sectors

- The special sectors (industry, waste)

- Other existing biomass energies

- Global sectors

3. The potential:

- The global potential

- The potential in Algeria

4. Benefits of using biomass

II. State of the art of "fuel" sectors

-Firewood

-Briquettes

- Granules

- Shredded biomasses.

- Gasification

- Pyrolysis

-Carbonization and roasting

- Anaerobic digestion

- Alcoholic fermentation

- Raw vegetable oils

- Esterification

- The turf

III. State of the art of "applications" sectors

- Domestic heating

- Public heating

- Industrial processes

- Cogeneration

- Cold weather

- Transportation

IV. Regulatory and political frameworks

- Energy

- Environment

- Waste

Duration:

5 days (30h)

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

WIND ENERGY

Target Group:

Senior and executive staff

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

I. The wind field

II. Wind power generation

III. Constitution and operation of a wind turbine

IV. The different types of wind turbines

V. The choice of the location of a wind farm

VI. The impact of wind energy.

VII. Regulatory & Policy Frameworks: Energy-Environment

Duration:

5 days (30h).

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

SIZING AND INSTALLATION OF PHOTOVOLTAIC SOLAR PUMPS

Target Group:

Senior and executive staff

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

I. Introduction

- Solar radiation and photovoltaic conversion
- The different photovoltaic systems
- Description and operating principle of the components of autonomous photovoltaic systems
- The pumping over the sun
- Underground water and soil characteristics
- Morphology of underground waters
- The cone of depression
- The surface waters

II. Components of a photovoltaic solar pumping system

- Types of pumps
- The suction pump
- The waste pump
- The volumetric pump features and its operating principle

- The centrifugal pump: features and operating principle
- Comparations between Synchronous / Asynchronous AC Pump Types
- Load adapter (DC engine)
- The inverter (reciprocating engine)
- Motor pump group performance
- Typical practical use and examples of projects on pumping over the sun

III. Sizing techniques of a photovoltaic pumping system

- Basic data
- Calculation of energy required daily
- Analysis of needs and operating conditions
- Sizing of the tank
- Sizing of the photovoltaic system
- Sizing fiche n° 1
- Estimation of the load
- Sizing fiche n° 2
- Definition of the conditions of the site
- Sizing fiche n° 3
- Sizing the field
- Criteria for choosing a photovoltaic pumping system
- Water distribution network by solar pump
- Practical use: Sizing of a PV pumping system
- Applied exercises (manual calculation)

IV. Sizing of a PV plant pumping using PV system

- Presentation of PV syst
- The types of pumping
- System of deep wells
- Lake or river system until storage
- Pressurized system
- Pumping System Configurations
- Regulation - direct coupling with booster
- Regulation - direct coupling with cascading pumps
- Regulation - direct coupling with network reconfiguration
- Regulation - constant DC input converter
- Regulation
- The types of engines
- DC engines/ shunt / compound
- Battery buffer configuration engine
- Practice: Sizing PV pumping plant
- Practical Exercises (By PVsyst)

V. Installation, operation and maintenance of photovoltaic pumping systems

- Installation of the photovoltaic pumping system
- Operation of the photovoltaic pumping system
- Preventive and corrective maintenance of the photovoltaic pumping system

Duration:

5 days (30h)

Certificate/Diploma:

Certificate

Trainees per Cycle:

—

Courses per Year:

—

CVT Provider: CDER

Title of the Training/Seminar:

Solar Photovoltaic Energy : Sizing, installation and maintenance

Target Group:

PV installers, technicians, engineers in the project

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Solar field
2. PV solar conversion
3. Photovoltaic systems
4. Modelling of PV systems
5. Sizing of PV systems
6. Installation, care and maintenance of PV systems
7. Practical example of a PV plant

Duration:

5 days

Trainees per Cycle:

15

Certificate/Diploma:

Certificate of participation

Courses per Year:

Upon request

CVT Provider: Centre for vocationall training

Title of the Training/Seminar:

Installation and maintenance of PV solar panels

Target Group:

Level of access to training : 2nd year of high school (*2ème année secondaire*)

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

—

Duration:

24 months

Trainees per Cycle:

—

Certificate/Diploma:

Technical certificate

Courses per Year:

—

CVT Provider: Centre for vocational training

Title of the Training/Seminar:

Installation and maintenance of thermal solar panels

Target Group:

Level of access to training : 2nd year of high school (*2ème année secondaire*)

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

—

Duration:

24 months

Trainees per Cycle:

—

Certificate/Diploma:

Technical certificate

Courses per Year:

—

CVT Provider: Centre for vocational training

Title of the Training/Seminar:

Installation and maintenance of PV solar panels

Target Group:

Level of access to training : 4th year of middle school (*4ème année moyenne*)

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

—

Duration:

12 months

Trainees per Cycle:

—

Certificate/Diploma:

Vocational training qualification

Courses per Year:

—

2.3. Indicative CVET Courses/Seminars for EE

CVT Provider: APRUE

Title of the Training/Seminar:

Energy auditor

Target Group:

Engineers (technical area) industrial sector

Methodology (in class, on-site, e-learning):

In class, and trips on site

Content/Training Modules:

Legislative and regulatory framework.

Measurement units, audit methodologies, energy billing.

Background information on electricity

Converters and power factor correction, lighting, variable-speed drives, pumps and fans, pressurized air, basic notions of thermodynamics and heat transfer, thermal balance of thermal equipment and its optimization (including furnaces, boilers, turbines), refrigeration and the cooling tower, measurement needs, case studies, energy management according to ISO 50001, environmental implications, economic evaluation of projects, practical visit and group works.

Duration:

10 days

Trainees per Cycle:

15 to 20

Certificate/Diploma:

APRUE

Courses per Year:

Energy auditor

CVT Provider: APRUE

Title of the Training/Seminar:

Energy man

Target Group:

Engineers and technicians (technical area) in the industrial and service sectors as well as in the municipalities

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

Legislative and regulatory framework.

Measurement units, the role on energy coordinators inside a plant, energy billing, background information on electricity, converters and power factor correction, lighting, the driving force (engine, pump, fan), compressors, notions of thermodynamics and heat transfer, thermal balance of thermal equipment and its optimization (furnaces, boilers), energy management according to ISO 50001, economic evaluation of projects, energy efficiency in captive fleets

Duration:

5 days

Trainees per Cycle:

20 to 25

Certificate/Diploma:

Certificate of participation

Courses per Year:

2

CVT Provider: APRUE

Title of the Training/Seminar:

Energy management (ISO 50001)

Target Group:

Engineers and technicians (Technical area) in the industrial and service sectors

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

Introduction to the energy management system, overview on ISO 50001. Access requirements of SME. Management responsibilities, the energy planning process, implementation and operation, the checking process, monitoring and measurement, the management review.

Duration:

5 days

Trainees per Cycle:

1

Certificate/Diploma:

20 to 25

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

Energy savings

Target Group:

Anybody

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

1. Definition of the different types of energy

2. Identification of the potential economic resources for his/her company

- Check-list of bad habits
- Energy performance of equipment and buildings
- Cost of the different types of energy

3. Good practices

-Temperature management

- Development of suggestions
- Collective and individual actions

4. Optimization of the use of existing equipment

- Diagnostics of the building (isolation, windows, thermal bridges, infrared)
- Optimization and management of the heating, air conditioning and lighting system
- Rationalization of electricity consumption

5. Identification of possible investments to reduce the energy bill

-Total or partial modernisation of the heating/air conditioning system

- Isolation of the building, management of lighting
- Investment in new equipment
- Estimation of the returns on the investments (operating costs, maintenance costs, energy costs)

6. Evaluation and monitoring of the performance

- Definition of indicators and of means of measurement

Duration:

3 days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

Management and processing of industrial waste

Target Group:

Company's employees

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

I. Industrial waste: what are we talking about?

1. **Notion of waste (terminology)**
2. **Environmental impact of waste**
3. **Waste and energy production**
4. **Categories of waste and their sector**
   - Hazardous waste
   - Non-hazardous waste
   - Inert waste
   - Final waste
   - Special categories of waste
   - DASRI (Infectious health care waste)
   - WEEE (electrical and electronic equipment waste)
   - Asbestos
   - Bio-waste
   - Household waste
   - Green waste
   - The classification of waste: understanding the nomenclature
5. **Liability of waste producers**
6. **The regulatory framework**

II. Waste management

1. **Internal management: from the production to the sorting ad grouping of waste**
2. **External management: collection, reuse, recycling, recovery, final disposal**
3. **Specific obligations according to the type of waste**
4. **The disposal and recovery channels**

III. Waste treatment

1. **Means to collect waste**
2. **The collection of hazardous and non hazardous industrial waste**
3. **Regulation about the transport of hazardous goods**
4. **Actors operating in the sector and private contracts**
5. **The waste treatment and disposal sectors**
6. **Operating principle, costs, main actors, waste concerned for:**
7. **Recycling plant**
8. **Incinerator**
9. **Landfill**
10. **Composting and methanisation**

Duration:

5 days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: IFEG

Title of the Training/Seminar:

DETERMINATION OF ENERGY NEEDS THROUGH THE SOFTWARE "ELEC-CALC"

Target Group:

Electrical engineers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

1. Introductions

2. User Interface

- Icons features and software sections
- Configuration and customization of the study

3. Calculation: calculation and energy balance

- Calculation of the drivers section
- Operating mode
- Selectivity in electricity
- The dilation

4. Import- export and printing of the electric diagram

- Notes of electrical calculation
- Single-line diagram
- Development and printing of the logo

Duration:

5 days

Trainees per Cycle:

—

Certificate/Diploma:

Certificate

Courses per Year:

—

CVT Provider: APRUE

Title of the Training/Seminar:

Energy auditor in buildings

Target Group:

Engineers and architects (technical domains)

Methodology (in class, on-site, e-learning):

In class, and on-site trip

Content/Training Modules:

- Training consist in educating energy auditors in buildings, in order for them to be able to deal with all energy aspects of a building in the service sector
- Legislative and regulatory framework
- Measurement units
- Audit methodologies
- Energy billing
- Background notions on electricity
- Lighting
- Variable speed drives
- Pumps and fans
- Pressurized air
- Background notions on thermodynamics and heat transfer
- Thermal balance of thermal equipment and its optimization (furnaces, boilers, turbines)
- Thermal balance of the building envelope
- Bioclimatic architecture
- CT BAT application
- Case studies
- Energy management according to ISO 50001
- Implications for the environment
- Group work

Duration:

10 days

Trainees per Cycle:

15 to 20

Certificate/Diploma:

Certificate of participation

Courses per Year:

1

CVT Provider: APRUE

Title of the Training/Seminar:

CT BAT Application

Target Group:

Engineers and architects

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

- The training consists in learning how to use an app for the statistical computation of leakage and heat supply of the envelope of the building
- Algerian thermal regulation DTR C3-2/4
- Identification of the envelopes
- Identification of the walls
- Thermal balance
- Practical example

Duration:

1 to 2 days

Trainees per Cycle:

15 to 20

Certificate/Diploma:

Certificate of participation

Courses per Year:

3

CVT Provider: CNERIB

Title of the Training/Seminar:

Use of local materials in buildings

Target Group:

Engineers and architects

Methodology (in class, on-site, e-learning):

-In class

-Visit to the lab

Content/Training Modules:

- Training on the use of local materials in buildings:
- Stone
- Soil
- Plaster
- Recommendations on the Stabilised Earth Brick (BTS)
- Laboratory tests

Duration:

2 days

Trainees per Cycle:

15 to 20

Certificate/Diploma:

Certificate of participation

Courses per Year:

1

CVT Provider: Centre for vocational training

Title of the Training/Seminar:

Thermal and acoustic isolation

Target Group:

Access requirements to training:

2nd year of high school (*2ème année secondaire*)

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

—

Duration:

24 months

Trainees per Cycle:

—

Certificate/Diploma:

Technical certificate

Courses per Year:

—

CVT Provider: Centre for vocational training

Title of the Training/Seminar:

Energy optimization in buildings

Target Group:

—

Methodology (in class, on-site, e-learning):

- Access requirements to training

- 3rd year of high school (*3ème année secondaire*)

Content/Training Modules:

—

Duration:

30 months

Trainees per Cycle:

—

Certificate/Diploma:

Advanced Technical certificate

Courses per Year:

—

CVT Provider: Centre for vocational training

Title of the Training/Seminar:

Refurbishment and renovation in housing

Target Group:

Access requirements to training:

- 3rd year of high school (*3ème année secondaire*)

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

—

Duration:

30 months

Trainees per Cycle:

—

Certificate/Diploma:

Advanced Technical certificate

Courses per Year:

—

CVT Provider: NAFTAL

Title of the Training/Seminar:

Installation of GPLc kits

Target Group:

Car mechanics

Auto electricians

Mechanical engineers

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

- Safety
- General mechanics computer programming
- Rules

Duration:

120 hours (theory) / 160 hours (practice)

Trainees per Cycle:

15

Certificate/Diploma:

Certificate of successful completion

Courses per Year:

—

CVT Provider: SARL ENVIRONNEMENT ET ECONOMIE

Title of the Training/Seminar:

Installation of GPLc kits

Target Group:

Car mechanics

Auto electricians

Mechanical engineers

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

- Safety
- General mechanics computer programming
- Rules

Duration:

120 hours (theory) / 160 hours (practice)

Trainees per Cycle:

15

Certificate/Diploma:

Certificate of successful completion

Courses per Year:

6

CVT Provider: SARL GHAZAL

Title of the Training/Seminar:

Installation of GPLc kits

Target Group:

Car mechanics

Auto electricians

Mechanical engineers

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

- Safety
- General mechanics computer programming
- Rules

Duration:

3 months / 400 hours

Trainees per Cycle:

10

Certificate/Diploma:

Certificate of successful completion

Courses per Year:

4

CVT Provider: APRUE

Title of the Training/Seminar:

Management of captive fleets

Target Group:

Fleets managers

Methodology (in class, on-site, e-learning):

In class

Content/Training Modules:

- Energy Audit
- Air emissions and rules
- Route optimization
- Choice of the vehicles
- Profitability and efficiency

Duration:

40 hours

Trainees per Cycle:

15

Certificate/Diploma:

Certificate of participation

Courses per Year:

1

2.4. Evaluation of Existing Trainings

	Very poor	Poor	Adequate	Good	Very good
Energy policy/legislation		X			
Energy planning		X			
Energy audits				X	
RE Technologies		X			
EE Technologies		X			
Installation of RE systems			X		
Installation of EE systems		X			
Size of the RE market		X			
Size of the EE market		X			
Integration of RE and EE in buildings		X			

5.2. EGYPT

1. Country Overview

1.1. Adult Education System

Overview

The General Authority for Adult Education was established in 1991 by law No. (8) for the eradication of illiteracy and the promotion of adult education. This decision was based on the right of every Egyptian to education, to remain educated and to survive and to believe in the importance of literacy for economic, social and cultural development.

In accordance with this law, the General Authority for Literacy and Adult Education was established in 1992, a body with a legal personality that is affiliated with the Minister of Education. The law gave the Commission the planning, executive and educational responsibilities required for the eradication of illiteracy and the promotion of adult education.

The Authority has a Board of Directors that is chaired by either the Prime Minister or his deputy, alongside the membership of the First Deputy Ministers who are concerned with adult illiteracy as well as those who are interested in literacy issues. The Authority also has branches in all the governorates - an administrative division of the country - of the Republic. Each of these governorates has an Executive Council for Literacy which is headed by the Governor of the Region that is responsible for the following:

- Preparing the planning of the executive programme, which is established and coordinated by the Authority;
- Drawing up the executive plans in accordance with the general plan approved by the Commission;
- Developing a programme of information and advocacy to address the problem of illiteracy;
- Identifying the stages of implementation of the programme in line with

key priorities;
- Establishing a system that ensures participation of all parties in the eradication of illiteracy;
- Developing a follow-up system to overcome difficulties;
- Preparing the budget and distributing it to the different parties.

The governorates also have to develop plans and programmes for literacy and adult education. They also have to follow up with implementation and coordination among the various bodies responsible for implementing these plans and programmes. The Board of Directors is the dominant authority in these affairs and it may take whatever it deems necessary to achieve and implement the provisions of the Law on Literacy and Adult Education.

Development and Improvement

The approach towards lifelong learning has been described as “different. This was noted during a high level speech at the 14th annual conference entitled ‘From Adult Education to Lifelong Learning for All for Sustainable Development’, which was organized by the Centre for Adult Education at Ain Shams University. The Arab Organization for Education, Culture and Science (ALECSO) and the General Authority for Adult Education (EFA) agreed that the definition of illiteracy has changed globally and that Egypt had to keep up with this transition process in lifelong learning (LLL). The financing of LLL is provided by the government or by the private sector.

The Initiatives

Egyptian universities have started to offer open learning and distance learning courses since the mid-1980s. This has been done by integrating materials and educational media, including the granting of all university and higher degrees. This has been developed through the creation of educational satellite channels, closed circuit TV and video conferencing.

The University Presidency of the Cairo Open Learning Centre is responsible for preparing and implementing the open learning programme by using books and educational media. Although this particular university is one of the oldest models of Arab experiences in this area, the social outlook is still limited to the degrees awarded by this system and its graduates. It is noted that there are no

regulations in place nor legal or administrative standards for this system at this level of Egyptian universities (Open Education Centre, 2012).

1.2. Technical and Vocational Education and Training (TVET)

Overview

The basic technical and vocational education and training (TVET) in Egypt is provided through secondary education, in both technical and commercial schools as well as in post-secondary education in training institutions. Other forms of training include training through industry attachments (such as dual systems and apprenticeships), in-service training, and the re-training of people already in the labour force, both employed and unemployed.

A significant number of young Egyptians are in both long-term and short-term vocational training centres (VTCs). Historically, a total of 16 ministries have been responsible for both public VTCs as well as institutes that offer courses that lead to diplomas. Indeed, the involvement of so many ministries has, at times, lead to the overlapping of mandates and confused oversight. Additionally, in 2012 there were 224 private VTCs and NGO-administered VTCs focused on disadvantaged groups, in particular women, unemployed youth and the disabled. For a short time, VTCs fell under the authority of the Ministry of Technical Education and Vocational Training, created in 2014. However, in September 2015, this ministry merged with the Ministry of Education (MoE) and, as a result, according to the most recent statistics available, more than 127,000 post-secondary Vocational Education and Training (VET) students were enrolled across 68 institutions in 22 disciplines.

Development and Improvement

The Ministry of Education recognises the need to improve and develop the Technical Education Strategy 2011/12 to 2016/17 so that it plays a more crucial role in economic and social development. The strategy's key targets include improving infrastructure for schools, raising teaching standards and ensuring that students receive a technical education.

Egypt has a major plan for the development of its system of technical educa-

tion and a strong industrial sector that can compete globally. In June 2018, the Minister of Education and Technical Education signed a cooperation protocol with private firms to implement the 'Egypt Makers' initiative, under the slogan 'Learn... Improve... Work'. The objective of this initiative is to raise students' productivity skills in general, and to advance TVE, which refers to all technical and vocational education and training at secondary level, generally comprising three-year programmes. Since 2019, a new standard for evaluating students' transition from high school to tertiary education has replaced the existing traditional approach.

The new system will be more challenging and demanding for students. It will also use a 'grade point average' (GPA) system, which determines the final grade according to the average of students' grades gained throughout the three years of secondary education, through either private or government institutions. The public system is administered by a multitude of government agencies. These agencies work independently, although in recent times the Government has sought to bring about more coordination between them and to bring more cohesion to TVET policies. It has established a Supreme Council on Human Resource Development (SCHRD), a tripartite body chaired by the Minister of Manpower and Emigration.

The Initiatives:

GIZ is implementing the following programmes and projects in Egypt, focusing on economic reform and development of the market economy:

Technical Education, Training and Employment-Mubarak-Kohl Initiative

Client: Federal Ministry for Economic Cooperation and Development of Germany (BMZ)
Lead executing agency: Ministry of International Cooperation Egypt (MoIC)
Overall term: July 2007 to June 2014
Objective: The interactive employability of young people has been improved through developed training and labour market institutions.
(in depth details about employment-Mubarak-Kohl below)

Qualifying technicians and technical trainers

Client: Federal Ministry for Economic Cooperation and Development of

Germany (BMZ)
Lead executing agency: Ministry of Trade and Industry (MTI)
Overall term: October 2001 to March 2008
Objective: The Technology Competency Centre (TCC) and the Staff Training Institute (STI) jointly train staff for industry, the public sector and private further education and training centres.

Small and Medium-Sized Enterprise Promotion Programme

Client: Federal Ministry for Economic Cooperation and Development of Germany (BMZ)
Lead executing agency: Ministry of Trade and Industry (MTI)
Overall term: December 2005 to November 2008
Objective: The competitiveness of SMEs in the cotton, fruit and vegetable processing and environmental technologies and services sectors has been improved.

Main TVET Institutions:

Ministry of Education
Ministry of Higher Education
Ministry of Trade and industry

Details about Mubarak-Kohl Initiative (MKI)

The programme 'Mubarak-Kohl Initiative' (MKI) aims at upgrading vocational education and training in Egypt as per the agreement between the Federal Republic of Germany and Egypt. The main partners include: The Egyptian Ministry of Education, The Investors and Businessman Association and Germany's international cooperation enterprise GIZ.

What makes the MKI Dual System so special is that it combines the theoretical aspects of technical secondary schools with practical training in the workplace. Students who take the three-years course spend two days a week in a technical secondary school and four days with a company in order to obtain the skills and qualifications that the labour market demands.

Since 1994, the MKI has shown that cooperative technical education can succeed in Egypt and that, with the appropriate structures in place, an adaptation of the

German dual system for human resource development can serve as an effective frame of reference. A key factor in the initiative has been the shared responsibility involved in the cooperation between the private and the public sectors.

M.K.I schools profile (data from 2008)

68 schools in all governorates of Egypt;
24,000 Students currently enrolled;
31 occupational profiles developed;
2,000 teachers;
The number of diploma graduates is more than 20,000 (13% female);
Companies and factories which take part in the project is about 1,900.

The benefits for trainees

Training contract;
Monthly remuneration;
Facilities from the company (transportation, meals, clothes);
The priority of the appointment;
Social insurance umbrella-MOE;
No of students does not exceed 24;
MKI schools are relatively better equipped;
The teaching and administrative staff are being carefully selected and continuously up-graded.

Major TVET Projects

The TVET Reform Programme is based on the provision of skilled human resources as the key solution for Egypt's economic development challenges and it is carefully designed to ensure the final delivery of a modern, consistent and sustainable TVET System.

The aim of the regional TVET project is to establish a network of countries as a mechanism for strengthening regional cooperation and enabling the participating countries to not only benefit from experiences and results of vocational training systems in these neighbouring countries but also to benefit from their own systems.

2. Infrastructures of EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes

Public

Cairo University Energy Research Centre (CU-ERC) has been established as part of the national plan of the Supreme Council of Universities to promote highly independent service oriented centres. The laboratories include training devices, such as a power saver trainer and an air distribution system trainer in addition to the basic energy management training system.

Egyptian Organisation for Standardization and Quality (EOS) is the official body responsible for standardization activities, quality and industrial metrology aiming at increasing the competitiveness of Egyptian products in the international and regional markets along with consumer and environmental protection. EOS has an important training department which has the objective to ensure continuous training in different fields.

Industrial Modernisation Centre (IMC) was established by a Presidential Decree in December 2000 to give an impetus for a sustainable, modernized, vibrant and competitive Egyptian industry. The aim is to support industrial enterprises, create an enabling business environment for the industrial sector, in coordination with the Ministry of Industry and Trade and SMEs. IMC provides services to the companies (clients) mainly by appointing external service providers.

Industrial Training Centre (ITC) is a governmental body under the Ministry of Industry and Trade. The ITC aims to provide high level trainings through different programmes such as the national training programme for employment.

Ministry of Electricity and Renewable Energy (MOERE) aims to optimize the use of available energy sources, taking into account environmental protection and to provide electricity with suitable and best quality. Moreover, one of the most important objectives of the Ministry is to develop the skills of engineers and technicians working in the

Private

Arab Chamber of Industry and Commerce (AHK) was established in 1951. Representing 2,700 member companies AHK is the largest organisation in the framework of business cooperation between Germany and the Arab world. It aims to promote trade and industrial development and business co-operation between Germany and Egypt.

Econsult is a design company and an environmental consultancy optimisation service provider. Their services are focused on helping companies start their green strategies and adopt a more cost efficient and sustainable approach that helps align them with global trends. Moreover Econsult has training technicians and engineers on RE/EE technologies.

International Academy for Renewable Energy & Energy Efficiency (IAREEE) is a private training institution with the purpose to empower scientific, social and economic development through the use of alternative energy resources like solar energy.

OASIS Renewable Energy (ORE) is a subsidiary of the Arab Consultancy Office, an Engineering, Procurement, and Contracting (EPC) Company with regional engineering expertise. ORE possesses training units, addressing hands-on training on design, installation, and troubleshooting for solar applications, i.e. solar heating, PV, and green buildings, as well as RE-agriculture applications.

Solar Energy Development Association (SEDA) is an institution advocating the development of the solar energy market (heat and power) in Egypt, through different initiatives, such as developing competencies of the people on using abundant solar energy, introducing innovative and creative solutions for developing the market. SEDA aims to facilitate an active collaboration among key stakeholders by actively researching and promot-

electricity sector through continuous trainings.

Ministry of Higher Education (MoHE) established in 1961, is entrusted to promote education in post-secondary stages with various types and levels, in addition to promoting the level of faculty and research staff and proposing educational policy and the development of plans and programmes for the implementation of this policy. The Ministry aims to provide a distinguished educational, research and training service as well as producing graduates who are able to compete on a regional and international level, and meet the requirements of the national and community renewable development.

Ministry of Industry and Trade (MFTI) aims to build a modern Egypt hinging on flexible administrative, productive, and economic bodies that are capable of reacting with the successive international challenges. The Egyptian government through MFTI has established strong links between production and exportation to form a harmonious scheme within the state-policy aiming at boosting exports, and upgrading national industry through modern international technology and expertise.

New and Renewable Energy Authority (NREA) is a governmental authority established in 1986 with the aim of acting as the national focal point for expanding efforts to develop and introduce renewable energy technologies on a commercial scale. NREA falls directly under the MOERE and is considered as both project developer and regulator. Inside the NREA, there exist a training unit responsible for giving trainings related to RE and EE.

National Research Centre (NRC) is an independent public organisation that was established in 1956, with the main aim to foster basic and applied scientific research, particularly in industry, agriculture, public health and other sectors of national economy. It is considered as one of the largest institutions affiliated to the Ministry of Scientific Research and employs about 60% of all the scientists working in these institutions. The NRC has to correspond to the country's key production and services sectors through the research conducted in different areas of science and technology, scientific consultation and training as well.

Productivity and Vocational Training Department (PVTD) is part of the MFTI. It was established in 1971. The department has been working on continuous education by providing training services to different management levels in activities, such as Industrial Engineering, improving productivity, and Management systems.

ing national market development campaigns and capacity building mechanisms that display social, economic and environmental benefits.

2.2. Indicative CVET Courses/Seminars for RES

CVT Provider: National Research Center (NRC)

Title of the Training/Seminar:

Introduction to general thermal and electrical applications of solar energy

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

30h

Trainees per Cycle:

20

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

Almost 20 course/year

CVT Provider: National Research Center, (NRC)

Title of the Training/Seminar:

Central systems of solar water heaters for residential and industrial purposes

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

30h

Trainees per Cycle:

20

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: National Research Center, (NRC)

Title of the Training/Seminar:

Solar photovoltaic technologies

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

30h

Trainees per Cycle:

20

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: National Research Center, (NRC)

Title of the Training/Seminar:

Solar refrigeration and air conditioning systems

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

30h

Trainees per Cycle:

20

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: National Research Center, (NRC)

Title of the Training/Seminar:

Solar water disinfecting system

Target Group:

—

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

30h

Trainees per Cycle:

20

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: National Research Center, (NRC)

Title of the Training/Seminar:

Solar water desalination systems

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

30h

Trainees per Cycle:

20

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: International Academy for Renewable Energy and Energy Efficiency (IAREEE)

Title of the Training/Seminar:

OFF-GRID Photovoltaics system Design for Engineers

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Introduction To Renewable Energy & Fundamentals in solar energy and photovoltaics, Basics of Solar Electricity, Types of Solar Photovoltaic Systems, Components and system design, PV cells and modules, Charger Controller, Inverters in PV systems, Batteries, Balance Of System components of grid-tied PV-systems , Principles and basic design of DC systems, Design of off-grid systems, Calculation example of DC systems

Duration:

12-15h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: International Academy for Renewable Energy and Energy Efficiency (IAREEE)

Title of the Training/Seminar:

ON-Grid Photovoltaics design Course for Engineers

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Introduction To Renewable Energy & Fundamentals in solar energy and photovoltaics, Basics of Solar Electricity, Types of Solar Photovoltaic Systems, Components and system design, PV cells and modules, Grid-connected Inverters in PV systems, Balance Of System components of grid-tied PV-systems, Site Analysis, design and Shading effects, Planning, design and security of grid-connected PV systems, Egypt Tie Code include technical regulations and guidelines, practical assembly of exercise roofs examples

Duration:	Trainees per Cycle:
21-28h	—
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance and participation	—

CVT Provider: International Academy for Renewable Energy and Energy Efficiency (IAREEE)

Title of the Training/Seminar:

Solar Pumping design Course

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Solar energy Fundamentals and photovoltaics, Basics of Solar Electricity, Types of Solar Photovoltaic Systems, Components of solar pumping systems, Fundamentals of Fluids Dynamics, Fundamentals of irrigation systems and requirement in Egypt, Types of Pumps and principle of operation, Type of Solar Pumping systems and system selection, Planning, design and sizing of solar pumping systems, Dimensioning of components and cables, Yield optimization, assembly and installation guideline, practical exercise of various pumps selections, Solar Pumping Visibility and payback calculation.

Duration:	Trainees per Cycle:
21-28h	—
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance and participation	—

CVT Provider: International Academy for Renewable Energy and Energy Efficiency (IAREEE)

Title of the Training/Seminar:

Solar Thermal System Design for Engineers

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Introduction To Renewable Energy & Fundamentals in solar energy and solar thermal System Components, Collectors, System Configurations, System Design I, System Design II, System Design III, Practical Aspects, System Commissioning, Project Management Marketing and Economics.

Duration:

21-28h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: International Academy for Renewable Energy and Energy Efficiency (IAREEE)

Title of the Training/Seminar:

LEED Green Associate | Exam Preparation

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

The lectures are divided as follows;

Lecture 2 – USGBC, GBCI, and LEED, Lecture 3 – Integrated process & practice questions, Lecture 4 – Location & Transportation, Lecture 5 – Sustainable Sites, Lecture 6 – Water Efficiency, Lecture 7 – Energy and Atmosphere & practice questions, Lecture 8 – Material and Resources & practice questions, Lecture 9 – Indoor Environmental Quality, Lecture 10 – Innovation in Design. The trainee gets an attendance certificate at the end

Duration:

14h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: International Academy for Renewable Energy and Energy Efficiency (IAREEE)

Title of the Training/Seminar:

Working At Highs & Vocational Installation and Site Survey Training

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

14-21h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: Oasis Renewable Energy in cooperation with the German Renewables Academy (RENAC)

Title of the Training/Seminar:

Fundamentals of PV systems training

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Energy in Egypt, Solar Energy concepts, PV basis, and components, practical system simulation. The trainee will get a successfully passed certification, the trainings contains a practical and theoretical exams. The institution responsible is the Renac & oasis

Duration:

16h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (2) / 2015 (2)

CVT Provider: Oasis Renewable Energy in cooperation with the German Renewables Academy (RENAC)

Title of the Training/Seminar:

PV design on-grid

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Customer requirements, system components, sizing and selection, system design and calculation, software simulation. The trainee will get a successfully passed certification, the trainings contains a practical and theoretical exams. The institution responsible is the Renac & oasis.

Duration:

40h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (2) / 2015 (2)

CVT Provider: Oasis Renewable Energy in cooperation with the German Renewables Academy (RENAC)

Title of the Training/Seminar:

PV system installation

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

System components, LV safety rules, system installation rules, practical installation. The trainee will get an attendance certification, the trainings contains a practical and theoretical exams

Duration:	Trainees per Cycle:
24h	—
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance and participation	2014 (1) / 2015 (1)

CVT Provider: Oasis Renewable Energy in cooperation with the German Renewables Academy (RENAC)

Title of the Training/Seminar:

Solar thermal design

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Customer requirements, system components, sizing and selection, system design and calculation, software simulation

Duration:	Trainees per Cycle:
40h	–
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance and participation	2014 (5) / 2015 (5)

CVT Provider: Oasis Renewable Energy in cooperation with the German Renewables Academy (RENAC)

Title of the Training/Seminar:

Solar thermal installation

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

System components, installation safety rules, system installation rules, practical installation

Duration:

24h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (1) / 2015 (1)

CVT Provider: Oasis Renewable Energy in cooperation with the German Renewables Academy (RENAC)

Title of the Training/Seminar:

Oasis Only: PV pumping system

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Customer requirements, system components, sizing and selection, system design and calculation

Duration:

20h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (3) / 2015 (3)

CVT Provider: Oasis Renewable Energy in cooperation with the German Renewables Academy (RENAC)

Title of the Training/Seminar:

Oasis Only: Wind Energy Foundation Course

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

The conceptual design for a complete wind farm, Feasibility study. The trainee will get an attended certification, the trainings contains a theoretical exams. The institution responsible is the oasis.

Duration:

36h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: Oasis Renewable Energy in cooperation with the German Renewables Academy (RENAC)

Title of the Training/Seminar:

Oasis Only: Wind Energy Advanced Course

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

The conceptual design for a complete wind farm, Feasibility study

Duration:

40h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: Oasis Renewable Energy in cooperation with the German Renewables Academy (RENAC)

Title of the Training/Seminar:

Oasis only: Managing Wind Energy Projects

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Project management

Duration:

40h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

—

CVT Provider: Solar Energy Development Association - SEDA

Title of the Training/Seminar:

Photovoltaic Grid connected system design

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Introduction to solar energy, Solar Photovoltaic Systems, Types of Solar Energy Systems, Solar Photovoltaic Systems, Components and system design, Site Analysis Design, PV System, Sizing Principles, Solar PV System Electrical Design, Grid connections, commissioning and functional test, Lightning and surge protection, System monitoring Economics, Financing models and markets

Duration:	Trainees per Cycle:
40h	—
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance and participation	2014 (8) / 2015 (8)

CVT Provider: Solar Energy Development Association - SEDA

Title of the Training/Seminar:

Photovoltaic off grid system design

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Overview of the worldwide renewable energy market, present situation, solar potential.

Duration:	Trainees per Cycle:
24h	—
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance and participation	2014 (3) / 2015 (3)

CVT Provider: Solar Energy Development Association - SEDA

Title of the Training/Seminar:

Solar Water pumping systems

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Introduction to Solar Pumping, PV Fundamentals and System Components, PV System Technical Specifications and Precautions, Tools and Equipment for solar PV Installation and Test, Irrigation Fundamentals, Pump Types and Pump Curves, Solar Pumping System Types, PV Pumping System Design Procedure, How to calculate the Payback Period. The Standards/norms used for this course is Local standards. The institution responsible is the EOS

Duration:

24h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (2) / 2015 (2)

CVT Provider: Solar Energy Development Association - SEDA

Title of the Training/Seminar:

Solar Thermal applications

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Design - operation and maintenance of solar water heaters. The Standards/norms used for this course is German standards adapted to the local regulations. The institution responsible is the EOS

Duration:

40h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (3) / 2015 (3)

CVT Provider: Solar Energy Development Association - SEDA

Title of the Training/Seminar:

Photovoltaics systems installer training

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

Basics of Solar energy. The Standards/norms used for this course is Local standards.

Duration:

24h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (1) / 2015 (1)

CVT Provider: The Regional Center for Renewable Energy and Energy Efficiency (RCREEE) in cooperation with GIZ, the Egyptian Ministry of Electricity and NREA

Title of the Training/Seminar:

Course on Investment-grade Calculation, Forecasting and Analysis of RE and EE Projects

Target Group:

RE and EE business and strategy analysts, project developers and manager, Energy policy makers, planners, bankers and senior professionals

Methodology (in class, on-site, e-learning):

Class room and a site visit

Content/Training Modules:

—

Duration:

3 DAYS

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2015(1)

2.3. Indicative CVET Courses/Seminars for EE

CVT Provider: Energy Research Center – Cairo University

Title of the Training/Seminar:

Energy Management Systems

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:	**Trainees per Cycle:**
60h	—
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance and participation	2014 (2) / 2015 (2)

CVT Provider: Energy Research Center – Cairo University

Title of the Training/Seminar:

Demand Side Management

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:	**Trainees per Cycle:**
12h	—
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance and participation	2014 (1) / 2015 (1)

CVT Provider: Energy Research Center – Cairo University

Title of the Training/Seminar:

Energy Audit

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (1) / 2015 (1)

CVT Provider: Energy Research Center – Cairo University

Title of the Training/Seminar:

Renewable Energy

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (2) / 2015 (2)

CVT Provider: Energy Research Center – Cairo University

Title of the Training/Seminar:

EE in Electrical Systems

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

18h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (2) / 2015 (2)

CVT Provider: Energy Research Center – Cairo University

Title of the Training/Seminar:

Heat Recovery Systems

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (1) / 2015 (2)

CVT Provider: Energy Research Center – Cairo University

Title of the Training/Seminar:

Energy Use Improvement

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (1) / 2015 (1)

CVT Provider: Energy Research Center – Cairo University

Title of the Training/Seminar:

EE in Lighting Systems

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (1) / 2015 (1)

CVT Provider: Energy Research Center – Cairo University

Title of the Training/Seminar:

High efficiency Motors

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

—

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2014 (1) / 2015 (1)

CVT Provider: Schneider Electric

Title of the Training/Seminar:

Schneider Energy university

Target Group:

Engineers, researchers, students and those interested in RES

Methodology (in class, on-site, e-learning):

Online course

Content/Training Modules:

Energy Efficiency courses and Data Centre courses

Duration:

—

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Participation, Data Centre Certified Associate (DCCA) and Professional Energy Manager (PEM)

Courses per Year:

Since 2015 till now

CVT Provider: Egyptian National Cleaner Production Centre (ENCPC)

Title of the Training/Seminar:

Identification and training of Green Entrepreneurs in Egypt

Target Group:

Identify and invite owners of green projects

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Capacity building and knowledge transfer.

Duration:

8 workshops

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance and participation

Courses per Year:

2009 (1)

2.4. Evaluation of Existing Trainings

	Very poor	Poor	Adequate	Good	Very good
Energy policy / legislation			X		
Energy planning			X		
Energy audits				X	
RES technologies					X
EE technologies			X		
RES systems installation				X	
EE systems installation			X		
Market size for RES					X
Market size for EE					X
Integration of EE and RES in buildings			X		

5.3. FRANCE

1. Country Overview

1.1. Adult Education System

Initial vocational training falls within the remit of the Ministry of Higher Education, Research and Innovation while the ongoing continuation of vocational training falls under the remit of the Ministry for Labour.

Several other ministries could also be marginally involved in the funding of trainings. For example, the role of the Ministry of Agriculture can also be noted in the management of vocational training and agricultural promotion centres (*Centres de formation professionnelle et de promotion agricole*).

In the field of education, the Ministry of Higher Education, Research and Innovation has retained responsibility for overseeing the curricular content, examinations and teaching staff, while the *départements* and regions have been placed in charge of facilities and the running of schools as well as the recruitment and remuneration of non-teaching personnel.

Over the last few years, several reforms have led to the education system's decentralization, giving more responsibilities to regions and even local authorities. The creation of the "validation of competences via the experience" system, introduced in 2002, provides several tools for promoting LLL. Regions have the power to promote policies concerning adult education, according to local priorities. After the process of decentralization, the regions are now responsible for the delivery of vocational training for both young people and adults. The regions also enact the "regional plan for the development of vocational training" (*plan regional de développement des formations professionnelles*).

Several tools are proposed for LLL:

The first is the **education plan** (*plan de formation*) of the enterprise, which provides the necessary education for employees to improve their performance

on the job and their progress within the company. It is paid for and organised by each company that is involved in the scheme.

The second type of education is known as the **personal training account** (*compte personnel formation - CPF*), which gives employees 20 hours per year for educational purposes. Since this amount of hours can be accumulated during 6 year periods, the employee can eventually take up to 120 hours for education that can support a personal job transition towards a new type of sector or activity.

Within the LLL, and under the Ministry of Higher Education, a grouping of public institutions and universities called "GRETA" (*groupement d'établissements*) are responsible for proposing training for adults through the pooling of resources. Currently, 101 GRETA exist in France, at least one in each department. Some regional and national coordination is done by the Ministry of Education. Trainings can also be paid by enterprises through dedicated funds.

The *Conservatoire National des Arts et Métiers* (CNAM) is a public institution with a dedicated scientific, cultural and professional objective to lifelong learning. Its mission consists of three points: 1) to provide vocational training for adults, 2) to promote technological research and innovation, and 3) to promote science and technology.

Education at CNAM is divided into four main areas: 1) economics and management, 2) work and society, 3) sciences and industrial techniques, and 4) IT and communication.

In addition to the GRETA and CNAM, several stakeholders are involved in "non-formal learning" like folk universities within the Association des Universités Populaires de France (AUPF). Here, NGOs provide specific trainings for adults, especially for those most vulnerable that cannot access the formal system. The private sector is also engaged in these courses.

1.2. Technical and Vocational Education and Training (TVET)

Regarding vocational training, regional councils are responsible for apprenticeships and vocational training for unemployed young people and adults. The State provides co-funding, along with the regions, for certain forms of training. The State has also retained responsibility for the vocational training of specific groups: prisoners, those who are illiterate, people with disabilities and foreign workers.

The legal framework has recently changed under the Law n°2018-771 - 5th September 2018, entitled "Law for freedom to choose professional future"[1]. It introduces several 'instruments' for promoting vocational training across a lifetime:

- Facilitating access to information and training: this is done through a "personal training account" and a direct-access single portal which allows online subscriptions and payment;
- Additional funding: this will be provided to those who are less qualified as well as those people with disabilities;
- Availability of part-time jobs on the personal training account;
- Promotion of apprenticeships and vocational training;
- Facilitation of transfer between higher education and vocational training;
- Promotion of traveling on a new scheme "Erasmus Pro" or facilitating enterprises to develop and propose apprenticeships. Within this topic, it includes the co-preparation with professional branches of programmes and diplomas;
- Increasing information on professional orientation;
- Increasing gender equality within enterprises with final sanctioning if obligations are not respected.

Vocational training courses addressing a variety of issues can be coordinated among different professional branches and administrations. In the case of vocational training on energy in buildings (which addresses construction as well as energy issues but also financial and administrative aspects) several initiatives can be underlined:

(1) *Loi pour la liberté de choisir son avenir professionnel*

- The FEEBAT Platform on energy efficiency for the building sector (*Formation des professionnels aux économies d'énergie dans le bâtiment:* www.feebat.org) is funded by the energy company EdF (as part of its obligation under the " white" energy savings certificate scheme), and was built with the different ministries in charge of energy, architecture, housing, and education, ADEME (the Energy and Environment Agency) and several professional organizations from the building sector. The platform provides a diversity of pedagogical tools. It includes, for example, teacher training on energy efficiency and building retrofit but also practical training platforms for construction workers (called PRAXIBAT) with dedicated modules for insulation, lighting and ventilation. Since 2008, 162,000 professionals have been trained through this scheme.
- Since 2006, the Qualit'ENR association was created to control and certify the quality of renewable energy trainings. Each training centre has to apply and implement specific terms of references in order to be recognised. The RGE label (*Reconnu Garant de l'Environnement*) is the general label for construction that is needed to receive benefits from tax credit or other subsidies. Since its adoption in 2012, the uptake of vocational training has increased owing to the fact that it is mandatory to be trained in order to acquire this label.

France has already carried out consistent work to determine the training needs of the building sector's workforce at national, but also regional and local levels. Different initiatives have already been undertaken to train construction workers. However, barriers still exist which inhibit the effective outreach to construction workers and craftsmen which therefore impeded the achievement of energy efficiency (EE) targets that are set at the European and national levels for that sector. The fact that the RGE label is granted to a company and not individual workers has been identified as a limitation: given the turnover in construction companies most of the employees do not receive the training for which the company is certified.

The aim of the "Build Up Skills France" project is to remove these barriers by defining a concrete roadmap for skills acquisition of the building sector's workforce until 2020. The project aims to undertake both a quantitative and qualitative assessment of current training demand and supply in France. The assessment will identify new skills that are required in the building sector for all "on-site" workers, as well as help review any initiatives or experiments that

have already been carried out or are under way at different levels (national, regional, local). The results would also help to elaborate an action plan (a "roadmap") in consultation with all relevant stakeholders e.g. employers' associations, trade unions, vocational training centres, relevant authorities, etc. This would not only help to meet the training needs and requirements but also help to remove the identified obstacles. This includes identifying ways for financing its further implementation in complement of the existing system (for more information, see: www.buildup.eu/en/skills/france).

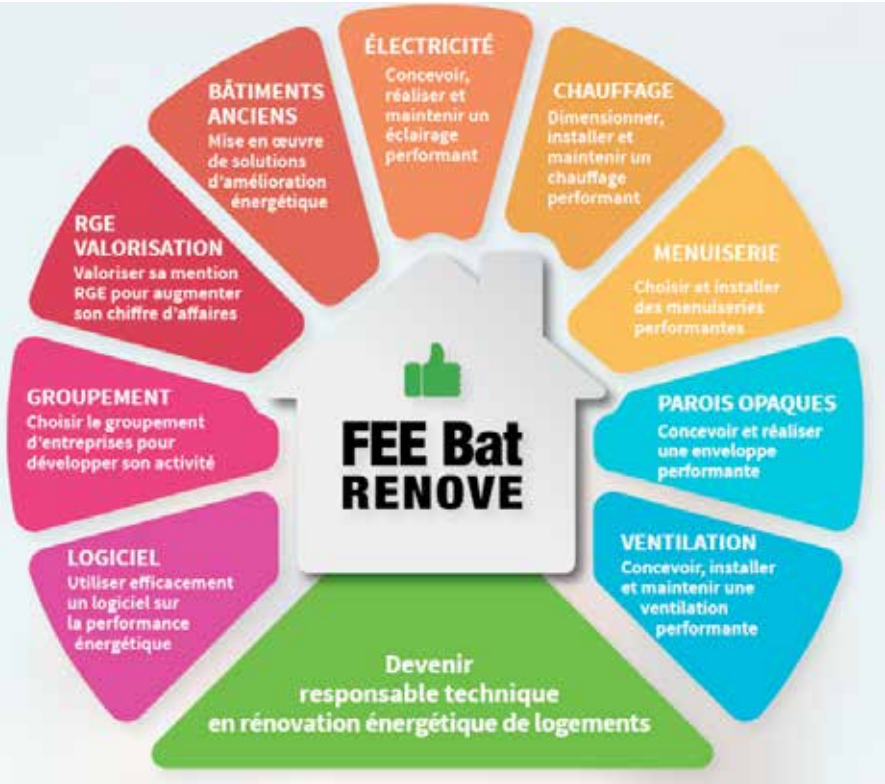
2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes	
Public	**Private**
ADEME, CAFOC	SOLENER, INES, etc.

2.2. Indicative CVET Courses/Seminars for EE/RES

As an example, the national FeeBat RENOVE programme is dedicated to EE in buildings. For each topic and following your location, local training providers could provide training. www.feebat.org/modules



Another private website proposes to reference all trainings that have been executed. The titles of each trainings are linked to the description of each training course : www.e-formation-environnement.com

CVT Provider: CFA Urban Environment Institute

Title of the Training/Seminar:

Energy - management and maintenance of the energy and climate system

Target Group:

Apprentices, high school level

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

yes

RE Training Modules:

yes

Duration:

2 years

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional 'bac' (high school level diploma)

Courses per Year:

n.a.

CVT Provider: Environmental Jobs School

Title of the Training/Seminar:

Renewable energy and energy saving

Target Group:

Bachelor level students

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

yes

RE Training Modules:

yes

Duration:

1 year

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional diploma

Courses per Year:

n.a.

CVT Provider: Orléans University / Higher School of Energy and Materials

Title of the Training/Seminar:

Environmental Engineering

Target Group:

Bachelor level students

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:
yes

RE Training Modules:
yes

Duration:
3 years

Trainees per Cycle:
n.a.

Certificate Diploma:
Engineer

Courses per Year:
n.a.

CVT Provider: Institute of nature and environment jobs

Title of the Training/Seminar:
Energy management

Target Group:
Bachelor level students

Methodology (in class, on-site, e-learning):
n.a.

EE Training Modules:
yes

RE Training Modules:
yes

Duration:
2 years

Trainees per Cycle:
n.a.

Certificate Diploma:
Professional studies certificate

Courses per Year:
n.a.

CVT Provider: INSA engineering school

Title of the Training/Seminar:
Energy Engineering and the Environment

Target Group:
Bachelor level students

Methodology (in class, on-site, e-learning):
n.a.

EE Training Modules:
yes

RE Training Modules:
yes

Duration:
5 years

Trainees per Cycle:
n.a.

Certificate Diploma:
Engineer

Courses per Year:
n.a.

CVT Provider: Technical University Institute

Title of the Training/Seminar:

Energy and development

Target Group:

Bachelor level

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

yes

RE Training Modules:

yes

Duration:

1 year

Trainees per Cycle:

n.a.

Certificate Diploma:

Master degree

Courses per Year:

n.a.

CVT Provider: Technical University Institute

Title of the Training/Seminar:

Renewable Energy Science and Technology

Target Group:

Bachelor level

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Energy production of thermal systems for tertiary building and networks (option 2)

RE Training Modules:

Stand-alone or grid-connected systems engineering (option 1)

Duration:

1 year

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional bachelor degree

Courses per Year:

n.a.

CVT Provider: Technological University

Title of the Training/Seminar:

Mechanics, energy and environment

Target Group:

Master level

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

yes

RE Training Modules:

yes

Duration:

1 year

Trainees per Cycle:

n.a.

Certificate Diploma:

Master degree

Courses per Year:

n.a.

CVT Provider: School of engineering

Title of the Training/Seminar:

Valuation of Renewable Energies and Waste in Construction

Target Group:

Master level

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

yes

RE Training Modules:

yes

Duration:

1 year

Trainees per Cycle:

n.a.

Certificate Diploma:

Master degree

Courses per Year:

n.a.

CVT Provider: National (engineering) School of Roads and Bridges

Title of the Training/Seminar:

Energy management: improving the energy performance of buildings

Target Group:

Professional training

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

yes

RE Training Modules:

yes

Duration:

2 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: Institute of work-linked management studies

Title of the Training/Seminar:

Sustainable Energy Management

Target Group:

Master or bachelor with valid professional experience

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

yes

RE Training Modules:

yes

Duration:

14 months

Trainees per Cycle:

30

Certificate Diploma:

Master degree

Courses per Year:

1

CVT Provider: Digital Environment and urbanism campus

Title of the Training/Seminar:

Renewable and non-renewable energies: sectors and applications

Target Group:

Energy professionals and or master level

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

—

RE Training Modules:

yes

Duration:

20h over 10 weeks

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

1

CVT Provider: School of technological innovation

Title of the Training/Seminar:

New energies and eco-innovation

Target Group:

Bachelor level in technology and or management

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

—

RE Training Modules:

yes

Duration:

3 years

Trainees per Cycle:

22

Certificate Diploma:

Master degree

Courses per Year:

1

CVT Provider: ADEME

Title of the Training/Seminar:

Social workers against fuel poverty

Target Group:

Social workers

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Identify fuel poverty factors, possible solutions, support households to set up and finance a renovation plan

RE Training Modules:

—

Duration:

3 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME

Title of the Training/Seminar:

Realize a quality energy audit in the building

Target Group:

Experienced consultancies

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Quality decision making support, mistakes to avoid in an energy audit

RE Training Modules:

—

Duration:

3 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME

Title of the Training/Seminar:

Energy Performance Contracts in Public Heritage Buildings: Interest, Feasibility and Key Success Factors

Target Group:

Technical and financial building managers

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Assessing the opportunity of energy performance contracts, assessing your building and your capacity to manage an energy performance contract

RE Training Modules:

—

Duration:

3 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME

Title of the Training/Seminar:

Introduction to geothermal energy

Target Group:

Building and real estate professionals

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

—

RE Training Modules:

Understanding geothermal energy and its uses, potential resources and applications

Duration:

1,5 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME

Title of the Training/Seminar:

Managing electricity demand in public lighting

Target Group:

Energy and lighting technicians and engineers

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Implementing a public lighting demand management programme, use the key technical, financial and environmental indicators

RE Training Modules:

—

Duration:

3 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME

Title of the Training/Seminar:

How to optimize energy consumption in your company?

Target Group:

Company energy managers and decision makers

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Identify key savings operations, energy management tools and methods, initiate concrete energy savings measures

RE Training Modules:

—

Duration:

3,5 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME and METROL

Title of the Training/Seminar:

Large wind turbines

Target Group:

Technical, administrative and financial wind energy professionals

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

—

RE Training Modules:

Technological state of the art, actors strategies, market update

Duration:

4 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME

Title of the Training/Seminar:

Photon network: implementation and monitoring of photovoltaic systems connected to the network

Target Group:

Grid-connected PV operators

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

—

RE Training Modules:

Installation feasibility evaluation, compare PV and alternative energies, installation sizing, identify relevant technical solutions

Duration:

3 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME and Geological and Mining Research Bureau

Title of the Training/Seminar:

Collective and tertiary geothermal heat pumps: project development

Target Group:

Decision makers, consultancies, heat pump installation and maintenance operators

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

—

RE Training Modules:

Geothermal project management, technical options, key performance indicators, cas studies

Duration:

3 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME

Title of the Training/Seminar:

Thermal solar: production of domestic hot water

Target Group:

Building sector decision makers, designers and installers

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

—

RE Training Modules:

Opportunity and feasibility of thermal solar, legal and financial steps of a project, installation sizing and design

Duration:

3 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: ADEME

Title of the Training/Seminar:

Low Energy Buildings: Achieving Low Consumption in Construction

Target Group:

Construction engineers and consultancies

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Why and how to design low energy buildings, design steps and tools (new buildings and renovation)

RE Training Modules:

—

Duration:

3 days

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional training certificate

Courses per Year:

n.a.

CVT Provider: Le Corbusier high school

Title of the Training/Seminar:

Energy engineering – Climate system installation and maintenance technician

Target Group:

High school

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Administrative and technical aspects of heating system maintenance, testing procedure and diagnoses, safety, client relationship and contracts

RE Training Modules:

—

Duration:

3 years

Trainees per Cycle:

n.a.

Certificate Diploma:

Profession ‘bac’ diploma

Courses per Year:

n.a.

CVT Provider: Savoie Association for the Promotion of Renewable Energies

Title of the Training/Seminar:

Energy management, renewable energy and eco construction

Target Group:

Professional training for bachelor level employees and job seekers

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

yes

RE Training Modules:

yes

Duration:
9 months

Trainees per Cycle:
n.a.

Certificate Diploma:
Professional training certificate

Courses per Year:
n.a.

CVT Provider: Polytech School of Savoie University

Title of the Training/Seminar:
Renewable energies and buildings

Target Group:
Master level technical executives

Methodology (in class, on-site, e-learning):
Class learning, practical training

EE Training Modules:
Building science and technology, tools for sustainable development

RE Training Modules:
Renewable energies (PV and thermal solar, geothermal)

Duration:
11 months (incl. 4 months internship)

Trainees per Cycle:
n.a.

Certificate Diploma:
Master degree

Courses per Year:
1

CVT Provider: INIT Environment

Title of the Training/Seminar:
Home Improvement “Eco housing technical advisor”

Target Group:
Building sector professionals bachelor level

Methodology (in class, on-site, e-learning):
Class learning, practical construction workshop training

EE Training Modules:
Environmental quality and labels, passive energy design, energy audit, energy renovation, insulation methods and products

RE Training Modules:
Heating and renewable energies

Duration:
910 hours (26 weeks)

Trainees per Cycle:
n.a.

Certificate Diploma:
Professional training certificate

Courses per Year:
n.a.

CVT Provider: CFA (Apprentice training centre) Guyancourt

Title of the Training/Seminar:

Energy Efficiency of Buildings Engineering

Target Group:

Bachelor level (technology, construction, environment)

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

yes

RE Training Modules:

—

Duration:

1 year

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional bachelor degree

Courses per Year:

n.a.

CVT Provider: CFA (Apprentice training centre) Guyancourt

Title of the Training/Seminar:

Energy Management and Renewable Energies

Target Group:

Bachelor level (heating, security, environment)

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Economics of energy management

RE Training Modules:

Renewable energy technologies and their uses

Duration:

1 year

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional bachelor degree

Courses per Year:

n.a.

CVT Provider: CFA (Apprentice training centre) Guyancourt

Title of the Training/Seminar:

Chemistry-Physics of Decentralized, On-board and Renewable Energies

Target Group:

Scientific master degree

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

—

RE Training Modules:

yes

Duration:

1 year

Trainees per Cycle:

n.a.

Certificate Diploma:

Professional master degree

Courses per Year:

n.a.

CVT Provider: Recyconsult

Title of the Training/Seminar:

E-Training 06: Renewable energies

Target Group:

Broad audience

Methodology (in class, on-site, e-learning):

e-learning

EE Training Modules:

—

RE Training Modules:

General energy issues, different renewable energy sources, how to choose a renewable energy source, actors in the field

Duration:

10h

Trainees per Cycle:

n.a.

Certificate Diploma:

e-training certificate

Courses per Year:

n.a.

CVT Provider: INIT Environment

Title of the Training/Seminar:

« Eco helper » ecological troubleshooting

Target Group:

Broad audience with a priority for job seekers and social and solidarity economy sector professionals

Methodology (in class, on-site, e-learning):

n.a.

EE Training Modules:

Eco-diagnosis, how to improve thermal comfort, improve or adapt lighting, advising on energy intensive appliance and efficient maintenance

RE Training Modules:

—

Duration:
455h

Trainees per Cycle:
n.a.

Certificate Diploma:
Professional training certificate

Courses per Year:
n.a.

In addition to this general information, several trainings were specifically developed for the Mediterranean region.

CVT Provider: ADEME/ EMENDA / CAFOC (Centre Académique de Formation Continue)

Title of the Training/Seminar:

Règlement Thermique de la Construction au Maroc (Thermal regulation in Buidling sector in Morocco)

Target Group:

Building sector professionals :

- Staff from AMEE (national agency)
- Consulting firms
- Architects
- Buidlers (including technical training for workers

Methodology (in class, on-site, e-learning):

Classrooms / on-site

Content/Training Modules:

—

Duration:
8 modules – each 2-3 days

EE
Yes

Certificate/Diploma:
Yes

RES
—

Trainees per Cycle:
15-20

Language:
Fr

Courses per Year:
NA

CVT Provider: ADEME / SOLENER

Title of the Training/Seminar:

Réaliser un audit énergétique simplifié de qualité dans les bâtiments / Simplified Energy Audits in buildings

Target Group:

Auditors / consulting firms

Methodology (in class, on-site, e-learning):

Classroom / onsite visit

Content/Training Modules:

1.1.1 *Jour 1 : Contexte, potentialités du climat, conception bioclimatique*

1.1.2 *Jour 2 : Optimisation énergétique et éléments méthodologiques de prédiagnostic*

1.1.3 *Jour 3 : Visites de sites à Blida*

1.1.4 *Jour 4 : Étude de cas*

Duration:

1 module 2 days

EE

Yes

Certificate/Diploma:

No

RES

Yes

Trainees per Cycle:

15-20

Language:

Fr

Courses per Year:

NA

CVT Provider: ADEME/ SOLENER

Title of the Training/Seminar:

MOOC Batichaud / MOOC on “Sustainable Building in tropical climate”

Target Group:

Open course / grand public + professionals

Methodology (in class, on-site, e-learning):

Online

Content/Training Modules:

www.mooc-batiment-durable.fr

1.1.5 *Semaine 1 - Construire avec le climat : les potentialités en zone tropicale*

1.1.6 *Semaine 2 - Approches et démarches méthodologiques*

1.1.7 *Semaine 3 - Retours d’expériences et appropriation des bâtiments par les usagers*

Duration:

3 weeks (1,5h)

EE

Yes

Certificate/Diploma:

Yes

RES

Yes

Trainees per Cycle:

300-500

Language:

Fr

Courses per Year:

2 sessions in 2018

CVT Provider: ADEME

Title of the Training/Seminar:

Mise en oeuvre de l'EE au niveau local / Implementation of EE Action plans at the local level

Target Group:

Local authorities

Methodology (in class, on-site, e-learning):

In classroom

Content/Training Modules:

—

Duration:

8 hours

EE

Yes

Certificate/Diploma:

No

RES

—

Trainees per Cycle:

15-20

Language:

Fr

Courses per Year:

N/A

CVT Provider: ADEME

Title of the Training/Seminar:

Conseil Info / énergie (adapted in MED° / Information platforms on energy efficiency

Target Group:

Local stakeholders / advisors

Methodology (in class, on-site, e-learning):

In classroom

Content/Training Modules:

—

Duration:

8 hours

EE

Yes

Certificate/Diploma:

No

RES

Yes

Trainees per Cycle:

15-20

Language:

Fr

Courses per Year:

N/A

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation			X		
Energy planning			X		
Energy audits			X		
RE Technologies			X		
EE Technologies			X		
Installation of RE systems			X		
Installation of EE systems			X		
Size of the RE market			X		
Size of the EE market			X		
Integration of RE and EE in buildings			X		

5.4. GREECE

1. Country Overview

1.1. Adult Education System

After finishing school, an adult in Greece has two educational options: 1) to continue onto formal education (tertiary level) by taking the national examination test and passing through to either the University system (AEI) or through to one of the Technical Education institutions (TEI) or 2) to continue to Vocational Education and Training.

There is also the option of Lifelong Learning (LLL), which is becoming a policy priority at European and international level. In order to achieve LLL development, a number of policies and strategies have been implemented in Greece over the past years. According to Law 3879/2010, the administrative bodies of Lifelong Learning and, by extension, of Adult Education are the General Secretariat for Lifelong Learning and Youth (GSLLL), the National Organization for the Certification of Qualifications and Vocational Guidance (EOPPEP) and the National Centre for Public Administration and Local Government (EKDDA).

The GSLLL is the main body for LLL at the central level, which is supervised by the Ministry of Education, Research and Religious Affairs (Law 4386/2016). Its purpose is to 1) plan public policy for lifelong learning, 2) to form the relevant regulations, 3) to prepare the corresponding national programme and 4) to monitor its implementation. For that reason, it has decentralised departments, which are the official bodies for non-formal education. The main responsibility of EOPPEP (supervised by the Minister of Education) is the certification of all branches of non-formal education. More specifically, EOPPEP certifies all educational bodies which are offering lifelong learning services, it defines the official job profiles of professions and educative programmes which can lead to a certified trainee. Furthermore, EOPPEP defines the qualifications that educators of adult learners need in order to provide training courses. EOPPEP is responsible for the development of the Hellenic Qualifications Framework and its correlation with the European Qualifications Framework (Law 4115/2013).

The EKDDA is the national strategic educational and training agent for the development of human resources of the Public Administration and Local Government. Its mission, among others, is to upgrade the Public Administration's HR through LLL and through certified training on knowledge and skills.

The legal framework for LLL was shaped by the Law 3879/2010, which sets the basis for the planning and implementation of a national holistic strategy on LLL and for the creation of the National Network of Lifelong Learning (NNLL). This encompasses all LLL governing bodies and service providers which are operating under the auspices of different ministries. The mapping and registration of the NNLL members, as well as their briefing on national LLL policies and the priorities that are linked to quality assurance, validation, accreditation, interoperability and mobility, as well as participation and accessibility, are a prerequisite for a fruitful interaction within the network.

Law 3879/2010 contain the following provisions:

- All LLL activities are organized under a general national framework;
- All activities and funding are included in the national programme for LLL and its implementation programme;
- The national qualification framework and the definition of vocational profiles are described accordingly;
- Synergies between LLL and employment are defined;
- Procedures for accreditation and quality assessment are described accordingly;
- The LLL implementation in municipalities and regions is defined.

GSLLL and EOPPEP are the main national authority bodies, which define the trainer's qualifications. In addition, EOPPEP has undertaken the establishment of a qualification certification system that upholds the quality and mutual trust between the social partners. The National (Hellenic) Qualifications Framework (HQF) has also been established, in correspondence with the European EQF, which has eight levels of learning. HQF sets incentives for the development of LLL as well as for the updating of knowledge, competencies and abilities of the country's manpower, such as:

- Linking programmes of non-formal education with the formal education system via modular and certified learning programmes;
- Granting special training leaves for the participation in LLL programmes;
- Introducing individual training accounts with the participation of both employer and employee;
- Introducing individual employee training time accounts for the attendance of LLL and training programmes;
- Linking the evaluation of LLL bodies with their funding.

The HQF, in its final form, enhances the mobility and the career advancement opportunities of the employees, provided that their qualifications are recognized at a national and European level. It also promotes transparency in qualifications as well as supports and matches the relationship between education and training to the needs of the labour market. With the implementation of the HQF, and by adopting forms of practical recognition of informal learning that have been tested in other EU countries (e.g. credit systems, etc.), there is now a great potential for the identification and certification of the professional experience of citizens. The HQF comprises of 8 levels covering all types of qualifications, from compulsory to higher education. It facilitates the validation of non-formally (i.e. initial and continuing vocational training) and informally (i.e. vocational experience) acquired qualifications. The learning outcomes that correspond to the qualifications of a specific level are defined through a set of descriptors, which are based on a classification of quality and quantity of knowledge, skills and competences.

There is currently no comprehensive national framework for the certification of non-formal education and informal learning. To this end, the EOPPEP (JMD 119959/H/20.10.2011 and Law 4115/2013), as the main administration body of the National Network for Lifelong Learning, aims to:

- Develop and implement a comprehensive national certification system of non-formal education (initial and continuous vocational training and general adult education); and
- Provide scientific support to the Vocational Orientation and Counselling services in the country.

The certification of qualifications concerns the certification of outputs; that is, the results of non-formal education, as well as informal learning. In co-operation with the labour market, in terms of the priorities which need to be set, and in connection with the certification of input, the EOPPEP:

- Shapes the regulatory framework for the recognition and certification of qualifications acquired through non-formal education and informal learning;
- Certifies specific qualifications; and
- Authorises independent bodies, which certify qualifications identified on the basis of the needs and priorities of the labour market.

The financing of LLL is provided by the state, the EU or private resources. The actions and programmes implemented by governmental/public entities are funded primarily by the Operational Programmes (OP) entitled 'Investment in Education, training, professional training for the acquisition of skills and LLL' and 'Human Resources Development - Training and LLL'. These fall under the National Strategic Reference Framework (NSRF) 2014-2020 and are co-financed by the Greek Government and the EU.

1.2. Technical and Vocational Education and Training (TVET)

The Technical Vocational Education and/or Training (VET) in Greece is within the competence of the Ministry of National Education and Religious Affairs (YPEPTH), namely the General Secretariat for Lifelong Learning and Youth and the National Organization for the Certification of Qualifications and Vocational Guidance (EOPPEP), through the Greek National Vocational Education and Training System (established by Law 2009/1992). The Lifelong Learning related policy in Greece is part of a wider development plan. The General Secretariat for Lifelong Learning and Youth plans the public policy of LLL.

Since 2000, four laws have been established on 1) the national system linking VET with employment (Law 3191/2003), 2) systematising lifelong learning (Law 3369/2005), 3) developing lifelong learning (Law 3879/2010), and 4) restructuring secondary education (Law 4186/2013). Numerous amendments have been enacted in an attempt to regulate the domain of VET and LLL. The new law on the restructuring of secondary – including vocational - education (Law

4186/2013), on the one hand, opens up the VET system to the economy and the job market and, on the other hand, attempts to regulate the field from the perspective of LLL.

Thus, according to the above mentioned Law, VET in Greece is provided under two basic forms:

a. Formal (initial) VET, i.e. initial vocational education within the formal education system, which can be defined as the first cycle of basic training/specialization, the second cycle of secondary education and providing basic knowledge and prowess for preparing the entrants for the labour market. This form of education is part of the national free educative system (public high schools) and it concerns the 2nd level of non-compulsory education, provided by the Vocational High Schools (*Epaggelmatika Lykeia* - EPAL). These schools (public or private/day or evening schools) are founded exclusively by YPEPTH. The minimum age for enrolment in a vocational evening school is 16. The public EPALs offer the specialties listed in the legislation, while the programmes are organised by sector, group and specialty, with most sectors offering two or more specialties. The sectors currently covered are information science, mechanical engineering, electrical engineering/ electronics/ automation, construction, environment and natural resources, administration and economics, agronomy-food technology and nutrition, and occupations in the merchant marine (captain, mechanic).

   Two cycles of studies are offered within the EPALs: the secondary cycle (3-years programme) and the optional additional post-secondary cycle, the "Apprenticeship Class" (education in the workplace). Regarding the Apprenticeship year, the responsibility for students' work placements and associated matters is shared by EPALs and OAED. Apprenticeship year programmes are financed by national and/or EU funds, with no contribution from the participating enterprises, in contrast to most other European countries that implement apprenticeship systems.

   Those who complete an upper secondary programme are awarded with a vocational upper secondary school leaving certificate (equivalent to the general upper secondary school leaving certificate) and a specialisation diploma at European qualifications framework (EQF) level 4, following school examinations administered by EPAL. Graduates of the apprenticeship year

receive a diploma at EQF level 5 issued jointly by the Ministry of Education and OAED, after procedures for certification of their qualifications have been completed by the national agency. Graduates from a vocational upper secondary evening school do not have to enrol in the apprenticeship year, but they can apply for certification of their qualifications if they have worked for at least 600 days in the specialty from which they graduated from in their third year.

Curricula can be developed in line with the European credit system for VET (ECVET), and take into account, where these exist, related job profiles certified by the National Organisation for the Certification of Qualifications and Vocational Guidance (EOPPEP).

b. Non-formal VET, according to the Lifelong Learning Act (Law 3879/2010), is defined as the education provided in an organised framework that is outside of the formal education system, and that can lead to nationally recognised qualifications. It includes Initial Vocational Training, Continuous Vocational Training and Adult Learning. The initial non-formal VET can be offered in:

- The newly-established SEK (Vocational Training Schools), which replace the previous EPAS, can be either public or private, These schools provide initial vocational training to those who have completed compulsory education. The programmes last for a three year duration. Also, there are no tuition fees at public schools. Students who are over 20 or employed can attend evening vocational training schools for four years. The last year of the three-year SEK programme is the apprenticeship year. Holders of a lower secondary school leaving certificate or equivalent can enrol in the first year of a SEK without sitting examinations.
- Vocational Training Institutes (IEK) provide initial vocational training, mostly for graduates of upper secondary schools, but also to those who have completed a SEK programme, with a view to integrating them into the labour market. These trainings are also open to EPAL graduates (who may enter the third semester of a related specialty), graduates of general upper secondary school and graduates of lower secondary school (in a limited number of specialties). IEK programmes last for five semesters, four of which are theoretical and which include laboratory training, and

one of which is for practical training or apprenticeship, which may be continuous or segmented. Students who successfully complete all these semesters are awarded with an attestation of vocational training, which in turn entitles them to take part in the certification examinations under the jurisdiction of EOPPEP, with which they acquire an upper secondary VET certificate. IEK graduates are awarded occupational specialization diplomas at EQF level 5.

The providers of vocational training (public or private), outside of the formal education system, are supervised by the General Secretariat for Lifelong Learning (GSLL) of YPEPTH. Under the new law, the specialties offered in public vocational training and the sectors under which they are classified, are determined by decision of the Minister for Education, in accordance with the needs of the national and local economy and proposals of regional administrations, competent ministries and social partners. Curricula are developed and overseen by the GSLL and certified by the EOPPEP and they can be defined in terms of learning outcomes and linked to credits, following ECVET.

— Continuous Vocational Education and Training (CVET) and general adult education is provided by Vocational Training Centres or Level II Lifelong Learning Centres (KDVM II) (former KEKs), which are focused on specific thematic areas that are defined by the institutional framework of their certification (JMD No. 110327/2005, Art. 3, Official Governmental Gazette 230 B'/21.02.2005). The Level II KDVM Centres can be private entities (profit or non-profit) or public providers of CVT. Through the Continuing Vocational Training, LLL aims to provide knowledge, skills and competences to adults who are capable and willing to enter the labour market. This training is aimed at individuals that have a low level of expertise / qualifications in there professions, or no expertise in any profession. Also, to self-employed persons in order to help them improve their qualifications or change their jobs, if their previous jobs have become obsolete. It is also aimed at staff in private companies or at those that are self-employed, to help them upgrade their typical or actual qualifications. The interested groups, through their Unions, present their requirements for further training and define the thematic fields.

The Ministry of Education, through EOPPEP, is responsible for safeguarding the quality of non-formal education through the evaluation of these centres and through monitoring their operations. EOPPEP licenses private Vocational Training Institutes (IIEK), and accredits the KDVM Level II Centres. Under the Law 3879/2010 that concerns lifelong learning, a decentralization of the actions has been suggested in this area. This has been done though the establishment of administrative bodies by the Greek regional administrations that can manage the national lifelong learning network. Each region draws up its own programme, which includes investments, vocational training actions or programmes, and more generally actions implementing public policy on lifelong learning in the region. The municipalities are competent of setting up Lifelong Learning Centres or mobilising the network of lifelong learning bodies in their region, offering programmes linked to the local labour environment and beyond. Currently, the qualifications that are acquired through continuing vocational training are not correlated to levels of the national qualifications framework, but this will eventually be done.

CVET in Greece is provided by a plethora of entities which focus on specific target groups and are supervised by different ministries. The existing institutional framework focuses on four categories:

- Training for unemployed;
- Training for private sector workers;
- Training for wider public sector workers;
- Training for socially disadvantaged groups.

The vocational training programmes are short-term and the hours of tuition depend on the subject, the curriculum and the targeted participants. According to EOPPEP, there are 516 accredited KDVM Level II (public and private).

In terms of funding sources for CVET in Greece, co-financing is provided by the European Social Fund and the Greek state itself. CVET is provided by the public KDVM Level II Centres of Greek Manpower Employment Organisation (OAED) at the national level. Private KDVM Level II Centres and KDVM Level II Centres which are run by social partners also provide CVET. These are also funded by the State since many of their training programmes are subsidized by OAED. More specifically, OAED funds a number of CVET programmes which have been selected following submissions through a public call.

The responsible authorities for CVET include the General Secretariat for Life-long Learning (GSLLL) which is responsible for LLL in Greece. EOPPEP is responsible to apply the legislated criteria to the training providers (institutes) of non-formal education encompassing VET and CVET. If the training providers have the necessary infrastructure, curricula and employ certified trainers, EOPPEP gives them accreditation and license to work. Furthermore, EOPPEP ensures that training providers follow the legislated specifications for their operations, have qualified employed staff and provide the respective services. Additionally, EOPPEP licenses Private Vocational Training Institutes (IIEK) and KDVM LEVEL II Centres. EOPPEP also develops the regulatory framework for the certification of qualifications.

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

In Greece there are several training courses, which include topics with regard to EE and RES technologies. In most of these courses, there are no specific entry requirements and usually they are attended by people interested in the RES and EE sector. There are also training courses offered by trade and industry associations, professional chambers, wholesalers and producers (only related to specific products), which in most cases are ad-hoc, short term (1-2 days) seminars. Training courses offered by the professional associations are more tailor-made to the needs of their members, covering part of the skills required in specific areas related to EE and RES.

Training Institutes	
Public	**Private**
• Institute for Youth and Lifelong Learning (INEDIVIM) • Public Centres for Lifelong Learning Level I (KDVM I) • Public Centres for Lifelong Learning Level II (KDVM Level II) • Public Vocational Training Institutes (IEK) • The Greek Manpower Employment Organization (OAED), with the following structures: – Employment Promotion Centres (KPA) – Apprenticeship Vocational Schools (EPAS) – Vocational Training Schools (SEK) – Vocational Training Institutes (IEK) • Bodies in the public and broader public sector who provide non-formal education in human resources in the public and broader public sector, such as: – National Centre for Public Administration – Local Government (EKKDA) • Providers of services of formal and non-formal adult education, including social, religious and cultural institutions and structures providing adult education services, such as the Second Chance Schools (SDE) and the Schools for Parents. • Public institutions (Universities, CRES, etc.) providing training in the frame of EU or national funded Projects (not on a systematic basis)	• Private LLL bodies Certified by EOPPEP: – Private Centres for Lifelong Learning Level I (KDVM I) – Private Centres for Lifelong Learning Level II (KDVM Level II) – Private Vocational Training Institutes (IIEK) • Bodies set up by professional associations and chambers which provide non-formal education to their members, such as: – Greek National Federation of Electrical Contractors (POSEH) – Greek Electricians Federation – Greek Federation of Building workers and related professions – Small Businesses of the General Confederation of Professionals, Craftsmen and Merchants (IME-GSEVEE) • Providers of LLL which are constituted by the tertiary unions and employers align by national collective contract. • Providers of consulting services of professional orientation. • Colleges

2.2. Indicative CVET Courses/Seminars for RES

CVT Provider: KDVM LEVEL II CENTRE IVEPE

Title of the Training/Seminar:

Geothermal Installations

Target Group:

Engineers and technicians who work on RES and air conditioning of buildings

Methodology (in class, on-site, e-learning):

in classroom / laboratories

Content/Training Modules:

New forms of air conditioning (cooling - heating) like the shallow geothermal energy/ Legislative framework, Types of Geothermal Systems & Selection, Geothermal Heat Pumps, Design and Dimensioning, Description of the geothermal air conditioning, Examples

Duration:	Trainees per Cycle:
20h	N/A
Certificate/Diploma:	**Courses per Year:**
Certificate of attendance	2012 (1)

CVT Provider: KDVM LEVEL II CENTRE IVEPE

Title of the Training/Seminar:

PV installations

Target Group:

Engineers and PV technicians

Methodology (in class, on-site, e-learning):

in classroom / laboratories

Content/Training Modules:

Concepts, definitions, basic principles of PV conversion, Autonomous, hybrid and grid connected PV systems, construction details. Solving problems that occur during operation, economic evaluation of investment. Legislation for Building Integrated PhotoVoltaics (BIPVs) and Building Assisted Photovoltaics (BAPVs)

Duration:	Trainees per Cycle:
20h	N/A
Certificate/Diploma:	**Courses per Year:**
Certificate of attendance	2012 (1)

CVT Provider: KDVM LEVEL II CENTRE of Heraklion Chamber

Title of the Training/Seminar:

Design of PV systems

Target Group:

Potential investors / PV installers

Methodology (in class, on-site, e-learning):

in classroom

Content/Training Modules:

PV technologies and comparative performance, Inverter Technology – Classification, interconnected systems, meteorological data from various regions in Greece, Legislation related to non-interconnected systems, Investment costs – Cost efficiency system, Examples of equipment selection

Duration:	Trainees per Cycle:
8h	N/A
Certificate/Diploma:	**Courses per Year:**
Certificate of attendance	2011 (1)

CVT Provider: Centre for Professional Development KEA

Title of the Training/Seminar:

Geothermal heat pumps and water management

Target Group:

—

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Training in new techniques of plumbing geothermal systems

Duration:	Trainees per Cycle:
90h	N/A
Certificate/Diploma:	**Courses per Year:**
—	2011 (1)

CVT Provider: KDVM LEVEL II CENTRE OF GSEVEE

Title of the Training/Seminar:

Photovoltaic systems for electrical contractors

Target Group:

Electrical installers

Methodology (in class, on-site, e-learning):

in classroom

Content/Training Modules:

Energy power. Voltage-amperage. DC power. Sun-wind. Climatic conditions (geographical area, orientation, slope shading potential solar - wind). Photovoltaic effect, solar cell (types)

Duration:

40h

Trainees per Cycle:

149

Certificate/Diploma:

—

Courses per Year:

2008 (1) / 2009 (2) / 2010 (5)

CVT Provider: KDVM LEVEL II CENTRE OF GSEVEE

Title of the Training/Seminar:

Photovoltaic systems for Electrical Installers

Target Group:

Electrical installers

Methodology (in class, on-site, e-learning):

in classroom

Content/Training Modules:

Introduction to renewable energy (solar thermal, solar electric, wind, wave, geothermal) - Electric energy, voltage-amperage, DC power, isolated large-scale producers (MICRO GRID), cross-linked derivatives, Photovoltaic effect, solar cells (type) solar panel, photovoltaic clusters calculation of energy needs housing size of installed power

Duration:

25h

Trainees per Cycle:

649

Certificate/Diploma:

Attendance certificate of CVET training

Courses per Year:

2010 (5)

CVT Provider: KDVM LEVEL II CENTRE OF GSEVEE

Title of the Training/Seminar:

Photovoltaic systems and information on RES

Target Group:

Electrical installers

Methodology (in class, on-site, e-learning):

in classroom

Content/Training Modules:

—

Duration:

—

Trainees per Cycle:

—

Certificate/Diploma:

Attendance certificate of CVET training

Courses per Year:

Constantly

CVT Provider: KDVM LEVEL II CENTRE OF GSEVEE

Title of the Training/Seminar:

Geothermal - Solar thermal

Target Group:

Plumbers

Methodology (in class, on-site, e-learning):

in classroom

Content/Training Modules:

—

Duration:

—

Trainees per Cycle:

—

Certificate/Diploma:

Attendance certificate of CVET training

Courses per Year:

Constantly

CVT Provider: TUV HELLAS

Title of the Training/Seminar:

Design & installation of PVs in domestic and industrial buildings

Target Group:

Engineers, electricians and PV installers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Study, design, installation, maintenance, supervision and sustainability of investment for small, medium and large scale PV systems

Duration:

16h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

10/2012

CVT Provider: IEK OMEGA

Title of the Training/Seminar:

Photovoltaic systems

Target Group:

Engineers, electricians and PV professionals (technician, consultant, investor)

Methodology (in class, on-site, e-learning):

in classroom

Content/Training Modules:

—

Duration:

45h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2/2011

CVT Provider: TÜV Rheinland Hellas

Title of the Training/Seminar:

Study of PV systems and Certifications

Target Group:

Engineers, technicians, PV installers

Methodology (in class, on-site, e-learning):

in classroom

Content/Training Modules:

PV systems concepts, calculations for autonomous, hybrid and grid connected systems, legislation, standards EN-IEC 61215 EN-IEC 61646 IEC 61730-1 IEC 60634; certification of installations according to EN 62446

Duration:

18h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2012

CVT Provider: TÜV Rheinland Hellas

Title of the Training/Seminar:

Design and certification of PV installations

Target Group:

Engineers and PV installers

Methodology (in class, on-site, e-learning):

in classroom

Content/Training Modules:

Knowledge acquired to design and oversee the construction of small and medium scale PV systems

Duration:

10h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2012

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

PV systems theory, practice, laws, construction & simulation

Target Group:

Engineers and PV installers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Critical parameters regarding the calculation, design and implementation of a PV system, Financial & market trends, Major aspects of the Greek legislation on PV systems, Basic principles of PV system operation

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2012

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

Installation techniques for PV plants

Target Group:

Engineers and PV installers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Design and implementation of a PV system, financial & market trends, major aspects of the Greek legislation on PV systems, and basic principles of PV system operation

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2012

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

Shallow Geothermal Systems and the New institutional framework

Target Group:

Engineers and technicians who work on RES and air conditioning of buildings

Methodology (in class, on-site, e-learning):

e-learning

Content/Training Modules:

New practices for air conditioning (cooling/heating) like the shallow geothermal energy Legislative framework, Types of Geothermal Systems & Selection, Geothermal Heat Pumps, Dimensioning, Description of the geothermal air conditioning, Examples

Duration:

—

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2015

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

PV technology – Financing

Target Group:

PV installers and potential investors

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

PV technology and applications PV Systems, Typologies, Systems' Design, Installation of PVs, Simulation, Technological Developments, Technological Issues, Financial Legislation in Greece, Ways of Funding, Typical Application Examples

Duration:

—

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2010

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

Design of PV on roofs up to 100 kW & lightning protection (connection to PPC)

Target Group:

Electricians, technicians, PV installers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Sizing of PV systems on roofs up to 100 kWp, required Lightning Protection, for connection to low voltage grid The PV system, PV system design, Installing PV system, Lightning Protection of the PV, Lightning

Protection of Buildings, Earthing, Examples

Duration:

6h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2012

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

HYDROLOGY OF A SMALL HYDROELECTRIC PROJECT (SHP)

Target Group:

Hydrologists, Plumbers, Environmentalists, Engineers and Technicians

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Basic Licensing Legislation, Public bodies for the licensing, Hydrology of a SHP, Types of hydro turbines, Construction of a SHP, Environmental Impacts – EIA, The Greek reality, examples

Duration:

—

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

—

CVT Provider: Euro Educational

Title of the Training/Seminar:

Application of CHP systems in buildings and industries

Target Group:

Engineers, building maintenance managers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Combined Heat and Power (CHP), Trigeneration plants for covering electrical, thermal and cooling loads for buildings and industry Feeding CHP units with gas fuels

CHP and electricity distribution networks

Environmental aspects, framework for CHP in Greece Sizing CHP systems Economic evaluation of CHP plants Examples

Duration:

5h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2011

CVT Provider: Euro Educational

Title of the Training/Seminar:

Design Analysis of PV systems

Target Group:

Engineers and PV installers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Design, installation and maintenance of PV installations, equipment selection, sizing, efficiency and minimization of shadows. Grid connected and stand-alone systems

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2011

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Solar and Wind Energy

Target Group:

a) Professionals activating to RES, people installing and maintaining heating systems, electricians, engineers, architects.

b) All people interested in RES regardless if they are technicians with or with not any working experience

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

3 modules are covered in this course:

- PVs
- solar thermal energy
- wind energy

Duration:

Estimated completion time: 1 year

The study period can be extended up to 3 years

Trainees per Cycle:

—

Courses per Year:

2012

Certificate/Diploma:

—

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

PV Installation on roofs of buildings

Target Group:

Engineers from AEI and TEI

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Analyze and present the aspects related to the proper installation of an PV system on the roof of a building/ building permit procedures for PVS; specifications for PV installation on roof, domestic & industrial roofs; critical points during installation; case study

Duration:

6h

Trainees per Cycle:

n/a

Certificate/Diploma:

Certification of attendance

Courses per Year:

Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Wind Energy & Wind Stations - Technology, capabilities, legislation

Target Group:

Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Wind turbines, wind power, design of wind farms, installation, cost, legislation, Offshore wind farms, future perspectives

Duration:

12h

Trainees per Cycle:

n/a

Certificate/Diploma:

Certification of attendance

Courses per Year:

Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Design and installation of PV systems

Target Group:

Engineers from AEI and TEI

Methodology (in class, on-site, e-learning):

e-learning

Content/Training Modules:

Energy Sources / Solar Geometry / Solar Radiation

PV Conversion

PV Array / Electrical Accumulator / Electronic Devices

Calculation of autonomous, hybrid & net-connected systems

Duration:

16h

Trainees per Cycle:

n/a

Certificate/Diploma:

Certification of attendance

Courses per Year:

Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Wind Installations with Small Wind Turbines

Target Group:

Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Technology and application, development of small wind turbines, Basic operation, categorization and types, Application of the technology, investments and economic sustainability, Licensing and legal Framework

Duration:

12h

Trainees per Cycle:

n/a

Certificate/Diploma:

Certification of attendance

Courses per Year:

Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Introduction to Heat Pumps air- water

Target Group:

Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Heat Pump: basic principles and operation, categorization, efficiency, boiler replacement, cost-benefit analysis of boiler replacement, Practice

Duration:
10h

Trainees per Cycle:
n/a

Certificate/Diploma:
Certification of attendance

Courses per Year:
2019

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:
Biomass for heating

Target Group:
Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):
Classroom Training

Content/Training Modules:
Solid biofuels, Combustion, exhaust gas measurement, calculation of thermal power, small and central heating systems, financial issues, practical instructions and examples

Duration:
10h

Trainees per Cycle:
n/a

Certificate/Diploma:
Certification of attendance

Courses per Year:
Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:
Maintenance and repair of PV systems

Target Group:
Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):
Classroom Training

Content/Training Modules:
Technical characteristics of PV installations, Maintenance of connected PV installations, Damage control and losses of PV installations, Benefits of maintenance and certification of PV installations

Duration:
6h

Trainees per Cycle:
n/a

Certificate/Diploma:
Certification of attendance

Courses per Year:
Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Solar Trackers

Target Group:

Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Solar radiation, PV systems, Solar trackers, Case study of a PV park with Tracking System

Duration:

5h

Trainees per Cycle:

n/a

Certificate/Diploma:

Certification of attendance

Courses per Year:

Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Electrical Circuits of Photovoltaic Systems

Target Group:

Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Electrical Circuits, Design of PV systems, DC / AC cables, Lightning protection, examples of calculations of measurements

Duration:

6h

Trainees per Cycle:

n/a

Certificate/Diploma:

Certification of attendance

Courses per Year:

Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Green Energy Lab

Target Group:

Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Biofuels in central heating, PV systems with solar trackers, Electrical Circuits of Photovoltaic Systems, shallow geothermal systems

Duration:	Trainees per Cycle:
16h	n/a
Certificate/Diploma:	**Courses per Year:**
Certification of attendance	Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Solar Thermal Installations

Target Group:

Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Basic principles, Calculation, Description and measuring solar thermal systems, economic evaluation of the investment

Duration:	Trainees per Cycle:
15h	n/a
Certificate/Diploma:	**Courses per Year:**
Certification of attendance	Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Assessment and design of shallow geothermal systems

Target Group:

Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Legislation, principles of operations, heat pumps characteristics and types of the systems, description of applications in buildings, methodology of designing system, presentation of softwares

Duration:	Trainees per Cycle:
16h	n/a
Certificate/Diploma:	**Courses per Year:**
Certification of attendance	Ongoing

CVT Provider: Master-D Engineering-Intelligence

Title of the Training/Seminar:

Biofuels

Target Group:

Engineers from AEI and TEI, technicians, consultants

Methodology (in class, on-site, e-learning):

Classroom Training

Content/Training Modules:

Biomass, biofuels, technologies, logistics, bioethanol, presentation of a biofuels production plants, biodiesel, biohydrogen, solid biofuels, Greek and European legislation, licensing, financing

Duration:

16h

Trainees per Cycle:

n/a

Certificate/Diploma:

Certification of attendance

Courses per Year:

Ongoing

CVT Provider: Europroodos KDVM II

Title of the Training/Seminar:

PV SYSTEM: S 1. Designer of PV installations, 2. Technician of PV installations, 3. Sales of PV systems, 4. Maintenance of PV systems

Target Group:

All related interested stakeholders

Methodology (in class, on-site, e-learning):

In classroom and in laboratory

Content/Training Modules:

Operation of PV and energy production systems

Design and installation of PV system

Maintenance and repair of PV systems

Duration:

6 months (3 theory, 3 practice)

Trainees per Cycle:

n/a

Certificate/Diploma:

Certification after examination
(in collaboration with Unicert and
University of Piraeus Research Centre)

Courses per Year:

Ongoing

CVT Provider: CRES- SolarCV [1]

Title of the Training/Seminar:

Solar Field Operators of CHP facilities

Target Group:

Professionals and specialist technicians of RES and senior students on Energy Studies

Methodology (in class, on-site, e-learning):

e-learning/ simulator- practices

Content/Training Modules:

Radiation, Technologies, Solar field in PT,HTF Solar oil system Thermal storage, Steam generator, Power block, Plant operation, Safety, Practices - simulator

Duration:	Trainees per Cycle:
300h	10-20
Certificate/Diploma:	**Courses per Year:**
Training Certificate	2017

CVT Provider: CRES- SolarCV [1]

Title of the Training/Seminar:

Validation of non-formal and informal learning of existing staff working in the CHP field.

Target Group:

Specialists and professionals in RES with technical background and experience in CHP.

Methodology (in class, on-site, e-learning):

e-learning

Content/Training Modules:

—

Duration:	Trainees per Cycle:
150	5-7
Certificate/Diploma:	**Courses per Year:**
Specialist Expert Certificate	2017

CVT Provider: COMPUTER START - KDVM LEVEL I

Title of the Training/Seminar:

Design and technology of photovoltaic systems and installations

Target Group:

Electrical Installers, Energy Inspectors, Electrical Engineers, Energy Technicians, Technical Offices, Electrical Equipment Sales Engineers, Construction Companies

(1) Ευρωπαϊκό πρόγραμμα “SOLAR CV - SSA to cover skill needs through delivery and recognition of EU joint CV in Concentrated Solar Power” (πλαίσιο Erasmus+, www.solar-cv.eu/)

Methodology (in class, on-site, e-learning):

e-learning or in classroom

Content/Training Modules:

Photovoltaic cell and devices

Operation of PV cell

Design of PV systems, calculation of loads, and dimensions

Generators and accumulators

Applications of PV systems

Installation of photovoltaic systems and power supply. Maintenance and upgrades

Duration:	Trainees per Cycle:
30h	N/A
Certificate/Diploma:	**Courses per Year:**
Training Certificate	2019

CVT Provider: PIRAEUS UNIVERSITY OF APPLIED SCIENCES (T.E.I. OF PIRAEUS)

Title of the Training/Seminar:

New Energy Storage Technologies

Target Group:

Energy and professionals, engineers, students, experts

Methodology (in class, on-site, e-learning):

In classroom

Content/Training Modules:

Features of Energy Storage Systems (ESS), Technologies of ESS,

Energy Storage Applications

Duration:	Trainees per Cycle:
30h	N/A
Certificate/Diploma:	**Courses per Year:**
Training Certificate	2015

CVT Provider: Technical Chamber of Western Greece

Title of the Training/Seminar:

PV systems: connected to the grid and autonomous

Target Group:

Engineers

Methodology (in class, on-site, e-learning):

In classroom

Content/Training Modules:

PV panels and PV parks, Spatial analysis, Design and dimensioning, grid connection, simulation programs, Islanding, Autonomous systems, economic and environmental data-RetScreen

Duration:

24h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2009

2.3. Indicative CVET Courses/Seminars for EE

CVT Provider: KDVM LEVEL II CENTRE IVEPE

Title of the Training/Seminar:

Burners and Boilers' Maintenance & Repair

Target Group:

Thermal and plumber Installations technician

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Maintenance of heating installations, Different Techniques. Tests & adjustments required in boilers and burners. Familiarize with tools and special parts of the boiler room / Burners, Boilers/ Hot water distribution systems

Duration:

20h

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

2010 (1) / 2012 (1)

CVT Provider: KDVM LEVEL II CENTRE IVEPE

Title of the Training/Seminar:

Maintenance of Electrical Equipment

Target Group:

Craftsmen, foremen and other supervisors of maintenance

Methodology (in class, on-site, e-learning):

-

Content/Training Modules:

Maintenance Standards, basic knowledge about the control methods and treatments on electromechanical components, necessary knowledge about the importance of lubrication and lubrication methods and practices.

Duration:

16

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

2012 (1)

CVT Provider: KDVM LEVEL II CENTRE IVEPE

Title of the Training/Seminar:

Operation and maintenance of gas networks

Target Group:

Craftsmen involved in Mechanical maintenance, at least primary school graduates with industrial experience 5-10 years, or technical schools graduates (experience 1-10 years

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Internal natural gas installations, safety, operation and maintenance of these facilities

Duration:

N/A

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

2010 (1)

CVT Provider: KDVM LEVEL II CENTRE IVEPE

Title of the Training/Seminar:

Automation Housing IBA - Industrial Automation PLC for Electrical Installers

Target Group:

Electrical installers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Introduction to Programmable Logic Controllers (PLCs) - PLC advantages – Principal operation of PLCs. Connected PV Systems: operation and troubleshooting.

Interface methods. PV frames-mounting electric accumulators (batteries)-Charge

Controllers Battery-power-conversion systems Electronic systems control, protection and other data-loss. Autonomous PV: Methodology of energy power plant needs addressed a standalone PV system-hybrid systems- Incorporating PV to buildings- PV operation problems on buildings

Duration:

40h

Trainees per Cycle:

18

Certificate/Diploma:

Attendance certificate

Courses per Year:

2006 (3) / 2007 (2) / 2008 (6) / 2009 (8) / 2010 (2) / 2011 (0) / 2012 (0)

CVT Provider: KDVM LEVEL II CENTRE IVEPE

Title of the Training/Seminar:

Internal electrical installations control for electrical contractors

Target Group:

Electrical installers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Electrical Installations - The New Legislative

Framework For Checking Electrical Installations - Control System

Duration:

20h

Trainees per Cycle:

20

Certificate/Diploma:

—

Courses per Year:

2007 (1)

CVT Provider: IEKEM TEE

Title of the Training/Seminar:

Energy Efficiency and Certification of Buildings (Directive 2002/91/EU)

Target Group:

Engineers, technicians and electricians

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

2002/91EU Directive, basic energy concepts and elements of building, bioclimatic design and passive heating and cooling, waterproofing techniques, thermal insulation of buildings

Duration:

20h

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

2011 (1)

CVT Provider: IEKEM TEE

Title of the Training/Seminar:

Practical Guide for Energy Conservation in Buildings, Hotels, Industries and Sports Centers

Target Group:

Engineers and technicians

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Energy-saving interventions in buildings, hotels, sports centers and industries in the following areas: Glazing, Lighting, Hot water use, Heating, cooling, Natural Gas, Energy Management System (BEMS), Electrical systems, domestic appliances, Green building

Duration:

20h

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

2011 (1)

CVT Provider: IEKEM TEE

Title of the Training/Seminar:

Financial Evaluation of Energy Saving Interventions

Target Group:

Engineers and technicians

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Economic evaluation of any intervention to save energy in the following areas: Building Envelope/ Electrical systems, Lighting Systems, Heating installations, Cooling systems, Thermal insulation in industry

Duration:

20h

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

2011 (1)

CVT Provider: IEKEM TEE

Title of the Training/Seminar:

Natural Lighting – Design and Energy Conservation Strategies

Target Group:

Engineers and other technicians working on buildings and internal space design

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Natural and artificial lighting (Definitions), openings design – geometry size – glazing options – selection of interior materials etc, levels of natural light measurement, simulation tools

Duration:

20h

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

2011 (1)

CVT Provider: IEKEM TEE

Title of the Training/Seminar:

Ecological Construction

Target Group:

Hydrothermal Installations technicians Boilers' technicians

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Ecological constructions (construction-works, buildings, open spaces, energy, water, noise, domestic waste, etc.). Quality construction, health, safety, resources and energy saving, indoor air quality, selection of appropriate building materials, energy performance of building materials (LCA), new clean technologies, legislation, certification of building materials

Duration:

44h

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

2011 (1)

CVT Provider: IEKEM TEE

Title of the Training/Seminar:

Measurements Techniques and Instruments for the Energy Audits in Buildings and in Industry

Target Group:

Engineers, Energy Auditors

Methodology (in class, on-site, e-learning):

N/A

Content/Training Modules:

Presentation of the procedure and design of the energy audit in buildings and industry, presentation of the techniques and the instruments used in energy audits (thermometers, moisture testers, photometers, anemometers, pyranometers, thermal conductivity coefficient meter, thermographic camera, gas analyzer, electrical energy analyzer).

Duration:

20h

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

N/A

CVT Provider: KDVM LEVEL II CENTRE GSEVEE

Title of the Training/Seminar:

Tele-heating for thermal plumber and air conditioning installers

Target Group:

Plumbers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Introduction to tele-heating– Tele-heating installations

Duration:

40h

Trainees per Cycle:

36

Certificate/Diploma:

—

Courses per Year:

2007 (2)

CVT Provider: KDVM LEVEL II CENTRE GSEVEE

Title of the Training/Seminar:

Finding and resolving faults of cooling systems for cooling installers.

Target Group:

Cooling installers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Damage compression system, reciprocating, centrifugal, screw. Damage centrifugal compressor unusually high temperature. Screwshaped lesions compressor, single screw. Damage reciprocating compressor, insurance overpressure. Damage reciprocating compressor, single phase motors.

Duration:

30h

Trainees per Cycle:

15

Certificate/Diploma:

—

Courses per Year:

2010 (1)

CVT Provider: KDVM LEVEL II CENTRE GSEVEE

Title of the Training/Seminar:

New technologies on cooling installations for cooling installers

Target Group:

Cooling installers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Automated cooling – air conditioning

Legislative framework Hygiene and safety

Duration:

90

Trainees per Cycle:

68

Certificate/Diploma:

—

Courses per Year:

2006 (1) / 2007 (2)

CVT Provider: DVM LEVEL II CENTRE GSEVEE

Title of the Training/Seminar:

Cooling & HVAC Automation for cooling installers

Target Group:

—

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Description of a cooling machine. Elements of thermodynamics. Control systems. Automated systems. Defrost mechanisms - Automatic heat (heat pumps) - Basic parts automation system

Duration:

50h

Trainees per Cycle:

33

Certificate/Diploma:

—

Courses per Year:

2007 (2)

CVT Provider: TUV HELLAS

Title of the Training/Seminar:

ISO 50001:2011

- Principles of Energy Management Systems

Target Group:

Engineers and technicians

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Analysis of key concepts of Energy Management, Energy Management Legislation, Basic Principles of an Energy Management System, Explanation of the Standard Requirements for both the design and internal / external inspection of an Energy Management System

Duration:

16h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

1/2012

CVT Provider: TUV HELLAS

Title of the Training/Seminar:

Effective management & energy saving

Target Group:

Engineers, Technical Managers, Maintenance Managers, designers, engineering offices and construction companies and technicians dealing with energy issues

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Methodology to extract data of energy consumption, energy efficiency indicators to describe the current situation and identify potential savings/ Energy, Energy Monitoring and Data Analysis / Energy Audits, Energy Saving Methods, Economic evaluation of energy investments

Duration:

16h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2/2012

CVT Provider: TÜV Rheinland Hellas

Title of the Training/Seminar:

Guide for building energy audits

Target Group:

Engineers and technicians working in the field of energy audits of buildings

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Building energy audits.

Laws and regulations on energy audits, building autopsy,

KENAK software, Certificate on energy efficiency

Duration:

16h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

6/2011

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

Green concrete – Green buildings – Energy building design

Target Group:

Engineers, Technical Managers, Maintenance Managers, designers, engineering offices and construction companies and technicians dealing with energy issues on buildings

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Terms and conditions to optimize the energy performance of existing buildings - and the design of new, analysis of key parameters taken into account in building design, key legislation associated with energy building design.

Impact on environment due to climate change, Sustainable construction > Environmentally friendly concrete (Green concrete), Life cycle of construction

Duration:

5h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

4/2010

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

Innovations in the design and construction of buildings; using new materials eco- friendly

Target Group:

Engineers, construction companies, technicians

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Innovative materials and eco-friendly technologies for the building, evaluation and costs comparisons to conventional materials

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

10/2010

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

Green buildings - Energy design: from the bioclimatic to the zero energy consumption building

Target Group:

Engineers and technicians dealing with the design of building.

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Terms and conditions to optimize the energy

performance of existing buildings - and the design of new. Analysis of key parameters taken into account in building design; key legislation associated with energy building design

Duration:

10h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

4/2010

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

New Building Regulation (N.O.K.) L. 4067;

79A/9-4-12

Target Group:

Engineers and technicians

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

New building regulations which replaced GOK/85 (L.1577/85), labelling changes and familiarity with the new structure (philosophy) the new law

Duration:

—

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

9/2012

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

Applied maintenance in hospitals, cost reduction and energy saving

Target Group:

Technical Services staff of hospitals

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Efficient maintenance of the equipment found in hospitals, Regulations and standards governing the maintenance, analysis of specific technical issues; Energy Saving Strategies in hospitals; methods of maintenance; Special topics in electrical installations in hospitals; oil or gas boilers, oil and gas; burners; pumps and circulators; power generators and transformers; lighting, gas supply

Duration:

N/A

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

5/2012

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

Lighting and Energy Saving with new technology LED lighting

Target Group:

Electricians, architects, interior designers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

How to save energy using LED lighting / key definitions and lighting specifications; design criteria and calculation of lighting; led selection; applications; investment criteria

Duration:

5h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

4/2011

CVT Provider: OIKONOMOTEXN IKH SEMINARS A.E.

Title of the Training/Seminar:

Thermography for Building Diagnostics

Target Group:

Engineers / technicians who work in the field of energy audits; electricians air conditioning technicians and technicians in charge of electromechanical maintenance

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Use of thermography for fast, efficient and reliable diagnosis of energy and construction problems

Duration:
5h

Trainees per Cycle:
—

Certificate/Diploma:
—

Courses per Year:
5/2011

CVT Provider: Euro Educational

Title of the Training/Seminar:
Study & design of low voltage electrical installations

Target Group:
Engineers, technicians and electricians

Methodology (in class, on-site, e-learning):
—

Content/Training Modules:
Requirements of ELOT 384 standard for low voltage electrical installations and relevant legislative framework

Selection and installation of electrical equipment, discrimination, selectivity, Cascading, backup protection between the protective devices

Duration:
12h

Trainees per Cycle:
—

Certificate/Diploma:
—

Courses per Year:
8/2012

CVT Provider: Euro Educational

Title of the Training/Seminar:
Guide for building energy audits

Target Group:
Engineers and technicians

Methodology (in class, on-site, e-learning):
—

Content/Training Modules:
The process of developing energy efficient building design according to KENAK

Duration:
6h

Trainees per Cycle:
—

Certificate/Diploma:
—

Courses per Year:
1/2011

CVT Provider: Euro Educational

Title of the Training/Seminar:

Economic Evaluation of energy saving interventions: 32 case studies

Target Group:

Engineers and technicians

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Simplified calculation methods for the economic evaluation of any energy saving intervention

Duration:

6h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

4/2010

CVT Provider: Euro Educational

Title of the Training/Seminar:

Energy audits of the building envelope

Target Group:

Engineers and technicians working in the fields of energy saving in buildings

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Energy Audits, introduce the concept of KENAK; energy measurement methodology, analysis of energy efficiency in buildings; energy certificate

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

3/2010

CVT Provider: Euro Educational

Title of the Training/Seminar:

Energy Conservation for Hotels

Target Group:

Engineers and technicians working in the field of design and maintenance of hotel facilities

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Energy saving measures in the hotels industry.

Optimizing the energy performance of existing hotels and designing new energy-efficient hotel facilities

Duration:

—

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

3/2011

CVT Provider: CAD Studies

Title of the Training/Seminar:

Energy Study & Audit

Target Group:

Engineers and technicians working in energy audits of buildings

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Energy Performance of Buildings Regulation (KENAK)

Encoding methodology for studies of Energy Efficiency and Energy Audits

Duration:

12h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

4/2011

CVT Provider: CAD Studies

Title of the Training/Seminar:

Seminar on bioclimatic design

Target Group:

Engineers and technicians working in the field

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Overview of bioclimatic design; thermal and visual comfort reducing energy consumption and harmonize with 2002/91/EC

Duration:

30h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

3/2010

CVT Provider: TUV Austria Hellas

Title of the Training/Seminar:

Energy Management Systems – EN 16001:2009 & ISO 50001:2011

Target Group:

Business executives interested in reducing energy costs, building maintenance managers

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Requirements of EN 16001 and ISO 50001, so that participants can identify opportunities for improving energy performance, cost savings, reduce greenhouse gas emissions; Basic concepts for energy management, energy management legislation; The principles and purpose of an energy management system in accordance with standards EN 16001 and ISO 50001, the relationship between EN 16001 and ISO 50001 with ISO 14001 and other relevant standards

Duration:

18h

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

10/2012

CVT Provider: TUV Austria Hellas

Title of the Training/Seminar:

Techno-economic analysis of the Energy Refurbishment of buildings and building complexes using the Life Cycle Cost Analysis- LCCA method.

Target Group:

Energy auditors, energy managers, consultants for energy refurbishment of buildings and equipment, certification consultants for ISO 50001, decision makers for energy refurbishment projects, buildings managers, etc.

Methodology (in class, on-site, e-learning):

N/A

Content/Training Modules:

Basic concepts of financial analysis of investments focusing on energy refurbishment projects, the requirements of ISO 15686 and ASTME917 standards, the principles and the methodology for the techno-economic analysis based on LCCA

Duration:

N/A

Trainees per Cycle:

N/A

Certificate/Diploma:

—

Courses per Year:

N/A

CVT Provider: Renewable and Sustainable Energy Systems Lab of the Technical University of Crete / Municipality of Rethymnon and the Prefectural Committee of the Technical Chamber of Greece of Rethymnon

Title of the Training/Seminar:

Energy Efficient Public Lighting

Target Group:

Administrative staff of municipalities and of local/regional services, Engineers, people involved in the energy efficiency and fesible energy design field

Methodology (in class, on-site, e-learning):

In classroom

Content/Training Modules:

Basic Principles – Criteria and basic parameters concerning lighting in public spaces, environmental impacts form lighting- Light pollution, Measures for the improvement of the energy efficiency in lighting, best practices in Greece and Europe

Duration:	Trainees per Cycle:
3h	N/A
Certificate/Diploma:	**Courses per Year:**
—	6/2015

CVT Provider: Renewable and Sustainable Energy Systems Lab of the Technical University of Crete / Municipality of Rethymnon and the Prefectural Committee of the Technical Chamber of Greece of Rethymnon

Title of the Training/Seminar:

Energy Saving in buildings and open spaces

Target Group:

Administrative staff of municipalities and of local/regional services, Engineers, people involved in the energy efficiency and feasible energy design field.

Methodology (in class, on-site, e-learning):

In classroom

Content/Training Modules:

Basic Principles – Legislative framework, Internal and external characteristics of the buildings energy efficiency, energy management of public buildings, energy audit and certification, best practices in Greece and Europe

Duration:	Trainees per Cycle:
3,5h	N/A
Certificate/Diploma:	**Courses per Year:**
—	6/2015

2.4. Evaluation of Existing Training

How would you qualify the level of training on the following subjects?

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation			X		
Energy planning		X			
Energy audits				X	
RE Technologies				X	
EE Technologies				X	
Installation of RE systems			X		
Installation of EE systems			X		
Size of the RE market			X		
Size of the EE market			X		
Integration of RE and EE in buildings				X	

5.5. ITALY

1. Country Overview

1.1. Adult Education System

At the national level, adult education is under the responsibility of the Ministry of Education, University and Research; the Centres for adult education (CPIAs) and upper secondary schools are autonomous education institutions organised at the local level.

CPIAs organise first-level courses, literacy courses and Italian language courses for foreign adults, while upper secondary schools offer second-level courses. A system of adult education has been running in Italy since 1997, organised at Local Permanent Centres (*Centri territoriali permanenti – CTPs*) and through evening courses at upper secondary education institutions.

In 2007, a specific Ministerial Decree launched the reform of the adult education system that started in 2012 and ended in the school year 2015/2016. The reform replaced the expression “adult education” with “school education for adults”, which refers to the more limited domain of the educational activities aimed at the acquisition of a qualification, with a view to raise the educational level of the adult population. The reform also provided for the establishment of Provincial Centres for School Education for Adults (*Centri provinciali per l’instruzione degli adulti – CPIAs*) that, together with the upper secondary schools for the second level courses, have replaced the existing CTPs and evening courses respectively.

The CPIAs are autonomous education institutions organised in local networks. They have the same degree of autonomy as mainstream schools, meaning that they have their own premises, staff and governing bodies. CPIAs provide programmes corresponding to initial education up to the completion of compulsory education as well as language courses for immigrants. The system of ‘school education for adults’ offers:

- **first-level courses:** organised by CPIAs, aimed at obtaining a first-cycle qualification and the certification of basic competences to be acquired at the end of compulsory education in vocational and technical education.
- **second-level courses:** organised by upper secondary schools, aimed at obtaining a technical, vocational and artistic school leaving certificate; literacy and Italian language courses for foreign adults, organised by CPIAs, aimed at the acquisition of competences in the Italian language.

The courses of the "school education for adults" system are available for prisoners, thanks to the establishment of separate seats of CPIAs and of upper secondary schools in the detention centres.

All courses provided by CPIAs have a flexible organisation, allowing for personalised study paths and the recognition of prior learning. Students can take up to 20% of the total required tuition time through distance learning.

The system falls under the responsibility of the Ministry of Education, University and Research. This type of provision is financed through public resources and it is free for participants.

The National institute for documentation, innovation and educational research (*Istituto nazionale di documentazione, innovazione e ricerca educativa – INDIRE*) is responsible for the monitoring of the CPIAs.

A non-formal learning service is provided by the Folks Universities (*Università Popolari*), which are a series of private and public organisations whose specific aim is to promote the education of adults. They organise diverse typologies of activities, mostly addressed to adults, but are also open to younger people. The biggest university is UPter, based in Rome, which provides a wide range of courses. Training options for employed or unemployed adults are provided by the Regions and the Autonomous Provinces for all adults in the framework of CVET system.

1.2. Technical and Vocational Education and Training (TVET)

Italian VET governance

The actors involved in planning and organising VET are several:

- the Ministry of Education, University and Research (MIUR) sets the framework for VET in national school programmes (technical and vocational schools) for higher technical training.
- the Ministry of Labour and Social Policies (MLPS) sets the framework for Regional Education and Vocational training courses (IeFP), while the regions and autonomous provinces are in charge of planning, organisation and provision.
- Regions and autonomous provinces are also in charge of planning, organisation and provision of ITS, IFTS, post IeFP, post-higher education, and most of the apprenticeship-type schemes; goals of Continuing Vocational Training (CVT) under the public system are set by the labour ministry, while CVT activities are managed by either regions and autonomous provinces or social partners.
- social partners play an important role in promoting company-level training plans (single or group of companies) to be financed by the regions or by the joint interprofessional funds.

The VET system includes:

- three- and four-year programmes at the upper secondary level (IeFP) and one-year post-secondary programmes under the responsibility of the regions.
- five-year vocational and technical education upper secondary programmes, and two-year tertiary level programmes, under the direct responsibility of the Ministry of Education, University and Research.

Upon completion of lower secondary education, young people at age 14 may enrol in one of the following upper secondary VET programmes:

(a) five-year programmes leading to technical or professional education diplomas, under the responsibility of the Ministry of Education (EQF 4).

(b) four-year programmes leading to vocational diplomas managed by the regions (EQF 4).

(c) three-year programmes leading to vocational qualifications managed by the regions (EQF 3).

These qualifications and diplomas are included in the National repository of education and training qualifications and of vocational qualifications.

VET at post-secondary and tertiary levels

After the upper secondary level, learners may enrol in the following programmes with vocational orientation:

(a) higher technical education and training courses (HTC), Istruzione e Formazione Tecnica Superiore (IFTS): one year post-secondary non-academic programmes which lead to a high technical specialization certificate (Certificato di specializzazione tecnica superiore, EQF 4);

(b) higher technical institutes (HTI), Istruzione Tecnica Superiore (ITS): two or three-year post-secondary non-academic programmes, which lead to a high-level technical diploma (Diploma di tecnico superiore, EQF 5).

Furthermore, in 2015, the Buona Scuola school reform (Law 107/2015) sought integration of practical training in school curricula, making alternance, a structural and compulsory training method for both VET and general education, with a view to increasing students' skills and employability. The law introduced compulsory school-to-work alternance in upper secondary schools. Students enrolled in the last three years of technical and vocational programmes have to complete a minimum 400 hours of in-company learning; students enrolled in the last three years of general education programmes have to complete at least 200 hours of in-company learning.

Quality assurance

For the IVET pathways falling within secondary education, a National Evaluation System was introduced in 2013, involving Istituto Nazionale per la Valutazione del Sistema di Istruzione e formazione (INVALSI), INDIRE and a team

of inspectors nominated by the Ministry of Education. For IVET courses managed by the Regions and Autonomous Provinces, the most relevant quality assurance tool is the accreditation of VET providers. It implies that Regions and Autonomous Provinces set standards relating to both services and expected results, which have to be respected by all those training agencies accessing public funding. Those standards refer to a common framework agreed at the national level by all Regions and by the State. The social partners are usually involved through committees or boards, which are consultative bodies for all VET and active labour market policies.

The Italian continuous VET system is articulated in two main pathways:

- a CVET offer provided by the Fondi Paritetici Interprofessionali per la Formazione Continua (Sectoral training funds) under the control of the Social Partners and established under the Ministry of Labour. These bilateral funds were established by law in 2000 and became operational in 2004. They are promoted at the national level by the central employer organisations along with the trade unions, but they can be articulated at the local level.
- a CVET offer provided by the Regions and the Autonomous Provinces. So, the Quality Assurance framework is almost the same for IVET and CVET.

Vocational training is usually determined by an annual plan, agreed with all the stakeholders and approved by the region. Almost all Regions have issued their own qualifications register, as the reference tool for the VET courses provision and the certification of acquired skills. The national qualifications register for the section relating to the VET system was due to be released in June 2016, which links and correlates all the regional registers.

In regional trainings, the accreditation system has been conceived as a quality assurance mechanism *ex ante* (minimal requirements are assessed beforehand), *in itinere* (requirements have to be maintained during the performance), and ex post (expected results have to be achieved and measured). In 2008, the accreditation system was further enhanced by an agreement between the State and the Regions, whose primary objectives are the promotion and valorisation of accreditation as a tool for quality assurance, with particular regard to the evaluation of effectiveness and efficiency of training services in terms of employability and learning outcomes. This measure aims at guaranteeing a homogeneous level of training quality nationwide, taking

into account the EQAVET Recommendation. Some training providers, in addition to the minimum requirements, on a voluntary basis, undertake quality certification processes (i.e. ISO 9000, EFQM, ...) using self-assessment tools, such as the Self-Assessment Guide for School and Training Providers, for guaranteeing quality assurance in their performance.

Regional VET planning is based on training and vocational needs, which are analysed in cooperation with the social partners. For a number of year, the Ministry of Labour and social policies has been supporting (financially through the European Social Fund (ESF)) a project implemented by the Union of the Chambers of Commerce (Unioncamere) called Excelsior, which takes into account a wide sample of enterprises and provides forecast data on labour market trends and on the occupational needs of enterprises on an annual basis.

Stakeholders are also actively involved in the planning, monitoring and evaluation of the vocational training initiatives funded by the ESF (and managed by the Regions).

Qualification and Certification

As for vocational upper secondary education, at the end of the five-year path, students take a state examination leading to a diploma, which allows successful students to continue their studies at an higher level. The Ministry of Education, Universities and Research is fully responsible for the delivering of this diploma and for regulating the final exams. As far as the courses promoted by higher technical institutes (ITS) are concerned, a final certification is issued by the technical or vocational institute, to which the ITS refers. The courses end with a final assessment of the competences acquired, which is carried out by examination boards made up of representatives of schools, universities, vocational training institutions, and experts from the labour market. For the issue of the relevant certification, IFTS (higher technical education and training) courses finish with the final assessment of competences acquired by students.

The Regions and Autonomous Provinces are the competent bodies for issuing and accrediting vocational qualifications, with the exception of IVET.

To create a comprehensive validation and competence certification system, Italy has issued the following legislative acts:

- the Legislative Decree 16 January 2013, n. 13, that defines the general rules and basic levels of performance for the identification and validation of non-formal and informal learning and service standards of the national system for the certification of competencies.
- the Inter-ministerial decree 30 June 2015, concerning the definition of the operational Common Framework for National Recognition of Regional Qualifications and related skills, as part of the National Repertory of Education, Training and Professional Qualifications. The Framework is the unique reference framework for:
  - the recognition of regional qualifications at national level.
  - the certification of learning acquired in all the contexts.
  - the matching between qualifications/skills and occupations.

The decree specifies the process and service standards and the minimum formats to be used in certifying non formal and informal learning

ENEA has coordinated two National BUILD UP SKILLS projects.

BUILD UP Skills (Pillar II) BRICKS (Building Refurbishment with Increased Competences, Knowledge and Skills) project aimed at developing tools and methodologies to set up training systems to increase the knowledge, skills and competences of workers in the field of buildings refurbishment. The goal was to intensify the introduction of Renewable Energy Sources (RES) and improve Energy Efficiency (EE) in the old as well as in the new buildings to reach nearly zero-energy buildings (nZEB) stocks by 2020. In the framework of this initiative, following the work of previous projects (QUALICERT, COMPENER, Heath4you, etc), the development of national standards (UNI/CEI) for some profiles has started, based on the EQF schemas, and the first preliminary standards have been set concerning:

- Building site trainer
- Trainer in the energy field
- Geothermal pump installer
- Building automation installer
- Solar thermal installer
- Biomass plant installer
- Photovoltaic installer
- Chimney installer
- Thermal heater installer
- Energy auditor

BRICKS promotes a voluntary certification model for competences obtained through formal, non-formal and informal learning, to be implemented across the network or ACCREDIA certification of organizations (third party certification, ISO 17024). BUILD UP SKILLS proposed also for RES installers to follow the Law 4/2013 as a preferential path, where a national or international technical standard exists, as this ensures that different bodies can recognize a homogeneous certification on a specific profession, in order to obtain a broader consensus on the requirements for certification. This is the case of “SECEM” certification for the experts in energy management, which is based on the national standard UNI CEI 11339. In particular, SECEM is a certification body for energy management, which leads as example of a voluntary scheme developed independently; at the same time, the FIRE (the Italian Federation for Rational use of Energy) promoted a technical standard in the working groups of the European Committee for Standardization (CEN) and Cooling Technology Institute (CTI). Once out of the national standard UNI CEI, the SECEM has made the necessary changes to the Regulation to update the scheme on the basis of what is reported in the technical standard.

Conversely, the energy auditors’ scheme (and qualification) is currently under development according to the Dlgs 102/2014 (corresponding to the Italian implementation of the EU Directive on EE). The lists of the courses/seminars, such as reported in the sections below 2, 2.1, 2.2,are not exhaustive; they provide an example (based on the source “Build Up Skills – Italy, Analysis of the national status quo, 2011”) of different features and actors involved, besides the public entities, such as associations and manufacturers, because a comprehensive overview at national level is not available yet.

2. Infrastructures of EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes	
Public	**Private**
• "Istruzione Tecnica Superiore (ITS)": two or three-year post-secondary non-academic programmes which lead to a high-level technical diploma, for example ITS Colle Val d'Elsa on Energy and Environment (www.itsenergiaeambiente.it/en) • Universities • Research organizations (ENEA, etc.)	The following list is not exhaustive; however we can mention: • Building Schools - The system of Building Schools is a network coordinating more than 100 local bodies. The first source of funding is the contribution from the "Casse Edili", the system of enterprises that are members of the bilateral organisation network, accompanied by a contribution by public funding. • Category associations : in a context of market and company growth, associations promote a series of initiatives to enhance quality in the enterprises of the energy sector, through the promotion of a quality brand and actions for technical and vocational information and training (CNA; ASSISTAL; etc) • Manufacturing firms • VET institutions accredited by Italian regions (+ two autonomous provinces), according to a set of minimum requirements. Whereas the training is funded by public resources (including ESF), the organizations must respond to a regional accreditation system. As an example, though the list of the accredited bodies in Lazio Region currently includes 452 organizations, it is not clear the number of those specifically devoted to energy . Furthermore, the training content is often subject to the funding availability. • Federazione Italiana per la Razionalizzazione dell'Energia/Energy Manager Federation (FIRE) and other organisations provide courses certified by ACCREDIA. • Not to forget local initiatives on energy job training based on bilateral agreements, often at trade-union level.

2.2. Indicative CVET Courses/Seminars for RES

NB: The included information is to be used just as an example. The list is not exhaustive. the source of information is "BUILD UP SKILLS – ITALY, Analysis of the national status quo, 2011."

CVT Provider: Fondartigianato – Notice 4/2007 published in GU n. 123 of 22/10/2007 and approved on 08/09 2009 by the Fondartigianato Board of Directors

Title of the Training/Seminar:

SOLAR SYSTEMS: DESIGN, INSTALLATION AND MAINTENANCE

Target Group:

Employees, organisational and technical production profiles in enterprises of the traditional installations: electrical and hydraulic; heating, conditioning, cooling systems for private and industrial systems; installers of boilers and plumbing systems; maintenance and operation of public and private buildings and with specific reference to the energy operation, design, installation, management and maintenance of photovoltaic systems.

Methodology (in class, on-site, e-learning):

All three courses use the same didactic method based on a mixture of classroom lessons, coaching, guided tours (only Course 1) case studies.

Content/Training Modules:

—

Duration:

Course 1: 16 hours

Course 2: 22 hours

Course 3: 24 hours

Trainees per Cycle:

N/A

Courses per Year:

N/A

Certificate/Diploma:

Attendance certificate

CVT Provider: CNA (National craftsmen association)

Title of the Training/Seminar:

PLANT FOR THE PRODUCTION OF ELECTRIC POWER FROM SOLAR SOURCES: PHOTO-VOLTAIC SYSTEMS

Target Group:

Electric installers

Methodology (in class, on-site, e-learning):

Classrom lesson

Content/Training Modules:

Study of the technical aspects and economic payback for the installation of photovoltaic systems.

Duration:
3.5 hours

Trainees per Cycle:
—

Certificate/Diploma:
Certificate of Attendance

Courses per Year:
—

CVT Provider: CNA (National craftsmen association)

Title of the Training/Seminar:
CONDENSATION BOILERS AND THERMAL SOLAR SYSTEMS

Target Group:
Heating installers

Methodology (in class, on-site, e-learning):
Classroom

Content/Training Modules:
Study on the technical aspects and economic payback for the technologies of Condensation Boilers, thermal solar systems and integrated systems.

Duration:
3 hours

Trainees per Cycle:
—

Certificate/Diploma:
Certificate of Attendance

Courses per Year:
—

CVT Provider: CNA

Title of the Training/Seminar:
HIGH EFFICIENCY COGENERATION SYSTEMS

Target Group:
Construction designers, builders

Methodology (in class, on-site, e-learning):
Classroom lesson. Lecturers from ISES Italia and GSE (Electricity Service Manager) for the theoretical part of the presentation of technologies and applicable regulations.

Participation of HERA and CISA for the presentation of case studies on the local level

Content/Training Modules:
—

Duration:
4 hours

Trainees per Cycle:
—

Certificate/Diploma:
Certificate of Attendance

Courses per Year:
—

CVT Provider: CNA - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA

Title of the Training/Seminar:

SMALL SCALE WIND ENERGY –TECHNOLOGY, APPLICABILITY IN THE BOLOGNA AREA AND THE RESULTS OF PLANT INSTALLED

Target Group:

Electrical designers and installers

Methodology (in class, on-site, e-learning):

Classroom lesson. Lectures by researchers from the University of Bologna, Department of Electrical Engineering (theoretical part) and CISA (for presentation of case study)

Content/Training Modules:

Study seminar on the technological, operational and applications aspects and the relative incentives to small wind energy systems.

Duration:

4 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

CVT Provider: CNA - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA

Title of the Training/Seminar:

PLANT FOR MICRO-COGENERATION

Target Group:

Heating and electrical designers and installers

Methodology (in class, on-site, e-learning):

Classroom lesson. Lectures by researchers from ENEA and the Milan Polytechnic (Department of Energy) and CNA officials from the department for incentives to energy savings and renewable energy

Content/Training Modules:

Study seminars on the technological, operational and applications aspects of micro-cogeneration systems and their incentives.

Duration:

4 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

CVT Provider: CNA - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA

Title of the Training/Seminar:

THE PROSPECTS OF PHOTOVOLTAIC

Target Group:

Electrical designers and installers

Methodology (in class, on-site, e-learning):

Lectures by researchers from CNR Bologna, University of Parma (Department of Physics), University of Bologna (Department of Electrical Engineering) and GSE (Electricity Service Manager) (Operational Division).

Content/Training Modules:

Classroom lesson. Study seminar on the technological development of photovoltaic production electricity and updating with regard to incentives systems.

Duration:

4,5 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

CVT Provider: CNA

Title of the Training/Seminar:

ENERGY SAVINGS IN AIR CONDITIONING

Target Group:

Installers

Methodology (in class, on-site, e-learning):

Classroom lesson

Content/Training Modules:

Design and installation of systems

Duration:

8 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

CVT Provider: CNA

Title of the Training/Seminar:

SOLAR THERMAL PANELS

Target Group:

Installers

Methodology (in class, on-site, e-learning):

Classroom lesson

Content/Training Modules:

N/A

Duration:

4 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

CVT Provider: CNA

Title of the Training/Seminar:

PHOTOVOLTAIC SOLAR SYSTEMS

Target Group:

Installers

Methodology (in class, on-site, e-learning):

Classroom lesson

Content/Training Modules:

N/A

Duration:

8 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

CVT Provider: CNA

Title of the Training/Seminar:

DEVELOPMENT OF REGULATORY FRAMEWORK AND THERMAL SOLAR SYSTEMS

Target Group:

Installers

Methodology (in class, on-site, e-learning):

Classroom lesson

Content/Training Modules:

1. From Presidential Decree 412/93 and subsequent amendments and additions to Legislative Decree 192/05 and subsequent amendments and additions

- Development of the legislative situation (requirements and possibilities) regarding heating systems and the use of renewable sources.

2. Funding opportunities

- Budget Law, Decree 19 February 2007; other forms of funding enacted or previously issued on the regional level.

3. Thermal solar systems

- Components of the plant and their type
- Natural and forced ventilation
- Installation layout

Duration:

16 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

CVT Provider: ASSISTAL - National Association of Plant's Constructors and Energy Service and Facility Management Companies

Title of the Training/Seminar:

THE PRODUCTION OF ENERGY FROM ANIMAL E PLANT BIOMASS

Target Group:

Installers

Methodology (in class, on-site, e-learning):

Classroom lesson

Content/Training Modules:

- Anaerobic digestion of biomasses
- Technologies for anaerobic digestion
- Optimisation of the anaerobic digestion process
- Techniques for removal of nitrogen from digested material
- Gasification and combustion of biomasses
- Regulation for incentives on biomass systems (Green Certificates)
- Economic evaluation and investments in biomass systems

Duration:

16 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

CVT Provider: ASSISTAL

Title of the Training/Seminar:

HEATING AND COOLING WITH GEOTHERMAL ENERGY

Target Group:

Installers

Methodology (in class, on-site, e-learning):

Classroom lesson

Content/Training Modules:

Regulatory reference framework

Geothermal sources (earth, groundwater, surface water) and relative availability

Positioning and calculation of geothermal probes

Installation solutions and possible integrations with traditional heating systems

Authorisation procedure

Economic aspects

Duration:

24 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

2.3. Indicative CVET Courses/Seminars for EE

NB: The included information is to be used just as an example, source: "BUILD UP SKILLS – ITALY, Analysis of the national status quo, 2011."

CVT Provider: CNA

Title of the Training/Seminar:

ENERGY CERTIFICATION AND ENERGY PERFORMANCE OF BUILDINGS: INNOVATIONS OF THE REGIONAL REGULATIONS IN FORCE SINCE 1 JULY 2008

Target Group:

Designers, builders, installers and systems maintenance personnel

Methodology (in class, on-site, e-learning):

Classroom lesson. Participation of RER consultant who has contributed to the drawing up of the regional law and the CNA official in charge of the service on tax deductions for energy savings

Content/Training Modules:

Presentation of main contents of regional regulations and the requirements for economic specialists; Illustration of the 55% tax deduction for energy efficiency improvement measures.

Duration:

3 hours

Trainees per Cycle:

—

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

—

CVT Provider: CNA

Title of the Training/Seminar:

INSULATION OF BUILDINGS, TECHNICAL SOLUTIONS MATERIALS AND INCENTIVES

Target Group:

Designers, builders

Methodology (in class, on-site, e-learning):

Classroom lesson. Participation a design engineer specialised in construction and a CNA official form the service for tax deductions for energy savings

Content/Training Modules:

Framework of applicable regulations and examination of the most widespread techniques for insulation, assessing economic savings and incentives regulations.

Duration:	Trainees per Cycle:
3 hours	—
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance	—

CVT Provider: CNA - Unione Costruzioni – Unione Installazione – Politiche Ambiente Energia – ECIPAR BOLOGNA

Title of the Training/Seminar:

SMALL SCALE WIND ENERGY –TECHNOLOGY, APPLICABILITY IN THE BOLOGNA AREA AND THE RESULTS OF PLANT INSTALLED

Target Group:

Electrical designers and installers

Methodology (in class, on-site, e-learning):

Classroom lesson. Lectures by researchers from the University of Bologna, Department of Electrical Engineering (theoretical part) and CISA (for presentation of case study)

Content/Training Modules:

Study seminar on the technological, operational and applications aspects and the relative incentives to small wind energy systems.

Duration:	Trainees per Cycle:
4 hours	—
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance	—

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy / legislation			X		
Energy planning			X		
Energy audits					X
RES technologies				X	X
EE technologies				X	
RES systems installation				X	
EE systems installation				X	
Market size for RES			X		
Market size for EE			X		
Integration of EE and RES in buildings				X	

5.6. JORDAN

1. Country Overview

1.1. Adult Education System

The Vocational Education for adults in Jordan is divided in three main programmes:

1. High School Vocational education Programme under the responsibility of the Ministry of Education.
2. Vocational Training Programme under the responsibility of the Vocational Education Corporation/Ministry of Labor.
3. Academic Vocational Education Programme under the responsibility of the Ministry of Higher Education.

The High school Vocational education is a system for adults at the high school education stage. The student through the high school vocational education Programme gets a high school certificate. If the adult pass all the programmes of the high school certificate, he/she has a chance to study in the Academic Vocational Education Programme to get a Diploma, and if he/she has failed in the high school certificate, he/she has a chance to study through Vocational Training Programme to get a Practice Certificate.

Each programme has a participant assessment system to ensure the competitiveness among participants. Through the Vocational Training Programme, the graduated students are classified into three categories: limited skills, skillful and professional, according to their qualifications. The center of Accreditation and Quality Assurance (CAQA) is the authorized organisation to accredit all the Vocational Training programmes and give the Practicing Certificates.

1.2. Technical and Vocational Education and Training (TVET)

The Vocational Education Corporation (VEC) was established in 1976 under the supervision of Jordan Ministry of Labour. Now the vocational education Corporation acts by law number 11 of 1985. The VEC has 42 training centres distributed around Jordan.

The CVET does not exist in Jordan as an individual authority or as part of the national system, but there is a programme in the framework of the VEC for graduated students for the CVET in topics not related to energy, as graduated students are entitled to study through this programme.

CAQA does not supervise the non-formal education trainings.

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes	
Public	**Private**
The training centres for Vocational Education Corporation provide programmes about EE & RE for the students that failed in the High School Certificate.	Al-Quds College – RE Programme.

2.2. Indicative CVET Courses/Seminars for RES

There are no CVET programmes in RES field in Jordan.

2.3. Indicative CVET Courses/Seminars for EE

There are no CVET programmes in RES field in Jordan.

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation	N. A.				
Energy planning	N. A.				
Energy audits	N. A.				
RE Technologies					X
EE Technologies				X	
Installation of RE systems					X
Installation of EE systems					X
Size of the RE market	N. A.				
Size of the EE market	N. A.				
Integration of RE and EE in buildings	N. A.				

5.7. LEBANON

1. Country Overview

1.1. Adult Education System

Overview

The Ministry of Education and Higher Education (MEHE) in Lebanon has an overall responsibility for all levels of education in the country. In the application of the article 2 of the law 247/2000, a Directorate General for Higher Education (DGHE) was established in the MEHE to regulate the private Higher Education sector, and to supervise and coordinate all actions related to it. The DGHE has been operating within the MEHE with very little staff and resources whilst still being in charge of the 46 private Higher Education institutions, which are currently in operation in the country. The DGHE manages the licensing and the starting up of new Higher Education institutions, the validation of the programmes offered and the recognition of the degrees. All other responsibilities are in the hands of each institution's governing body.

Aside from the conditions that must be fulfilled at the licensing stage, neither the national government nor any local authority is involved in the governance, the funding nor the internal management of private Higher Education institutions. The power of licensing or supervising by the state for Higher Education is loose and subject to many political and sectarian constraints. The State fails to provide a consistent, regular, structured control over a sector which, although constitutionally free and independent, remains a public good under the responsibility of the State.

The public Lebanese University (LU) enjoys a clear autonomy with its own system of governance. Most of the faculties of the LU have branches spread all over the country. The responsibility of managing the faculties belongs to the Deans, while the management of the university is in the hands of the University Council headed by the Rector.

The structure of the Higher Education system

According to the law 75/67 dated 26 December 1967, which governs the public Lebanese University:

"The Lebanese University is the only institution in Lebanon which offers public Higher Education in all fields and levels; it also conducts scientific research and provides continuing training as part of its national, human and developmental role in all the sectors and the regions of the country."

Although the public Lebanese University is not governed by the law 285/2014 for private Higher Education, Lebanon has spelled out in this law its vision for its Higher Education by stating the following:

"Higher education is a public service provided by higher education institutions, it responds to the needs of the society in building its capacities, developing its capabilities and in scientific research, with full respect of the basic freedom of individuals and groups and of all the noble values stated by the international Conventions, particularly those values related to academic freedom" (Law 285/2014).

In 2007, the government adopted a new national education strategy in which a vision for Higher Education was included. It aims at the provision of good quality and available education which is given on the basis of equal opportunity. This means that education contributes to social integration, economic development and to the creation of a knowledgeable society.

This strategy remained without feasible action plans until 2010, when the MEHE announced its quinquennial action plan for general education. In 2011, the newly appointed Minister of Education and Higher Education reconfirmed this action plan and put the following issues on the Ministry's agenda:

- The organisation of the private Higher Education sector;
- The Quality Assurance in Higher Education;
- The organisation of private university branches spreading all over the country;
- The organisation of Masters and PhD degrees;
- The modernisation of Higher Education management, particularly of the Directorate General of HE;

- The reform of the Lebanese University system and the development of its resources;
- International cooperation projects for developing Higher Education structures and scientific research.

Achievements have been made in some of these areas:

- A new law for the reorganisation of private Higher Education was adopted in 2014;
- Two laws, one for the creation of a National Agency for Quality Assurance in HE and another for the restructuring of the DGHE, have been drafted and are in their final stage of ratification at the Lebanese Parliament;
- An audit campaign targeting the chaotic opening of university branches all over the country has been launched and many have been asked to readjust their status;
- A decree for the organisation of doctoral studies has been issued.

Although Lebanon is not a signatory country of the Bologna Process, it has been invited to the Bologna Policy Forum meetings and many universities have started implementing some of the Bologna principles since 2002. The majority of the faculties at the public LU are now applying the Licence-Master-Doctorate 3-cycle system (LMD) together with the European Credit Transfer System (ECTS). Co-habitation between these two systems has caused some problems of adaptation and credit equivalence.

Many private universities have also started implementing the Bologna system. The reform in the Lebanese Higher Education system has been considerably inspired and supported by many European Union Tempus projects, as well as the team of Higher Education Reform Experts who are working under the guidance of the DGHE. However, the highly diversified sector, together with the absence of a comprehensive national plan for reform, has made this modernisation process fragmented and somehow chaotic depending on the individual strategy of each Higher Education institution.

The Higher Education sector in Lebanon offers two types of studies: academic studies delivered by universities, and applied studies delivered by all types of Higher Education institutions. Other vocational and technical studies are delivered by technical schools and institutes which are not considered as Higher Education institutions.

Higher Education is mainly divided into three cycles: First cycle: Bachelor or License; Second cycle: Master and; Third cycle: PhD. All types of Higher Education institutions can deliver degrees of the first two cycles. PhDs can only be delivered by universities and university colleges.

First cycle of studies includes:

1. Undergraduate academic studies (Bachelor or Licence) – lasting for 3-4 years, carrying 180 to 240 ECTS, or 90 to 120 American credits (contact hour credits).
2. Bachelor of technology – lasting for 3 years, carrying 180 ECTS or at least 90 American credits.

Second cycle of studies includes:

1. Master of Arts (MA) or Master of Science (MS) – lasting for 1-2 years and carrying 60 to 120 ECTS (based on the duration of the Bachelor degree) or 30 to 39 American credits.
2. Specialised Applied Studies (Teaching Diploma, Postgraduate degree) – lasting for 1 year and carrying 60 ECTS or 21 to 24 American credits.

Third cycle of studies includes:

1. Doctoral academic Courses (PhD) – lasting for a minimum of 3 years of study carrying 180 ECTS or 40 to 45 American credits.
2. Professional Doctorate in Business Administration (DBA) – lasting 3 to 4 years.

In the field of medical sciences, a Medical Doctor (MD) degree is awarded as a professional qualification after a minimum of 7 years of study, whereas other specialities require, by the law, different durations of study: a minimum of 5 years for dentistry, a minimum of 4 years for physiotherapy and a minimum of 5 years for pharmacy.

In Engineering, a student must complete 5 years of study to be awarded a Bachelor of Engineering (BE) or a Master of Engineering (ME) (300 ECTS or 150 American credits). There is no national rule for the definition of an academic year. However, this academic year is organised by the Higher Education institutions and it starts normally between September and October.

1.2. Technical and Vocational Education and Training (TVET)

There are 162 public and 398 private vocational and technical schools in Lebanon offering TVET, and approximately 83,168 students were registered in such programmes in the 2016–2017 academic year. There are several pathways from general education to the vocational stream. Students may opt to join the technical/vocational stream in lower secondary school. Students who choose the vocational track attain the *Certificat d'Aptitude Professionnel* (CAP) at the end of their intermediate schooling, which is a prerequisite for the *Brevet Professionnel* (BP). Students must hold the BP to pursue TVET at the secondary level. BP and *Brevet d'Etudes* (general education) graduates between the ages of 15 and 18 are eligible for the *Baccalauréat Technique* (BT).

For enrolment in the BT, students must provide the candidacy card to the *Brevet examinations* or an official certified document confirming that they have passed ninth grade. If students have pursued the Dual System (DS combines apprenticeships in a company and vocational education at a vocational school), they are only eligible for the BT certificate once they have sat for additional examinations in general subjects. Students may also sit for the BT if they have completed the *Certificat Professionnel de Maîtrise*, which is a vocational certificate that involves practical training in the workplace. After obtaining a three-year BT, technical students have the opportunity to pursue higher education at the university level or technical education. BT graduates who pursue two years of post-secondary technical education are awarded the title of *Technicien Supérieur* (TS). An additional year after the TS then qualifies students for the *Licence Technique* (LT), upon successful completion of official examination.

Students who decide on vocational instead of technical education can opt for the DS, for which enrolment requirements are exactly the same as those for BT. DS students choose between eight different occupations within different industries and trades as well as tourism services. Students who have completed the first year of BT can also transition to the DS, joining those in their second year of the Dual System programme in their chosen specialization. Compared to BT, the DS combines apprenticeships and vocational education in one course. After completing the DS, students may then advance into the two-year Master degree, which is the highest level in the vocational education stream. In addition to graduates of the DS, graduates of BT and those with a

General Secondary Diploma (*Baccalauréat*) with at least five years of practical experience are also eligible to apply for the Master degree.

As it currently stands, the formal TVET system only offers long programmes, without the option of shorter modules. Consequently, students who drop out of the education system risk entering the labour market without having acquired those competencies necessary to practise their occupation. Making provisions for competency-based education, and introducing modular courses that are geared towards meeting labour market demands, allows students to enter the labour market with clear credentials and a specific set of skills.

A decree concerning the Fields, Levels and Certificates of Technical and Vocational Education (No. 8590) was issued in 2012. This decree regulates vertical and horizontal progression within the qualification system and delineates the prerequisites for each level. However, Decree 8590 does not determine the recognition and equivalence of academic and TVET qualifications, nor does it specify the competencies required at each level.

TVET training providers in Lebanon

The DGTVE administers TVET provision in Lebanon. Even though the provision of technical education is centralized at the DGVTE, the provision of vocational education and training is fragmented, with several providers and with little coordination between them. In addition to the DGTVE, the Ministry of Agriculture (MOA) also provides technical education. Other providers of short-term vocational education include Ministry of Social Affairs (MOSA), the National Centre for Vocational Training (NCVT), the National Employment Office (NEO), local and international NGOs and the private sector.

The Higher TVET Council was established to serve as an advisory board to the DGTVE and leads on strategic planning and policy-making. The Council, however, has not met since 2000. As a result, coordination mechanisms between TVET providers, as well as systematic collaboration with social partners, remain weak.

Unlike public providers, private TVET providers are independent, both in terms of their funding and management. Some private providers are operated by NGOs, whereas others operate for profit. Despite their relative independence, however, private providers must still obtain DGTVE accreditation before

they can provide TVET services. Non-formal providers must be in a school that is certified by the Government, and officially registered with the DGTVE. They must also have their students sit for one official examination organized by the central administration at the end of each academic year.

Upon successful completion of the course, students are provided with a certificate from the institution authenticated by the Directorate General. Generally, private technical and vocational schools focus on non-industrial disciplines, such as business, commerce and IT, which do not require heavy equipment, factories or laboratories. The DGTVE is mandated to oversee the work of private institutes and schools. Once they receive accreditation from the DGTVE, private schools are required to submit an annual report covering general activities and highlighting pending needs. Schools also draft their own qualitative and subjective self-evaluation on their pedagogical methods, which they attach to their annual reports. However, because of staff shortages, the DGTVE has no follow-up mechanisms to assure the quality of private schools.

Continuing vocational training (CVT)

Many private Higher Education institutions, particularly those following an American style of education, have engaged CVT initiatives in their settings or in their curricula. Some have clearly underlined CVT in their mission statement. In 1993, a Centre for Continuing Education (CCE) was established as a division of Haigazian University. Through their respective Continuing Education Programme and Division of Continuing Education, the Lebanese American University and the Notre Dame University have been involved as partners in a Tempus project called Euro-Mediterranean Integration through Lifelong Learning (EU-MILL), which aims at turning lifelong learning into a bridge between Higher Education and the industry. The University for Seniors (UfS) is a new lifelong learning initiative which was launched in May 2012 by the American University of Beirut to promote lifelong learning and active aging, offering lectures, study groups and a social community to older students. This initiative is a first of its kind in Lebanon and the Middle East and it is part of the AUB's Continuing Education Centre. As CVT is becoming a trend, a very new Higher Education institution (Azm University, established in 2015) has introduced CVT as one of the objectives sought by the university.

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes	
Public	**Private**
• **LIBNOR:** The Lebanese Standards Institution is a public institution attached to the Ministry of Industry. It was established on 23-7-1962 by a law giving it solely the right to prepare, publish and amend national standards, as well as to grant the Lebanese Conformity Mark NL.	• **ALMEE:** The Lebanese Association for Energy Saving and for Environment, established in 1993, is involved in a wide range of activities related to sustainable practices and other "green" issues. ALMEE describes itself as "a non-political and non-profit association" committed to better handling of multiple issues and technologies associated with Energy and Environment.
	• **LSES:** The Lebanese Solar Energy Society was established on the 22nd April 1980 in Beirut under the initiative of highly educated engineers and was comprised of solar energy company owners, chairmen of university engineering departments and electrical, mechanical, chemical engineers. LSES currently has around 60 members with a main target to promote the use of solar and renewable energy with the consideration for the protection of the environment, energy saving, and the quality of life.
	• **IRI:** Established in 1953, the Industrial Research Institute (IRI) is registered as a Lebanese non-profit institution declared of public utility by D/L n° 10059 dated 17th August 1955, linked to the Ministry of Industry by Lawn° 642/1997, with administrative and financial autonomy for studies, industrial research and scientific testing, calibration, inspection and certification (system, product and personnel). Furthermore, IRI provides training and consultancy for laboratories' accreditation on National, Regional and International level.

Training Institutes	
Public	**Private**
	• **LCEC:** The actual work of the Lebanese Centre for Energy Conservation started back in 2002 when it was initiated as a joint project between the Ministry of Energy and Water (MEW) and the United Nations Development Programme (UNDP) Lebanon. In 2007, the MEW and UNDP signed an agreement to continue their cooperation towards the setup and institutionalization of LCEC. Following this agreement, the LCEC was created as an independent governmental organization affiliated to the MEW in 2011.

2.2. Indicative CVET Courses/Seminars for RES

CVT Provider: ALMEE

Title of the Training/Seminar:

PV systems: Design and optimization

Target Group:

Mechanical & Electrical Engineers

Methodology (in class, on-site, e-learning):

In classroom + Laboratories

Content/Training Modules:

Basics of PV, Sizing and optimization methodologies for on-grid and off grid system, modelling and simulation for PV systems Concentrated PVs Distributed energy sources, smart-grids and micro-grids, hybrid PV systems

Duration:	Trainees per Cycle:
35h	10
Certificate / Diploma:	**Courses per Year:**
Attendance certificate	2011 (2)

CVT Provider: ALMEE

Title of the Training/Seminar:

Solar Cooling systems

Target Group:

Mechanical & Electrical Engineers

Methodology (in class, on-site, e-learning):

In classroom + Laboratories

Content/Training Modules:

Introduction to solar cooling technologies, design, dimensioning, monitoring and data evaluation.

Design and simulation of solar cooling system

Duration:	Trainees per Cycle:
80h	6
Certificate / Diploma:	**Courses per Year:**
Attendance certificate	2012 (1)

CVT Provider: ALMEE

Title of the Training/Seminar:

Solar Thermal systems

Target Group:

Mechanical & Electrical Engineers

Methodology (in class, on-site, e-learning):

In classroom + Laboratories

Content/Training Modules:

Introduction to collector performance tests according to European standards solar thermal.

Development and testing of a mobile monitoring system for solar thermal systems

Duration:	Trainees per Cycle:
80h	12
Certificate / Diploma:	**Courses per Year:**
Attendance certificate	2011 (1)

CVT Provider: IRI

Title of the Training/Seminar:

Solar Water Heater systems

Target Group:

Engineers and technicians who work on RES and solar water heater in particular

Methodology (in class, on-site, e-learning):

In classroom + Laboratories

Content/Training Modules:

Theory, design considerations and installation strategies necessary to install and maintain a solar domestic hot water system

Duration:	Trainees per Cycle:
30h	32
Certificate / Diploma:	**Courses per Year:**
Attendance certificate	2009 (1) / 2010 (1)

CVT Provider: IRI

Title of the Training/Seminar:

PV systems: Off Grid, on-grid

Target Group:

Engineers and technicians who work on RES and solar water heater in particular

Methodology (in class, on-site, e-learning):

In classroom + Laboratories

Content/Training Modules:

Theory, design considerations and installation strategies necessary to install and maintain an off-grid PV system & an on-grid PV system solar domestic hot water system

Duration:

30h

Trainees per Cycle:

32

Certificate / Diploma:

Attendance certificate

Courses per Year:

2017(1)

2.3. Indicative CVET Courses/Seminars for EE

CVT Provider: ALMEE

Title of the Training/Seminar:

Energy policy & Energy Planning

Target Group:

Mechanical & Electrical Engineers

Methodology (in class, on-site, e-learning):

In classroom + Laboratories

Content/Training Modules:

Energy planning & usage of Energy models.

Optimization methodologies for Energy planning.

Energy policy analysis using planning tools.

Demand forecasting.

Duration:

35h

Trainees per Cycle:

10

Certificate / Diploma:

Attendance certificate

Courses per Year:

2011 (1) / 2012 (1)

CVT Provider: ALMEE

Title of the Training/Seminar:

GRASS

Target Group:

Mechanical & Electrical Engineers

Civil Engineers & Architects

Methodology (in class, on-site, e-learning):

In classroom + Laboratories

Content/Training Modules:

The Purpose of this training is to improve the skills of trainees to assist Project teams in Understanding the criteria for each of the main components of the GRASS Rating Tool. Trainees who pass exam became GRASS assessors.

Duration:	Trainees per Cycle:
30h	10
Certificate / Diploma:	**Courses per Year:**
Attendance certificate	2015 (2) / 2016 (1) / 2017 (1) / 2018 (1)

CVT Provider: LIBNOR

Title of the Training/Seminar:

Energy Management system: Iso 50001

Target Group:

Engineers and architects, energy management team from industrial and commercial sectors

Methodology (in class, on-site, e-learning):

In classroom

Content/Training Modules:

The Plan-Do-Check-Act (PDCA) cycle

A policy for more efficient use of energy. Targets and objectives to meet the policy.

Use data to better understand and make decisions about energy use

Measure the results Review how well the energy policy is working.

Duration:	Trainees per Cycle:
40h	35
Certificate / Diploma:	**Courses per Year:**
Attendance certificate	2016 (1) / 2017 (1)

CVT Provider: IRI

Title of the Training/Seminar:

Energy Efficiency in food industrial sector

Target Group:

Engineers who work on food industry

Methodology (in class, on-site, e-learning):

In classroom + Factories

Content/Training Modules:

According to each food process what are the possibilities to save energy for each level, each appliance & machine, how we can calculate and evaluate the potential of energy saving.

Cost saving & feasibility study

Duration:

30h

Trainees per Cycle:

25

Certificate / Diploma:

Attendance certificate

Courses per Year:

2016(1) / 2017(1)

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation		X			
Energy planning		X			
Energy audits		X			
RE Technologies			X		
EE Technologies			X		
Installation of RE systems		X			
Installation of EE systems		X			
Size of the RE market			X		
Size of the EE market			X		
Integration of RE and EE in buildings		X			

5.8. LIBYA

1. Country Overview

1.1. Adult Education System

Overview

The Libyan Government spends more than 2.7% of its GDP on its education system, to expand, upgrade and modernise its fundamental infrastructure, and to improve the learning curriculum in both vocational institutions and universities.

The main objectives of the ongoing educational system are to acquire the required knowledge and skills to fulfil the country's need for an educated and well-trained workforce and experts in various development domains to achieve national policy progress and advancement, develop new technologies, increase productivity and secure a sustainable development.

Compared to many countries in the Arab region, the employment rate is quite high in Libya, where the highest share of jobs (almost 70%) are in the public and government sectors. However, it is important to highlight the gap between the supply of education and training and required skills in the labour market.

According to the Global Competitiveness study, Libya has a well-developed vocational and higher education system, but additional efforts must address the quality of the ongoing process and its relevance to cover the current needs of the labour market, namely the importance to set-up a clear mechanism to analyse the job market and its skills requirements and, then, associate it to the training provision.

The Libyan economy depends substantially on the energy sector, where the oil and gas industry accounts for almost 60-70% of GDP, 95% of the exports and approximately 90% of the government revenue. However, the employment rate in this sector represents only 3% of the total. This explains the need to allocate higher efforts in the implementation of dedicated and sustainable

capacity development programmes to develop national human resources in the energy field and, particularly, in the sustainable energy technologies.

Considering the importance of developing sustainable energy for securing and diversifying the energy provision in Libya, structural reforms to support the economic growth and diversification of the private sector are clearly needed. The immediate and effective engagement of the private sector, including industrial, consultants, and other non-governmental actors in vocational trainings, is key and yet remains one of the major gaps besides the theoretical challenges and the absence of appropriately equipped laboratories and practical learning.

Some institutional arrangements and reforms are being designed, but not been made operational yet. The National Board of Technical and Vocational Education and the Ministry of Labour are both taking initiatives to assess and consider the skills needs associated with vocational training programmes requested by local private stakeholders.

As many Arab countries, Libya should make further efforts to develop their human resources and national expertise in their capacity development sector. The gaps identified in the sustainable energy sector are mainly:

- The lack of coherence between RE and EE needs, programs/planned projects and implemented CD activities.
- The limited role of some national RE and EE institutions in the implementation of CD activities and lack of cooperation and coordination between national stakeholders.
- No quality insurance for sustainable capacity development activities and lack of certification and accreditation processes and programs for training modules at the national level.
- Absence of regular and systematic monitoring, evaluation, update and review of capacity development activities as well as impact measurement.
- Limited experience exchange and information sharing with other countries in EE and RE fields and associated capacity development activities.
- Absence of sustained communication and awareness campaigns for regional and national CD initiatives and programs targeting mainly policy-makers.

1.2. Technical and Vocational Education and Training (TVET)

Overview

Vocational education and training (VET) is an important sub-sector of the public education system in Libya. It has been subject to an active process of redesign and has become the focus of the government's strategy in more recent years, during the 1990s. A network of Public Higher Vocational Education and Training Colleges (PHVETCs) was introduced for enhancing the supply of skilled work force needed for the socio-economic development plans.

The vocational training sector, that has been considered for a long time as an alternative for absorbing low performing students from both basic and secondary education, are under the responsibility of the National Board of Technical and Vocational Education (NBTVE), belonging to the Ministry of Higher Education and Scientific Research. TVET system in Libya consists of three programs: the intermediate institutes, higher institutes and technical colleges, which are managed by a dedicated directorate at the NBTVE. Other relevant employment regulations include Article 51 of Law 12 for the work relations, stating that the Libyan workforce must constitute an accumulated 75% in private (national/foreign) companies, and for each licensing request for foreign workers 30% of Libyans must be employed, and an additional 20% must be trained.

The main objectives and missions of the National Board of Technical and Vocational Education (NBTVE) are as follows:

- Apply the rational system of government in all technical and vocational education and the adoption of systems of institutions and mechanisms of monitoring and evaluation to ensure the actual application and modify the appropriate paths.
- Build operations effective partnership between all the relevant technical and vocational education parties through the establishment of boards of specialized skills in different economic sectors and contribute to the modernization and development of local technical and technical education programs.
- Conveniently adapt technical and vocational education programs to the needs of the current and future professions and skills of the labour mar-

ket, with the ability to respond to the disciplines of the conflicting change.

- Support and guide scientific research towards the development of technical and vocational education and allocate budgets to do so by the government and regional and international organizations and bodies.
- Develop mechanisms to identify current and future needs in terms of skills, so as to ensure the sustainability of harmonizing technical and vocational education programs with the labour market requirements.
- Support the technical and vocational education as an essential tool for the life-long learning, and recognition of technical and professional qualifications, including training qualifications.
- Involve local and foreign investors in the development of technical and vocational education and support constructive competition through appropriate investment climate.
- Institutional stability of the administrative system responsible for technical and vocational education.
- Development of Technical and Vocational Education Institutions through the preparation and development of education and training curricula and programs in accordance with the requirements of the approved quality standards, and the development of new disciplines and specialties freeze list based on unemployment indicators and job seekers, as well as professions occupied by non-Libyans.
- Employ various media to spread community awareness about the importance and role of technical and vocational education in the social and economic development and to encourage involvement in this type of education.
- Improve infrastructure of technical and vocational education by stimulating the environment for the development of absorptive capacity in quantity and quality.
- Promote equal access to technical and vocational education for all without discrimination, with special attention to the poor and people with special needs.
- Establish specialised skills councils sectors of tourism, hospitality and construction and infrastructure to contribute to the modernisation and development of technical and vocational education programs.

- Convert Higher Technical Institutes to become outstanding Technical Colleges accordance with the rules and principles adopted.
- Upgrading the Higher Technical Institutes to be able to better contribute to the implementation of the strategy for technical education and vocational training in Libya.
- Renovating the medium vocational institutes so as to be more responsive to the needs of the Libyan labour market, especially as it spreads over most cities in Libya.

Vocational education programmes are available to pupils who do not complete their 9 years of basic education, although they may receive these during this period too. Over 44 programmes are available in different fields, such as electrical and mechanical, building and carpentry, architectural, agricultural and marine fishing, and even in what are referred to as female vocations.

Continuing training provision comes under the broad responsibility of the Ministry of Labour. However, most provision is in about 450 private centres, mainly concentrating on English language, IT and management. In contrast, the Ministry operates only four centres, which specialize in construction, engineering professions, soft skills, IT and management. The biggest of these has branches in six cities.

In terms of employment measures, the current Libyan government has begun (since 2011) to give priority to de-mobilized fighters in need of training and jobs. Both the Ministry of Labour and the Warrior Affairs Commission are planning programs for implementation. The Ministry of Labour has a target of 25 000 beneficiaries and is offering jobseekers three types of program:

- an orientation program focusing on communication skills and on how to search for a job.
- a foundation programme focusing on ICT, foreign languages and soft skills.
- a VET programme for technical skills.

In general, Libya has undergone considerable changes through the last three decades up to the Libyan Revolution. A variety of radical changes has taken place to revise the economic, educational and social conditions of the country. There has been significant progress in developing the Libyan TVET systems as experienced

by the increased number of technical institutes in Libya, which became more than 120 institutes in 2004 from 84 in 2000 in order to meet the sharply growing needs for engineers and technicians.

The Libyan government has placed large emphasis on TVET programs to support the manufacturing sectors and a significant part of training needs has been met nationally by the universities and specialized institutions. However, most of these developments lack a strategic direction and very little has been done to study and analyses the effectiveness in supplying the skills needed by the national industries.

The table below illustrates some training centres and the number of beneficiaries during a specific period:

Training Level	1986 - 1990		1991 - 1995		1996 - 2000	
	Females	Males	Females	Males	Females	Males
In house training	-	6300	-	7800	-	10000
Vocational Training Centers	4000	23200	8000	26000	10000	40500
Other Training Centers	18600	49400	27300	72300	28300	81200

TVET programmes are taught in three kinds of school, which are the responsibility of the National Board of Technical and Vocational Education (NBTVE), belonging to the Ministry of Higher Education and Scientific Research. These are the intermediate institutes, higher institutes and technical colleges, each of which is managed by a dedicated directorate at NBTVE:

- Intermediate institutes offer three-year programs to students aged 15 and above, who hold the compulsory basic school certificate (382 intermediary institutes).
- Higher institutes offer courses to students aged 18 and above, holding the secondary school certificate (111 higher institutes).
- Technical colleges offer courses to students aged 18 and above, who finished secondary school certificate with higher grade (18 colleges).

Due to the political situation in Libya, there is very little information available about the infrastructures of EE and RES professional training, as well as indicative training courses.

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Missing information due to the current political situation in Libya.

2.2. Indicative CVET Courses/Seminars for RES

Missing information due to the current political situation in Libya.

2.3. Indicative CVET Courses/Seminars for EE

Missing information due to the current political situation in Libya.

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation		X			
Energy planning		X			
Energy audits		X			
RE Technologies				X	
EE Technologies			X		
Installation of RE systems			X		
Installation of EE systems		X			
Size of the RE market			X		
Size of the EE market			X		
Integration of RE and EE in buildings		X			

5.9. MOROCCO

1. Country Overview

1.1. Adult Education System

Overview:

The National Agency for Combating Illiteracy was founded in 2013. It is specifically geared to combating illiteracy and concerned with the development of various programs for this purpose.

Through the national strategy to combat illiteracy, the government seeks to reduce the illiteracy rate in Morocco and to harmonize all literacy programs with the various target groups. Recently, the government of Morocco teamed up with nongovernmental organizations (NGOs) to broaden the reach of the Moroccan formal education system through the introduction of an innovative, NGO-delivered literacy training program. Morocco has made progress in increasing its adult literacy rate in recent years.

The one-year old literacy program combines public, private initiatives, donor and government funding to provide a new delivery mechanism in the fight against illiteracy. The World Bank is funding some of these initiatives through the Social Priorities Program.

Through this program, the Moroccan government enters into delivery agreements with NGOs that target priority groups such as rural populations, women, and urban workers to provide basic literacy classes. The program utilizes both new and older nongovernmental organizations and a range of teachers. Some of the teachers are university graduates; others have a secondary school training and relevant experience. The government has developed special materials and a support system for the program.

Its Board of Directors is governed by Law No. 38.09 of representatives of the most important actors in the field of combating illiteracy in Morocco (minis-

tries, public institutions, non-governmental organizations, private sector).

In the first year of operation, the government has reached agreements with 30 NGOs (17 of which are covered by Bank financing) to provide service to more than 49,000 learners. Two models of training are being followed:

1. The first provides 200 hours of instruction in reading and writing.
2. The second combines the same amount of literacy training with classes in civics, family planning health, environment and work-related skills to attract older learners.

Intiatives:

1. In 2007, the Kingdom of Morocco and the European Union have accorded a first Support Programme in the form of Sector Budget Support (SBS). In the SBS framework, a series of technical assistance missions for the external monitoring have been planned and entrusted to a team of experts presented by the company **Eptisa**, through a public bid as required. This technical assistance, which took place from 2009 to 2016, **Eptisa** accompanied a sectoral dialogue between Morocco and the European Union on this strategy and its outstanding results, both at a quantitative level (6,8 millions of illiterate people have followed training sessions along the last ten years!) – through an emphasis on involving women and youth, and lately, rural people (category with a high proportion of low levels of qualification) – and at a qualitative level (referential, educational approach, training of trainers, use of ITC, computerized management of Programmes, monitoring and certifications, among others).

2. The National Education and Training Charter (CNEF) was unable to meet its objective of reducing illiteracy to less than 20% by 2010 and totally eradicating it by 2015 even though the number of ben-eficiaries of literacy programmes tripled from 286000 in 2002-03 to nearly 763000 people in 2012-13, according to CNEF. The *Agence Nationale de Lutte Contre l'Analphabétisme* (ANLCA) set out a partnership strategy with different bodies, including non-governmental organi¬sations (NGOs) to be as close as possible to rural and remote areas where illiteracy is taking its toll.

More than half (52.2%) of literacy programmes have been provided by NGOs, highlighting the role of the civil society in education.

1.2. Technical and Vocational Education and Training (TVET)

TVET Strategy

Developing human resources is regarded by the Government of Morocco as one of the main tools for modernising Moroccan society. Following the increasing student demands for TVET programmes, the government developed a number of TVET-related strategies since 2000.

Accordingly, the National Strategy for Vocational Training (*Stratégie Nationale de la Formation Professionnelle*) for the period 2015-2021, and the Vocational Training Vision 2020 basically work to increase access to TVET programmes and empower students to access the labour market. The strategic documents highlight the importance of close cooperation between TVET institutions and employers to determine the skills needed in different geographical areas of the country. Accordingly, the government involves employers in TVET planning and requests them to present forecasts for future needs. The strategies also aim to:

- Strengthen cooperation with chambers of commerce, businesses and professional associations.
- Increase the practical component of TVET courses by expanding workplace training.
- Create new training centres and increase the capacity of the existing ones.

The TVET system in Morocco is regulated by the Ministry of National Education and Vocational Training (*Ministère de l'Education Nationale et de la Formation Professionnelle* – MNEVT) and the Ministry of Labour and Social Affairs (*Ministère de l'Emploi et des Affaires Sociales* – MEAS). The Vocational Training Department (*Département de la Formation Professionnelle* – DFP) is responsible for defining and assessing, in consultation with other stakeholders, the direction of national TVET policy. The DFP brings together public institutions attached to various government departments, the National Office for Vocational Training and the Promotion of Work (*L'Office de la For-*

mation Professionnelle et de la Promotion du Travail – OFPPT) and private operators. Other entities responsible for TVET include the National Jobs and Skills Promotion Agency (*L'Agence Nationale de Promotion de l'Emploi et des Compétences – ANAPEC*), which has 50 branches, and the Labour Department (43 branches).

The National Office for Vocational Training and Work Promotion (OFPPT) is responsible for organising and providing TVET programmes. It has financial autonomy and accommodates regional representatives from all DFPs. Other TVET providers include centres from the Ministry of Agriculture, the Tourism Department, the Maritime Fishing Department and the Small Trades and Crafts Department.

Vocational Training Establishments (EPPs) include Vocational Qualification Centres, Applied Technology Institutions and the Higher Applied Technology Institutions. Social partners, such as employers and trade unions, provide feedback on Government TVET policy. For instance, different social partners have been involved in the Torino Process analysis on the impact of TVET reform in Morocco.

TVET legislation

- Law No. 13 (2000) regulates the provision and accreditation of TVET by Private Vocational Training Establishments (EFPPs).
- Law No. 12 (2000) regulates the organisation of apprenticeship training. The Law defines apprenticeships as practical training conducted 80% through on-the-job training and 20% in general and technical education.
- The National Education and Training Charter (NETC), signed in December 1999, defines the aims of TVET as follows: (1) to satisfy the needs of industry; (2) to promote youth employment; and (3) to improve new prospects for employees. Specifically, Article 20 of the NETC stresses that TVET is a national priority. The Charter also addresses continuing education as a mean to meet companies' human resource needs and emphasises the need to strengthen companies' performance in the context of globalisation. The Charter recommends the establishment of a contractual continuing education system adapted to the specific characteristics of each professional field.

- Law No. 39-96 (1996) regulates alternance training in Morocco.
- Decree No. 2.86.325 (1987) regulates the organisation of Vocational Training Establishments (*Établissements de Formation Professionnelle* – EFP).

Initiatives:

1. Formal TVET programmes are offered at various stages of the Moroccan education system. Upon completing six years of compulsory primary education, students are able to take TVET specialisation programmes lasting a varied amount of time depending on the type of skills required. Qualification courses are available to students who have completed three years of junior education. Similar to specialisation courses, the duration of courses varies according to the type of skills required. Technical Diploma courses are available to those who have completed secondary education. As of 2008 there are 1858 private TVET institutions in Morocco, representing approximately 79 percent of the total TVET institutions. Private TVET institutions are encouraged to cooperate with employers and enterprises and also offer TVET programmes in continuing education.

Tertiary level TVET programmes are offered at public and private institutions and include:

- Diploma programmes (*Diplôme de Technicien Spécialisé*) lasting two years.
- Advanced Diploma programmes (*Brevet de Technicien Supérieur or Adjoint Technique Specialisé*) lasting two years.
- A four-year programme in higher professional education, culminating in a Diploma in Applied engineering (*Diplôme d'Ingénieur d'Application*).

2. Non-formal TVET in Morocco is taught in the form of residential, alternating and learning programmes. The public sector has introduced alternative training methods (apprenticeship training schemes, evening classes, distance learning), the majority of which are at an experimental stage or are gradually expanding. For instance, the National Office for Vocational Training and the Promotion of Work (OFPPT) organises evening classes leading to TVET qualifications.

Residential training is provided by public and private providers and takes place in educational institutions providing short-term business courses. Al-

ternating training takes place in businesses (50%) and in Vocational Training Centres (50%). Apprenticeship training consists of on-the-job training (80%) and education in Learning Training Centres (20%).

The informal TVET system plays a significant role in Morocco and casual as well as undeclared jobs are normally found in the domestic and commercial sectors.

3. Another initiative aims to introduce 750 000 graduates into the labour market over the next four years. This will be 250 000 graduates more compared to the 500,000 students, who graduated between 2003 and 2007. A number of measures will be put into place in order to achieve this target. These measures include the Moroccan government working closely with chambers of commerce, businesses and professional associations, while sector-based vocational training programs will aim at encouraging workplace training.

4. The policy for developing human resources is a major objective of the Moroccan Government. It is regarded as one of the main tools for modernizing Moroccan society and will mean that short, medium and long-term challenges can be taken up. It is based on the reform of the education and training system, established as a national priority, and its objectives are defined by the National Education and Training Charter, published in December 1999. The anticipated reform is based on the following central themes:

- the establishment of informal education for young people between the ages of 8 and 16 not in full-time education or out-of-school so that they are able to re-enter an education-training cycle.
- combating and eventually eradicating illiteracy, which currently affects 51% of the population.

5. Office of Vocational Training and Employment Promotion (OFPPT): founded in 1974, OFPPT is a public training institution, which offers vocational training free of charge. The training is based on a demand-driven strategy meeting the qualification needs and requirements of the labor market and has a large network of training centres all over Morocco that provide acknowledged competencies at the service of business companies. OFPPT, provides diversified services, such as young training and adult training , ultra – company training, seminars and technical training courses, training through mobile units,

distance – learning, intensive adult training, employees functional literacy. Between 2009-2010 a training was provided to 220 000 trainees. OFPPT supports specialized technicians, thanks to courses with a duration of two, one-year and six months.

Vocational Training Adapted to Companies' Needs In Morocco

Morocco implements a highly dynamic vocational-training policy to enable economic operators to benefit from resources adapted to their needs, with the appropriate profiles and skill are:

- 327 public vocational-training centers (2012-2013)
- 1667 private vocational-training centers (2010-2011)
- 310 000 interns are in training (2012-2013) in the public sector and 76474 in the private sector (2011-2012)
- 148470 graduates in the public sector and 45726 in the private sector in 2010
- 171 training courses (2012-2013)
- Training in all disciplines of 1,000,000 young people by 2016

Training Centres for Morocco's Strategic Sectors

Specialist training centers set up in a context of public-private partnership, at the core of integrated industrial platforms (P2I) to develop cutting-edge skills are:

- Training center specializing in the automotive industry in Tangier (CFMA/TM).
- Training centers specializing in the automotive industry in Casablanca, Tangier and Kenitra, focusing on automotive equipment needs.
- Institute of Aviation (*Institut des Métiers de l'Aéronautique – IMA*).
- The graduate School of Creative Design and Fashion, to provide support for textile firms towards the final product.

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes	
Public	**Private**
• Office National de Formation Professionnelle et de la Promotion de Travail (OFPPT) • Institute de recherche en Energie solaire et énergies nouvelles (IRESEN) • IFMEREE Tanger • IFMEREE Oujda • Masen: Moroccan Agency for Sustainable Energy • AMEE: Agence Marocaine d'Efficacité Energétique	• Centre for Professional Development KEA • REUNET + European project EUROSUNMED + MASEN + Polydisplinary faculty of Ouarzazate • Training Institute for Water, Energy and Environment IFORM 3E • IFFEN Morocco • AJM - H3C Center • IFIER: industrial RE training centre

2.2. Indicative CVET Courses/Seminars for RES

CVT Provider: AMEE

Title of the Training/Seminar:

Solar Pump

Target Group:

Agricultural sector

Methodology (in class, on-site, e-learning):

International hall for solar pump

Content/Training Modules:

Awareness-raising workshop on the benefits of solar pumping: discussing the operational constraints (technical, financial and organizational) and their impact on the sustainable development of the solar pumping market and to identify the expectations and priorities of regional and local actors for the development of solar pumping projects.

Duration:

1 Day

Trainees per Cycle:

N/A

Certificate/Diploma:

N/A

Courses per Year:

2018

CVT Provider: Moroccan local authority and R20

Title of the Training/Seminar:

Solar energy

Target Group:

—

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

Solar technology

Duration:

4 Days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2012

CVT Provider: OFPPT

Title of the Training/Seminar:

PV system installation

Target Group:

—

Methodology (in class, on-site, e-learning):

OFPPT headquarter

Content/Training Modules:

—

Duration:

—

Trainees per Cycle:

30

Certificate/Diploma:

—

Courses per Year:

2018

CVT Provider: REUNET + European project EUROSUNMED + MASEN + Polydisplinary faculty of Ouarzazate

Title of the Training/Seminar:

Concentrated Solar Thermal (CSP) Training

Target Group:

PhD students from different universities and Moroccan research institutes

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

—

Duration:

—

Trainees per Cycle:

60

Certificate/Diploma:

—

Courses per Year:

2017

CVT Provider: Solar Cluster and the DKTI Project

Title of the Training/Seminar:

PV system for auto-consumption – energy independence and value creation

Target Group:

Different groups

Methodology (in class, on-site, e-learning):

Anfa Palace Hotel, Casablanca

Content/Training Modules:

Economic potential of this technology; market trends; interest of the investment; barriers and lessons to be learned

Duration:

1 Day

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2017

CVT Provider: DKTI Project, and RCREEE

Title of the Training/Seminar:

Establishment of a national certification system for renewable energy training and energy efficiency

Target Group:

For the benefit of IFMEREE (Vocational training institutes in renewable energies and energy efficiency)

Methodology (in class, on-site, e-learning):

IFMEREE, Oujda

Content/Training Modules:

The main objective of this event was to develop an action plan for the implementation of the certification project through the completion of the requirements; Appropriate steps and procedures to be adopted in order to certify continuing education modules in the photo-voltaic (PV) sector.

Duration:

1 day

Trainees per Cycle:

—

Certificate/Diploma:

Certification of RE and EE training

Courses per Year:

2017

CVT Provider: IFMEREE Oujda

Title of the Training/Seminar:

Qualified Vocational training

Target Group:

Technicians involved in RE and EE fields

Methodology (in class, on-site, e-learning):

Theoretical and practical courses

Content/Training Modules:

Wind Energy

PV systems

SWH

Bio-Gaz

Duration:

5 days

Trainees per Cycle:

Almost 30 candidate

Certificate/Diploma:

Certification ISO 29990

Courses per Year:

2017 / 2018

CVT Provider: CNRS-promes, franc

Title of the Training/Seminar:

Training seminar on solar thermal concentration

Target Group:

Marocain Research Teachers

Methodology (in class, on-site, e-learning):

Polydisciplinary Faculty of Ouarzazate

Content/Training Modules:

—

Duration:

4 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2016

CVT Provider: NUON SOLAR TEAM and supported by GIZ

Title of the Training/Seminar:

Moroccan Solar RACE Challenge “workshop on solar utility”

Target Group:

Young Moroccan engineers

Methodology (in class, on-site, e-learning):

Golden Talip FARAH

Content/Training Modules:

—

Duration:

2 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2016

CVT Provider: Research Institute for Solar Energy and New Energies (IRESEN)

Title of the Training/Seminar:

Management and promotion of research projects in the field of renewable energies

Target Group:

—

Methodology (in class, on-site, e-learning):

Green Energy Park

Content/Training Modules:

Recognize and identify what is valuable from research and development projects.

Define how to manage and value intellectual property and other research results.

Formulate an attractive customer value proposition.

Duration:

2 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2016

CVT Provider: GIZ and DKTI

Title of the Training/Seminar:

Complementary training on photovoltaic systems connected to the electricity grid

Target Group:

This training is for high-level specialists able to manage complex photovoltaic projects, increase their performance and reduce their production costs.

Methodology (in class, on-site, e-learning):

University of King Mohamed

Graduate School of Technologies in Salee

Content/Training Modules:

—

Duration:

4 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2015

CVT Provider: REUNET and COFM

Title of the Training/Seminar:

Generic techniques for manufacturing electronic devices in general and devices for new and renewable energies

Target Group:

For PhD-level students, students in the second year of masters and engineering students in the third-year of Electronics and Renewable Energies.

Methodology (in class, on-site, e-learning):

Faculty of science BEN M'SIK

Hassan II University in Casablanca

Content/Training Modules:

—

Duration:

2 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2018

2.3. Indicative CVET Courses/Seminars for EE

CVT Provider: Ministry of energy and AMEE

Title of the Training/Seminar:

Workshop on EE in the industrial sector.

Target Group:

Industrial sector

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

This workshop is a part of a series of thematic workshops organised to promote energy efficiency in key sectors of the national economy, discuss the potential opportunities for energy efficiency development, and to exchange information. experiences in this area between different actors.

Duration:

1 day

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2018

CVT Provider: Ministry of energy and GEZ

Title of the Training/Seminar:

Heating system improving

Target Group:

Midelt province

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

—

Duration:

1 day

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2018

CVT Provider: DKTI project

Title of the Training/Seminar:

Training on thermal dynamic simulation software for buildings.

Target Group:

For the benefit of and capacity building of the National Architecture School.

Methodology (in class, on-site, e-learning):

Rabat

Content/Training Modules:

—

Duration:

2 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2017

CVT Provider: RENUET and COFM

Title of the Training/Seminar:

Training seminar on energy efficiency in the building.

Target Group:

—

Methodology (in class, on-site, e-learning):

IFMEREE in Oujda

Content/Training Modules:

—

Duration:

3 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2016

CVT Provider: With the support of GIZ

Title of the Training/Seminar:

Workshop on energy efficiency and integration of renewable energies.

Target Group:

—

Methodology (in class, on-site, e-learning):

—

Content/Training Modules:

—

Duration:

2 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2015

CVT Provider: IFMEREE Oujda

Title of the Training/Seminar:

Qualified Vocational training

Target Group:

Technicians involved in RE and EE fields

Methodology (in class, on-site, e-learning):

Theoretical and practical courses

Content/Training Modules:

EE in building sector

Duration:

5 Days

Trainees per Cycle:

Almost 30 candidates

Certificate/Diploma:

Certified training

Courses per Year:

2017 / 2018

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation				X	
Energy planning				X	
Energy audits			X		
RE Technologies					X
EE Technologies			X		
Installation of RE systems					X
Installation of EE systems			X		
Size of the RE market				X	
Size of the EE market			X		
Integration of RE and EE in buildings			X		

5.10. PALESTINE

1. Country Overview

1.1. Adult Education System

Overview

Since being established in 1994, the MoEHE is considered as the main body that is fully responsible for planning, implementing, coordinating and following up on the literacy programme in Palestine. The General Directorate of General Education, through the Division of Non-Formal education, determines the curricula for this programme, the educational plans and the different activities that need to be executed. Through different Education Directorates that occur across the country, the Ministry provides all the necessary facilities, classrooms, text books, facilitators and stationary etc. Also, and through the Educational Directorates, the Ministry technically supervises and manages the centres. At the end of each programme, the participants take a general exam and the Ministry issues the certificates.

Adult Education in Palestine is seen as a social responsibility and of the utmost importance, not only by the MoEHE but also by the Ministry of Labour, in collaboration with labour unions, the Ministry of Social Affairs, the Ministry of Women Affairs, local and international NGOs, universities and women's organizations who are involved in these topics. Adult Education covers reduction of illiteracy, dealing with school drop outs, providing skills and vocational training to workers, upgrading the skills and knowledge of university graduates and professionals in keeping up with the changing labour market and empowering women through life skills and rights education.

Adult Education Initiatives

1. The National Illiteracy Reduction Programme includes basic education, literacy, women's education, and information technology for adults, targeting refugees especially, as well as people with special needs, and people in

rural areas. Depending on the needs of the targeted groups, other issues are added to the curriculum, such as environmental education, health education, life skills, and citizenship education.

2. Another programme is the IT4Youth programme, which is a four-year local pilot project aimed at enhancing the learning skills and employability of the Palestinian youth from ages 11 to 24, through computer-based information technology. The programme was developed as a partnership between the International Youth Foundation and the Welfare Association. The programme partners with local institutions, such as the MoEHE, local village councils, schools, and the Future kids Training Centre.

3. Support to Palestinian Education Programme (SPEP) is a project funded by the Italian Cooperation Agency and which is managed by the United Nations Development Programme (UNDP). The project involves the Palestinian MoEHE, 24 public schools, 4 local Universities and relative Districts (3 in West Bank and 1 in Gaza Strip) as well as he University of Bologna. Its aim is to support the capacity of schools for self-improvement by developing a process whereby the school becomes able to self-evaluate itself in terms of the quality of education (learning and teaching) given, its management and leadership, learning environment, networking, the relation with parents and community and the continuation of professional development for teachers and principals. Each school develops its improvement plan with specific action plans, target and tasks, each with clearly identified success criteria in order to evaluate results. Local Universities, coordinating with the MoEHE, each work with 6 schools visiting them regularly, helping them to identify standards and targets for the quality of education, improvement planning, teacher training in different areas, monitoring, advising and reviewing. The main concept behind the SPEP intervention is a comprehensive developmental process focusing on the school itself and leading to school growth and improvement. The Department of Education of the University of Bologna has a technical advisory role in the ICT component supporting and working together with Palestinian Universities and schools and coordinating with UNDP and MoEHE.

4. LLIP is the first 'joint project' of Tempus on the West Bank and Gaza that focuses on Lifelong Learning as a national system in Palestine. It introduces a systematic approach across the Palestinian territories, encouraging a more networked way of thinking about different arrangements of Palestinian education and sup-

porting Palestinian communities. The Palestinian universities in this project are the University of Birzeit, Islamic University of Gaza, University of Al Quds and University of Bethlehem and the non-university partners from the Centre for Applied Research in Education (CARE), and the Women Graduates of the Islamic University of Gaza. European Partners are the University of Glasgow, National University of Ireland Maynooth and St Mary's University College London.

1.2. Technical and Vocational Education and Training (TVET)

The overall objective of the National TVET Strategy is to create a knowledgeable, competent, motivated, entrepreneurial, adaptable, creative and innovative workforce in Palestine. A skilled workforce is expected to contribute to poverty reduction as well as to the country's social and economic development through the facilitation of a demand-driven, high quality TVET that is relevant to all sectors of the economy, at all levels and to all people. A National Qualification Framework (NQF) will allow for mobility of TVET students within the entire education system through comparable education levels and accreditation of graduation certificates.

As part of the National TVET Strategy, a governance structure for the TVET system has been set up. The establishment of two management bodies marked a very important step in establishing cooperation and coordination in TVET. The Higher Council for Technical and Vocational Education and Training was established in 2005. The Council was composed of 16 members which were made up of representatives from the private and public TVET bodies. The Council was chaired in rotation between the MOEHE and the Ministry of Labour (MOL). In addition to the Higher Council, the Executive Board, which consists of technical and decision making members of the Council, are in charge of implementing the National TVET Strategy, coordinating with the different training providers and relevant stakeholders, and proposing regulations, procedures and standards.

Apprenticeships between business and TVET schools are organised in certain fields, such as automobile maintenance and hospitality. However, education and business cooperation have yet to be institutionalised and are currently still just based on individual endeavours. The challenges that face public-private partnerships in TVET education, therefore, are due to 1) a high fragmentation of the organisations that represent the private and academic

sectors which mainly consist of family-owned small and medium businesses 2) a wide range of overlapping TVET programmes that are provided by a variety of TVET institutions and 3) a lack of tracer studies that follow graduates as they seek employment (ETF, 2010).

The Palestinian Authority (PA) have deferred the development of a general education law until the general status of the negotiations for the territories are completed. Similarly, there is currently no specific law governing the TVET system. There is a large number of rules and regulations for different aspects of education. These need to be modernised and updated, as well as classified under clear topics to facilitate their retrieval (UNESCO, 2011).

Intiatives

1. Formal TVET system

National Qualifications Framework (NQF)

The German-funded regional TVET Project was set up to establish a TVET platform for regional TVET reform. The project ran in two phases (1st phase: 2003 - 2007 and 2nd phase: 2007 – 2011). Participating countries (Egypt, Jordan, Lebanon, Palestine, Syria) cooperated in three main areas:

- Consolidation of the TVET regional network;
- Regional use of an Arab Occupational Classification standard (AOC); and
- Qualification of TVET multipliers (ToT).

One of the project outcomes has been the Arabic Glossary for TVET Curricula Terms which aims to facilitate TVET-specific communication. It targets TVET teachers and trainers, as well as curricula developers. The Arab Occupational Qualification (AOC), adopted in 2008, provides a system for collecting and organising vocational titles and establishes a common understanding of vocational structures for the labour force by outlining the type of work executed and the level of skill required.

Quality assurance

The National TVET Strategy 2010 anticipates the development of a quality system that will be used for all components of the TVET system, including

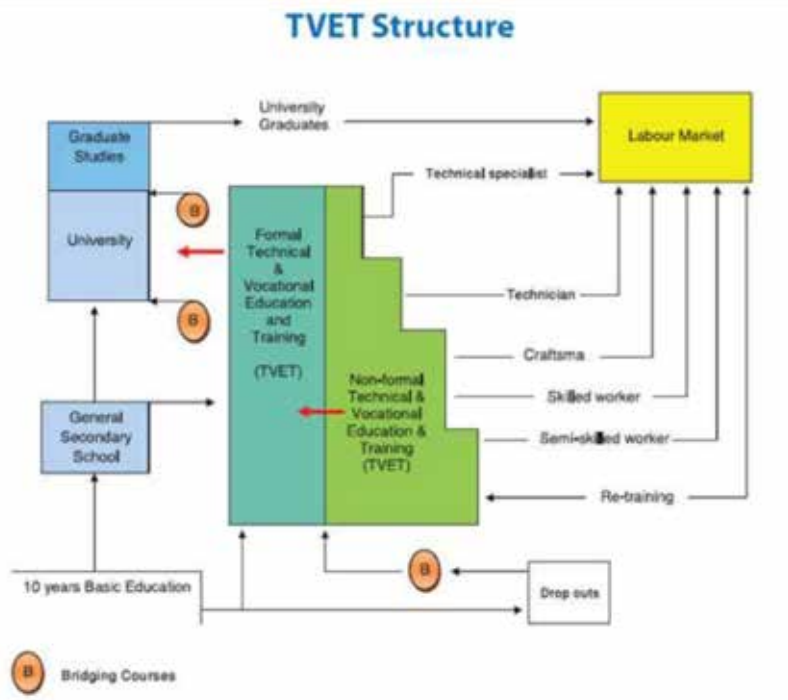
internal and external evaluations to ensure the quality of the output.

The Accreditation and Quality Assurance Commission (AQAC), under the umbrella of the Ministry of Education and Higher Education, is in charge of ensuring that there is quality control in TVET. The Strategy recognises that TVET accreditation and quality assurance responsibilities must be realised within the AQAC. The AQAC is expected to approve and maintain the quality criteria, develop the quality standards, accredit TVET institutions and programmes and monitor and evaluate TVET institutions and programmes to ensure adherence to these standards. TVET responsibilities and tasks in AQAC will be linked to the Higher Council, and managed by a steering committee that includes representatives from the Ministry of Higher Education, the Ministry of Labour, labour and trade unions, and experts from TVET institutions where there will be sub-units and/or qualified staff to implement specific roles and tasks.

Following ten years of basic education, students can proceed with secondary vocational education. Vocational secondary schools offer two-year programmes that produce skilled craftspeople. At tertiary level, vocational school graduates can continue their education in university colleges as well as most universities. Colleges provide two-year courses which train technicians, while universities and university colleges educate specialists. The formal TVET system allows students to continue their education at university level while non-formal TVET system provides little opportunity for further education (ETF, 2010).

TVET programmes and schemes:

- 4-5 year bachelor degree
- 2 year technical / community colleges diploma
- 2 year full-time vocational secondary stream
- Applied stream
- Apprenticeship scheme



2. Non-formal and informal TVET systems

Initiatives in non-formal education and adult learning are implemented by MoEHE and the Ministry of Labour, in cooperation with the labour unions, the Ministry for Social Affairs, the Ministry of Women Affairs, NGOs and university organisations (UNESCO, 2011). Furthermore, the United Nations Relief and Works Agency for Palestinian Refugees (UNRWA) offers training for Palestinians registered as refugees in the West Bank, Gaza, Lebanon, Syria and Jordan. It runs ten TVET centres with the capacity of training 6,600 students.

3. UNRWA training centres offer the following types of courses: trade (2 years), technical/semi-professional (2 years) and certificate courses (1 -2 years). The UNRWA TVET programme also runs short-term courses (8-40 weeks) that focus on improving refugees' existing training skills or provides basic technical skills to untrained trainees. Aside from running TVET training, UNRWA offers career guidance and conducts student surveys monitoring graduates' professional development.

4. Community Based Training for Self-employment and Enterprise Creation (CBTSEC) is a GIZ supported initiative focused on social partnerships at the local level. The aim of CBTSEC is to provide individuals with necessary techni-

cal and entrepreneurial skills and support services which aim to help these individuals establish self-employment or income-generating activities at the local level. The training is open to employees seeking to improve their entrepreneurial skills. In order to convey the training, a community-based system is in place to enable the integration of different stakeholders. The local population and organisations are involved in identifying potential business or self-employment opportunities. CBTSEC was started in November 2009 and is running in four areas including Bethlehem, Ramallah, Nablus and Hebron.

TVET Institutions

- Palestinian Federation of Industries
- Lutheran World Federation
- Palestine Technical College – Alaroub
- Palestine Technical College – Deir El-Balah
- Palestine Technical College – Tulkarim

The main bodies providing TVET training

- Governmental Sector - Ministry of Education & Higher Education (MOEHE)
- Ministry of Labour (MOL)
- Ministry of Social Affairs
- UNRWA
- NGOs
- Private sector entities

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes

Public

Palestinian Energy and Natural Resources Authority: (Functions of the Renewable Energy Department)

The Palestinian Energy and Natural Resources Authority, through its work plans and in cooperation with other governmental and non-governmental stakeholders, undertakes the following strategic tasks:

Develops regulations, policies, plans and operational programmes that ensure the achievement of the objectives of the national plan in this area.

Palestinian Energy and Environment Research Centre (PEC):

This is a national R&D institution which was established in 1993. It is responsible for :

- Conducting studies to assess and evaluate Palestine's sources of renewable energy, and developing plans to develop its use;
- Conducting technical studies and research to develop the use of these sources and following up the global development of various modern technologies, as well as conducting technical and economic evaluation of each of them and their suitability to the Palestinian conditions;
- Developing an advanced system for renewable energy information, and providing information services in the areas of competence of the Department;
- Providing technical consultations of all kinds for renewable energy projects, rationalizing energy consumption, encouraging diversification of energy supplies and increasing the share of RES in order to increase their contribution to the total energy supply;
- Contributing to the development of standard specifications for various renewable energy equipment and systems and adapting the international standards to suit local conditions;

Private

Palestinian Engineering Association: The organization of Palestinian engineers working on the capacity building of its members in order to participate effectively in economic development efforts. An example of its activities is the work with the Ministry of Local Government and the municipalities on the issue of the building licenses in accordance with the Palestinian building code. Moreover, the Association recently initiated the works to launch the green building code, which will help the development of the profession.

Najah National University- Energy Research Centre (ERC)

The ERC was established in 1996. Its primary objectives are to conduct scientific research studies and experiments on the various conventional and renewable energy fields and to increase public awareness on the best use of energy, energy conservation and on the feasible renewable energy applications specifically appropriate for rural development. The presence of this pioneering centre will enhance the works required from the NCG, while its role in applying the SEAP comes as monitoring and assessment of the existing projects according to their adoption of the SEAP and CO2 emission reduction methods through the master and Bachelorette programs they have.

Hebron University – Renewable Energy Unit.

A unit that was established in 2011 with the objective to be a key player for the research and development of renewable energy and strengthen Hebron University's role to be among the leading institutions that apply renewable energy projects as part of its plan to gradually become a green campus. Another objective is the provision of professional consultation in the renewable energy field for the local community, individuals and students. Its role

- Providing assessment and certification capabilities for renewable energy equipment and systems;
- Implementing renewable energy projects and developing the local manufacturing potential of its equipment, as well as linking them to the results of the evaluation of pilot, projects.

Ministry of Local Government (MoLG) – A ministry working on capacity building of the Local Authorities, enabling them to achieve the welfare of their citizens/ constituencies within the framework of good local governance.

The Ministry of Local Government has been assigned to act as the focal point, since it is directly responsible for the local governmental units.

Environment Quality Authority (EQA):

Authority working in the field of environment impact assessment, pollution reduction and climate change issues by enhancing the capacity building of the related stakeholders in this subject and through awareness-raising campaigns for the private sector, schools and public people toward environment and climate change.

in applying the SEAP comes as monitoring and assessment of the existing projects, according to their adoption of the SEAP and CO2 reduction methods through their master and bachelor programmes.

Palestine Economic Policy Research Institute (MAS).

The Palestine Economic Policy Research institute (MAS) was founded in Jerusalem in 1994 as an independent non-profit institution to contribute to the policy-making process by conducting economic and social policy research. Its role focuses on providing technical and expert advice to PNA bodies, the private sector, and NGO's to enhance their engagement and participation in policy formulation.

Palestinian Electricity Regulatory Council (PERC), established by law (13/2009).

Its objectives are to review and monitor electricity tariff application, the issuance of the licenses needed for electricity generation, transmission and distribution, and to increase public awareness regarding renewable energy and energy conservation. In addition, PERC focuses on reconciling disputes between customers and companies, providing all electricity sector stakeholders with all needed information for the provision of services in the best manner, as well as monitoring all electricity sector activities (generation, transmission and distribution). PERC presence will be effective in NCG as the governing regulatory body that would follow up on the implementation of projects related to energy conservation and renewable energy.

Municipal Development and Lending Fund (MDLF).

MDLF was created by the Council of Ministers Decree No. 32/36/09 dated October 20th 2005, as an autonomous juridical entity to accelerate Palestine's drive toward self-sustained, decentralized, prosperous, and creditworthy local government. It is a sustainable semi-government institution whose main objective is to effectively manage funds (grants & Loans) to local government units to render high quality services and achieve sustainable development in harmony with the national plans and policies, so as to improve the delivery of local infrastructure and municipal services, to promote economic development, and improve municipal efficiency and accountability. In addition, the MDLF aims to enhance mobilization of donor assistance, strengthen intergovernmental financial transfers and promote emergency response capacity.

2.2. Indicative CVET Courses/Seminars for RES

CVT Provider: The Regional Centre for Renewable Energy and Energy Efficiency (RCREEE) in cooperation with GIZ, the Egyptian Ministry of Electricity and NREA

Title of the Training/Seminar:

Course on Investment-grade Calculation, Forecasting and Analysis of RE and EE Projects

Target Group:

RE and EE business and strategy analysts, project developers and manager, Energy policy makers, planners, bankers and senior professionals

Methodology (in class, on-site, e-learning):

Class room and a site visit

Content/Training Modules:

—

Duration:

3 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2015(1)

CVT Provider: Energy Research Centre at An-Najah university

Title of the Training/Seminar:

A Training Session and a Workshop on the MEDSOLAR Project

Target Group:

—

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

A training session and a workshop on promoting and implementing innovative solar technologies in public facilities and buildings as part of the MED-SOLAR project

Duration:

2 days

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

2015(1)

CVT Provider: (Coordinating Institution:) University of Natural Resources and Life Sciences, Vienna. (Partner Institution:) Islamic University of Gaza (Hala El-Khozondar)

Title of the Training/Seminar:

Developing maker-movement-inspired training courses on renewable energy sources in the Gaza Strip - Palestine | MakingFutureEnergy4Palestine

Target Group:

—

Methodology (in class, on-site, e-learning):

Classroom

Content/Training Modules:

The overall objective of this project is a transfer of knowledge, technologies and socio-economic competencies that are urgently needed in Gaza. The intended partnership will set up training courses at IUG, based on maker-type organized practical courses where students create their own projects in renewable energy technologies. The partnership will provide the possibility for researchers from Gaza to gather personal experience in Austria as well as vice versa and develop strategies to promote studying renewable energy engineering in Gaza. The specific experiences at BOKU along with the organization of practical courses in renewable energy engineering, also based on maker movement (e.g. 3D printing), is expected to be a valuable asset for this cooperation. Maker-based education is a novel way to build self-designed laboratory tools on reasonable costs to perform tests with new methods and technologies. A specialty of the cooperation will be a collaboration between experts from technical and socio-economic disciplines as well as from teaching experts in order to get to a comprehensive view on structural development issues.

Duration:

1st of February 2017 - 31st of January 2020

Trainees per Cycle:

—

Certificate/Diploma:

—

Courses per Year:

Still working

CVT Provider: At insights

Title of the Training/Seminar:

Solar Energy in Palestine

Target Group:

–

Methodology (in class, on-site, e-learning):

Online

Content/Training Modules:

Rooftop or ground-based PV, grid connected or off-grid solar: focusing on the growth potential in different segments

Regulatory environment: focusing on the laws and rules governing the development of solar energy projects in Palestine Concentrated solar heat (CSH) for commercial and industrial uses: focusing on the CSH technology could help Palestinian enterprises fulfill their energy needs.

Duration:

1h

Trainees per Cycle:

–

Certificate/Diploma:

–

Courses per Year:

2018(1)

CVT Provider: Palestine Engineers Association

Title of the Training/Seminar:

Palestine Engineers Association organizes First International Conference on Climate Change

Target Group:

–

Methodology (in class, on-site, e-learning):

–

Content/Training Modules:

It is the first international event on climate change in Palestine

Duration:

–

Trainees per Cycle:

–

Certificate/Diploma:

–

Courses per Year:

2017(1)

2.3. Indicative CVET Courses/Seminars for EE

CVT Provider: Schneider Electric

Title of the Training/Seminar:

Schneider Energy university

Target Group:

Engineers, researchers, students and those interested in EE

Methodology (in class, on-site, e-learning):

Online course

Content/Training Modules:

Energy Efficiency courses and Data Centre courses

Duration:

–

Trainees per Cycle:

–

Certificate/Diploma:

Certificate of Participation,

Data Centre Certified Associate (DCCA) and Professional Energy Manager (PEM)

Courses per Year:

Since 2015 till now

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation			X		
Energy planning		X			
Energy audits			X		
RE Technologies			X		
EE Technologies		X			
Installation of RE systems			X		
Installation of EE systems			X		
Size of the RE market				X	
Size of the EE market			X		
Integration of RE and EE in buildings		X			

5.11. PORTUGAL

1. Country Overview

1.1. Adult Education System

The National Qualifications System (NQS) was established in 2007 and reforms the previous system of vocational training. Its aim is to integrate, into a single system with common instruments and objectives, the vocational training which is attached to the educational system and the vocational training, which is associated with the labour market.

One key instrument of this NQS is the National Qualifications Catalogue (NQC) which offers initial and continuing training. Based on the existing and emerging needs of companies and activity sectors, both of these trainings have been adjusted to the needs of companies and to the labour market.

In order to accomplish its goal, the NQC organizes the NQS double certification for non-higher education qualifications and incorporates NQFs that promote and support their development. Today the NQC comprises of 261 qualifications, which are grouped by area of education and training as well as by level of qualifications of the National Qualifications Framework (NQF). For each qualification, the NQC provides an occupational profile, a training NQF standard and a standard for the recognition, validation and certification of (educational and professional) competences.

NQC comprises training standards for these qualifications so that they can be accessed by way of a set of education and training modalities. These target either young people who have finished their basic education and who seek vocational qualification e.g. vocational training courses or apprenticeship courses, or adults who do not possess qualifications in a given vocational domain, and/or education and training courses for adults (EFA) and certified modular training.

These qualifications can be accessed, in addition to a training pathway, by way of recognition, validation and certification of the skills that have been acquired through professional experience. They have a national scope and

may be promoted by different kinds of training operators, i.e. basic and secondary schools, vocational training schools, training centres of the Institute of Employment and Vocational Training network and certified private training providers, among others.

Following the successful completion of a NQC qualification pathway, a qualifications certificate and a diploma are issued. This proves that the professional holds the competences associated with the respective professional profile and grants him/her a qualification level of the National Qualifications Framework. To create the NQF, Portugal adopted the principles of the European Qualifications Framework (EQF), which determines a direct relationship between the national qualification levels and the EQF qualification levels.

Educational and Training Options for Adults

Double-certification Training:

- Short-duration training unit (UFCD): A learning unit, which can be autonomously certified and integrated into one or more training standards referred to in the NQC, making it possible to acquire the certified competences.

Modalities of double-certification training targeted at adults:

- Education and Training Courses for adults (EFA) – level 2 and level 4 qualification: Courses aimed at individuals who are 18 years-old or over, who have either not finished basic education or secondary education or are unqualified or without appropriate qualification. The purpose of these courses are for integration, re-integration and/or progress in the labour market (Ordinance no. 283/2011).
- Certified Modular Training: This training, which is targeted at adults in the framework of continuing training, is developed by attending and thus acquiring any short-duration training units (UFCD) that are part of basic training and/or the technological training of any NQC standard, of level 2 or level 4 of qualification (Ordinance no. 283/2001).

Modalities of double-certification education and training, targeted at non-university post-secondary level:

- Technological specialization courses – level 5 of qualification: Specialized technical training courses for the purpose of integration, re-integra-

tion and progress in the labour market. Also aimed at individuals who have finished or hold a secondary education degree, or higher to further enable them to continue their studies (Decree-Law no. 88/2006).

1.2. Technical and Vocational Education and Training (TVET)

Institutional framework for VET

The National Qualification System (NQS) aims to ensure that the training and learning in personal development is modernised for the corporate sector and for the economy.

Having this in mind, the NQS ensures that people have obtained the certified qualifications. Acquired skills are certified by completing a full training pathway in the framework of an initial training modality, or by completing a number of short-duration training units of the National Qualifications Catalogue (NQC) standards. These training units are eligible to obtain certified qualifications.

All training actions in the framework of the NQS, if not NQC-specified, grant a vocational training certificate that proves the successful completion of such training, thus allowing for the recognition of the acquired competences. NQS also provides an individual skills handbook for recording all competences that are acquired in a life time, both those mentioned on the National Qualifications Catalogue and all other trainings, even if provided by a non-certified training entity. The skills handbook has existed since 2010 and is issued by SIGO – the database Information and Management System for the Educational and Training Supply.

Structures used for the provision of CVET

The national qualifications system is coordinated by the cabinet members responsible for the vocational training and education areas. Each department that is responsible for executing the education and vocational training policies follow up and evaluate all different modalities.

The National Agency for Qualification and Vocational Education (ANQEP) was created in the framework of the NQS. ANQEP is a government body jointly supervised by the Ministry of the Economy and the Ministry of Education and Science, which is in charge of coordinating the structure network and for following up, monitoring, evaluating and regulating the system, in close cooperation with the other member institutions of the National Qualifications System.

ANQEP set up the Sectorial-Councils for Qualification with the aim of updating the National Qualifications Catalogue (NQC), which is the strategic qualifications management instrument of the NQS. These councils are technical-consultative groups who are in charge of permanently identifying and updating the needs of the qualifications included in the NQC. The councils purpose is to match training with technological progress and sector-required competences, albeit initial training or indeed lifelong learning.

Sectorial-Councils for Qualification are composed of, among others, experts appointed by the Ministry of Labour, Solidarity and Social Welfare, which is responsible for the respective sector of activity, trade unions and employers' organizations. These represent the respective sectors of activity, reference companies, training entities with high-level expertise in the sector or region and independent experts.

Training providers

The network of training entities of the national qualifications system consists of:

- schools of basic and secondary levels;
- private teaching establishments with recognized pedagogic plans or recognized public interest;
- vocational schools;
- centres for vocational training and vocational rehabilitation and private sector entities with certified training structures which fall under the ministries responsible for vocational training and education; and
- training entities attached to other ministries or other legal persons governed by public law.

In the concrete case of energy sectors, special reference should be made to a few more relevant training entities of the National Qualifications System, namely:

- Centres for Training on Joint Management, of the Institute for Employment and Vocational Training's network, for the building sector:
  - CICCOPN – Centre for Vocational Training of the Building and Public Works Industry of Northern Portugal
  - CENFIC – Centre for Vocational Training of the Building and Public Works Industry of Southern Portugal
- Centres for Training on Joint Management of the Institute for Employment and Vocational Training's network, as well as the training centres specific to the sectors of electronics, energy and mechanical engineering:
  - CINEL – Vocational Training Centre of the Electronics, Energy, Telecommunications and Information Technologies Industry
  - APIEF – Vocational Training Centre for the Thermal, Energy and Environment Industry
  - CENFIM – Vocational Training Centre of the Metalwork and Mechanical Engineering Industry
- Public or private-owned educational establishments, licensed to teach courses in the fields of education and training on building, energy and electricity:
  - Basic and secondary schools of the public network
  - Private-owned Vocational Schools supervised by the Ministry of Education
- Private training providers certified by the Directorate General for Employment and Labour Relations (DGERT) in the training areas relevant to the building and energy sector. These are training entities evaluated by DGERT, with minimum proven conditions in terms of their quality references as organisers of training activities, regarding their installed capacity, resource-wise, their practices inherent to the processes of training development and the results achieved.

Accreditation/licensing of providers of non-formal education

The Certification System for Training Entities[1] replaced the Accreditation System for Training Entities which lasted for thirteen years. It is run by the competent central department of the Ministry responsible for vocational training.

The Certification System for Training Entities, together with other mechanisms, is one of the instruments for assuring the quality of the National Qualifications System in Portugal. It recognizes those pedagogic practices that are appropriate for training entities to help develop training activities. It also audits the certified training provider on a regular basis in order to evaluate compliance with certification requirements and the results that are obtained with its activity.

The certification system for training entities is run by the Directorate General for Employment and Labour Relations (DGERT).

Certification of qualifications

The National Qualifications Catalogue (NQC) is a strategic management instrument for non-higher qualifications, including all essential NQFs that are required to better match the training offer to the needs of companies, the labour market and citizens.

Accordingly, all elements of the NQC are permanently updated with the support of the sector specific boards for qualifications, by including, excluding or changing qualifications as a function of the current and emerging needs of companies, economic sectors and individuals.

Qualifications incorporated in the NQC have been structured according to the levels of the qualification defined by the National Qualifications Framework (NQF). NQF adopts the principles of the European Qualifications Framework (EQF). These cover the description of the qualifications in terms of learning outcomes, in accordance with the descriptors associated with each qualification level and which promote the qualification comparability as a function of its profile and not as a function of contents or training processes.

(1) Regulated by Ordinance no. 851/2010, of the 6th September, as specified in Cabinet Resolution no.173/2007, of the 7th November, which approved the Reform of Vocational Training, and in Decree-Law no. 396/2007, of the 31st December, which established the National Qualifications System.

Qualifications have also been organized as a function of educational and training areas, which in some cases correspond to sectors of economic activity and are defined according to the National Classification of Education and Training Areas (CNAEF).

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes	
Public	**Private**
• CICCOPN – Centre for Vocational Training of the Building and Public Works Industry of Northern Portugal • CENFIC – Centre for Vocational Training of the Building and Public Works Industry of Southern Portugal	• CINEL – Vocational Training Centre of the Electronics, Energy, Telecommunications and Information Technologies Industry • APIEF – Vocational Training Centre for the Thermal, Energy and Environment Industry • CENFIM – Vocational Training Centre of the Metalwork and Mechanical Engineering Industry • Private-owned Vocational Schools supervised by the Ministry of Education

2.2. Indicative CVET Courses/Seminars for RES

CVT Provider: ISQ

Title of the Training/Seminar:

Solar Thermal Systems for Services and Residential Buildings – Installation and Design

Target Group:

Designers of HVAC systems

Methodology (in class, on-site, e-learning):

Classroom lessons and practical work

Content/Training Modules:

Introduction to Solar Energy

Equipment and accessories

Design and scaling

Practical case ECOTERMOLAB – Inspection of an existent installation

Development of an individual project

Duration:

18h

Trainees per Cycle:

N/A

Certificate/Diploma:

N/A

Courses per Year:

N/A

CVT Provider: ISQ

Title of the Training/Seminar:

Regulation and maintenance of Solar Thermal Systems

Target Group:

Energy auditors, technicians responsible for the installation and maintenance of solar thermal systems and/or HVAC and solar systems functioning, system designers, energy managers

Methodology (in class, on-site, e-learning):

Classroom lessons

Content/Training Modules:

Study of the different technical aspects of solar thermal systems: characterization of their functionating principle, identifying the relevant variables and their influence on systems' performance, collecting and evaluating operating data, regulating the system, carrying out maintenance plans.

Duration:

8h

Trainees per Cycle:

N/A

Certificate/Diploma:

N/A

Courses per Year:

N/A

CVT Provider: CEAC

Title of the Training/Seminar:

Solar photovoltaic energy

Target Group:

Technicians aspiring to work in the installation and maintenance of solar photovoltaic systems or in the commercialization of solar photovoltaic systems

Methodology (in class, on-site, e-learning):

Online course, including individual activities, participation in forums, realization of practical works, participation in lectures

Content/Training Modules:

The course provides the competences and knowledge necessary to perform the installation, maintenance and reparation of solar photovoltaic systems.

Duration:

330 h

Trainees per Cycle:

N/A

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

N/A

CVT Provider: CEAC

Title of the Training/Seminar:

Renewable Energies

Target Group:

Technicians aspiring to work in the installation and maintenance of solar or wind systems or in the commercialization of renewable energy systems

Methodology (in class, on-site, e-learning):

Online course, including individual activities, participation in forums, realization of practical works, participation lectures

Content/Training Modules:

The course provides the competences and knowledge necessary to perform the installation, maintenance and reparation of solar (thermal and photovoltaic) and wind systems

Duration:

420 h

Trainees per Cycle:

N/A

Certificate/Diploma:

Certificate of Attendance

Courses per Year:

N/A

CVT Provider: Academia ADENE

Title of the Training/Seminar:

Photovoltaic systems – Self-consumption

Target Group:

Engineers, Technical Engineers, Architects and other technicians

Methodology (in class, on-site, e-learning):

Theoretical-practical course. It includes a technical visit to an installed or in process of installation self-consumption system.

Content/Training Modules:

The course aims to train professionals for the photovoltaic systems market, notably to work in the production of energy for own consumption.

Duration:	Trainees per Cycle:
48 h	N/A
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance	N/A

CVT Provider: Sifomate

Title of the Training/Seminar:

Training of cogeneration plant operators

Target Group:

Employed and Unemployed individuals with completed compulsory education

Methodology (in class, on-site, e-learning):

Theoretical-practical course

Content/Training Modules:

Providing the competences and knowledge necessary to operate a cogeneration plant

Duration:	Trainees per Cycle:
180 h	N/A
Certificate/Diploma:	**Courses per Year:**
N/A	N/A

2.3. Indicative CVET Courses/Seminars for EE

CVT Provider: ISQ

Title of the Training/Seminar:

Energy Legislation and Energy Management

Target Group:

Managers, Consultants, Auditors and Technicians working in the field of energy management

Methodology (in class, on-site, e-learning):

Classroom lesson, supported by courseware

Content/Training Modules:

1. Energy planning

2. Energy Management System (EMS) implementation and operation

3. EMS performance verification and monitoring

Duration:

30 h

Trainees per Cycle:

N/A

Certificate/Diploma:

N/A

Courses per Year:

N/A

CVT Provider: ISQ

Title of the Training/Seminar:

ISO 50001 – Energy and Energy Efficiency Management Systems implementation

Target Group:

Professionals interested in EMS implementation or working in energy management

Methodology (in class, on-site, e-learning):

Classroom lesson.

Content/Training Modules:

- Introduction to EMS and to the ISO 50001 standard
- Top management commitment
- Energy planning
- EMS implementation and operation
- Monitoring EMS performance
- EMS revision by the management

Duration:

4 h

Trainees per Cycle:

N/A

Certificate/Diploma:

N/A

Courses per Year:

N/A

CVT Provider: ISQ

Title of the Training/Seminar:

Energy Audits – Electrical Measurements in Electrical Panels

Target Group:

System designers, Energy auditors, electrician, maintenance technicians, measurement and energy monitoring technicians, technicians responsible for the operation and functioning of electrical installations

Methodology (in class, on-site, e-learning):

Classroom lessons and practical work

Content/Training Modules:

Electrical installations; electrical panels; tools and equipment for measurement and testing of electrical installations; measurements on electrical panels

Practical case: taking measurements in electrical panels

Duration:

12 h

Trainees per Cycle:

N/A

Certificate/Diploma:

N/A

Courses per Year:

N/A

CVT Provider: SGS

Title of the Training/Seminar:

Management of vehicle fleets and sustainability (green procurement)

Target Group:

Professionals responsible for the management of vehicle fleets in organizations

Methodology (in class, on-site, e-learning):

Classroom lessons.

Content/Training Modules:

Course intended to provide technical knowledge for a more efficient management of road vehicle fleets. The course addresses the main vehicle technologies available in the market, operational management of transportation and strategies for the conversion of fleets to more sustainable vehicles

Duration:

24 h

Trainees per Cycle:

N/A

Certificate/Diploma:

N/A

Courses per Year:

N/A

CVT Provider: SGS

Title of the Training/Seminar:

Energy objectives, energy goals and action plans for energy management

Target Group:

Professionals responsible for the energy performance of organizations

Methodology (in class, on-site, e-learning):

Classroom lessons.

Content/Training Modules:

Course on the instruments and results of the EMS planning process: conceiving and implementing the energy planning process; developing action plans for energy management; evaluating the efficacy of action plans in accomplishing objectives and targets

Duration:	Trainees per Cycle:
8 h	N/A
Certificate/Diploma:	**Courses per Year:**
N/A	N/A

CVT Provider: CICCOPN

Title of the Training/Seminar:

Energy rehabilitation and infrastructures' conservation specialized technician

Target Group:

Adults and young people with secondary level education or professional qualification (level 3 and 4 in the National Qualification Framework) or intending to carry out professional requalification

Methodology (in class, on-site, e-learning):

Classroom lessons and work-related training

Content/Training Modules:

Designing and implementing energy rehabilitation solutions, by programming and coordinating the execution of small and medium scale maintenance interventions, with the objective of minimizing infrastructures' consumptions

Duration:	Trainees per Cycle:
1450 h	20
Certificate/Diploma:	**Courses per Year:**
Technological Specialization Diploma and Certificate of level 5 qualification	N/A

CVT Provider: CICCOPN

Title of the Training/Seminar:

Energy management and control specialized technician

Target Group:

Adults and young people with secondary level education or professional qualification (level 3 and 4 in the National Qualification Framework) or intending to carry out professional requalification

Methodology (in class, on-site, e-learning):

Classroom lessons and work-related training

Content/Training Modules:

Energy management and planning; installation, maintenance and repair of different types of electrical and electromechanical equipment and systems

Duration:

1560 h

Trainees per Cycle:

20

Certificate/Diploma:

Technological Specialization Diploma and Certificate of level 5 qualification

Courses per Year:

N/A

CVT Provider: CICCOPN

Title of the Training/Seminar:

Designer of the thermal behavioral characteristics of residential buildings

Target Group:

Architects, civil/mechanical engineers, engineers of other specialties with links to the area of buildings' thermal behavior, specialists in climatization engineering

Methodology (in class, on-site, e-learning):

Classroom lessons.

Content/Training Modules:

Developing of competences for the execution of verification projects of the thermal behavior characteristics of residential buildings

Duration:

24 h

Trainees per Cycle:

N/A

Certificate/Diploma:

Certificate of attendance

Courses per Year:

N/A

CVT Provider: Academia ADENE

Title of the Training/Seminar:

Formation in Residential Buildings – Regulation on the Energy Performance of Residential Buildings

Target Group:

Individuals holding masters or bachelors courses in architecture, civil engineering, mechanical engineering, electrotechnical engineering

Methodology (in class, on-site, e-learning):

Classroom lessons.

Content/Training Modules:

Study of the basic concepts related to the thermal performance and energy efficiency of residential buildings, within the framework of the Regulation on the Energy Performance of Residential Buildings (REH)

Duration:	Trainees per Cycle:
56 h	N/A
Certificate/Diploma:	**Courses per Year:**
Certificate of attendance	N/A

CVT Provider: Academia ADENE

Title of the Training/Seminar:

Energy Management in Industries

Target Group:

Technicians responsible for the energy area of industrial facilities

Methodology (in class, on-site, e-learning):

Classroom lessons

Content/Training Modules:

Intensive energy consumptions management system (SGCIE); ISO 50001; heat recovery systems; lighting; boilers; measuring equipment; compressed air; preparation of energy diagnostics; energy audits; engines and VEV

Duration:	Trainees per Cycle:
32 h	N/A
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance	N/A

CVT Provider: Academia ADENE

Title of the Training/Seminar:

Building Rehabilitation and Energy Efficiency

Target Group:

Architects, civil and environment engineers, managers of municipal buildings, construction companies, equipment suppliers, individuals responsible for construction, maintenance and rehabilitation of buildings

Methodology (in class, on-site, e-learning):

Classroom lessons and a technical visit to an rehabilitated reference building

Content/Training Modules:

The course aims to provide specific and specialized knowledge on matters related to buildings' rehabilitation, considering technical aspects and the applicable regulations. The course is specifically focused in the dimensions of thermal rehabilitation, acoustics, structures and energy efficiency measures.

Duration:	Trainees per Cycle:
40h	N/A
Certificate/Diploma:	**Courses per Year:**
Certificate of Attendance	N/A

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation				X	
Energy planning				X	
Energy audits				X	
RE Technologies				X	
EE Technologies				X	
Installation of RE systems				X	
Installation of EE systems				X	
Size of the RE market	w/o experience				
Size of the EE market	w/o experience				
Integration of RE and EE in buildings			X		

5.12. SPAIN

1. Country Overview

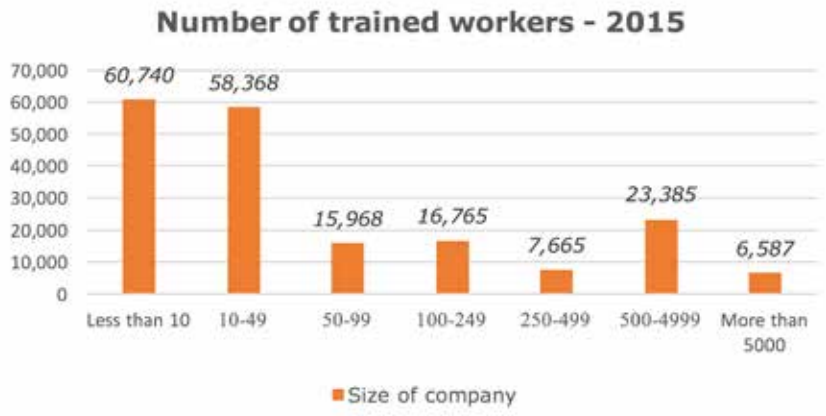
1.1. Adult Education System

This training, which is quite up-to-date and in accordance with market needs, is mainly aimed at company employees.

The body responsible for managing the funds for this kind of permanent training (named vocational training for employment) is the State Foundation for Employment Training (*Fundación Estatal para la Formación en el Empleo, FUNDAE*). This training is managed by the Ministry of Work, Migrations and Social Welfare and is focused on helping entrepreneurs and workers improve their skills so that they can be ready for changes in the labour market and the productive sectors. The training also promotes access to free and quality training for all workers.

There are differences in the level of participation depending on the size of the company. Figure 1 shows the number of trained workers in the construction industry in 2015, in accordance with company size.

Figure 1

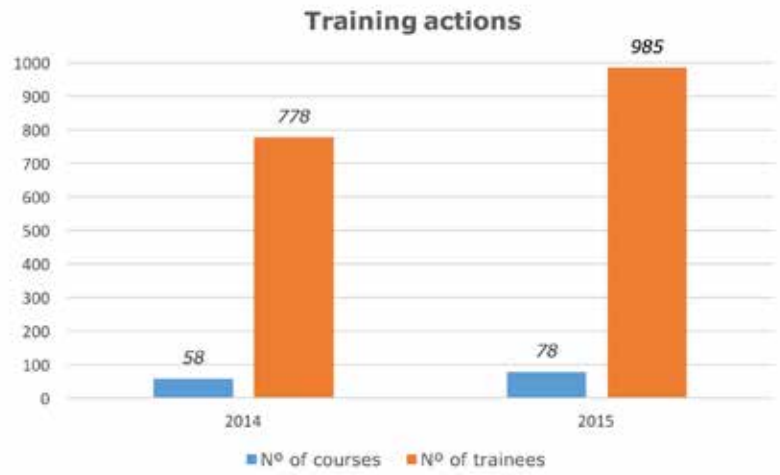


Source: State Foundation for training at employment (FUNDAE)

There is no data available regarding the provision of training provided by permanent training entities on EE or RE in the building sector. However, in the opinion of the consulted experts (Build Up Skills), there is a wide range of private training available related to EE and RES.

The organisation which manages the largest volume of training in the construction sector is the Labour Foundation for Construction (FLC). According to the data, the number of trainees and training actions held at FLC on issues related to EE and RES show an increase in 2015 compared to 2014.

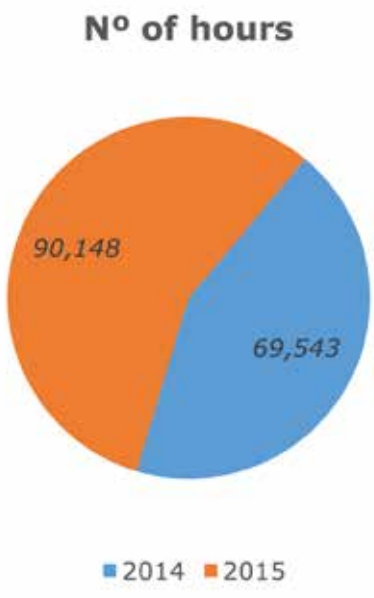
Figure 2



Source: Labour Foundation for Construction

Regarding the number of training hours, there has been also an increase from 2014 to 2015.

Figure 3



Source: Labour Foundation for Construction

> What are the existing educational options for an adult after school?

There are two options:

1. Vocational training referred to the National Catalogue of Professional Qualification (CNCPF)

The National Qualification Framework, through the National Catalogue of Professional Qualifications (Ministry of Education, Culture and Sport), sets the basis for the elaboration of education and training paths. Aside from regular or initial vocational education, vocational training also stems from this Catalogue. The differences between regular vocational education and vocational training are mainly three:

1. Vocational training provides Vocational Certificates to trainees instead of diplomas, despite their same official value;

2. Vocational certificates are shorter (from 260 to 800 hours);

3. Vocational training is mainly focused on the practical part of the trade.

2. Vocational training not referred to the National Catalogue of Professional Qualification (CNCPF)

Formal training in energy efficiency is aimed at level 3 (supervisor profile level 5 – 6 from the European Qualification Framework, EQF), even though the content of the training addresses levels 1 (labourer profile, level 1 – 2 EQF) and 2 (skilled worker profile, 3 – 4 EQF). As a result, training on EE and RES is being covered by permanent training, which is made up of tailor-made courses aimed to swiftly upgrade workers' skills, even if it does not contribute toward an official accreditation.

> How can adults enrich their knowledge/ skills/competences?

Both option 1 and 2 are mainly focused on the practical part of a given trade, therefore the training has a Work Based Learning (WBL) approach, which is much more appealing for the construction workforce.

> What is the quality system that is used or the certification(s) given?

On the one hand, vocational training referred to the National Catalogue of Professional Qualification (CNCPF) provides Vocational Certificates to trainees instead of diplomas, despite their same official value.

On the other hand, training which is not referred to by the CNCPF does not usually include official accreditation as such. In fact, the most common situation is that an institution participating in the permanent training system issues its own certificate that accredits the students' participation in the training course. Paradoxically, accredited training is usually most demanding by companies and individuals.

1.2. Technical and Vocational Education and Training (TVET)

The Spanish National System for Qualifications and Vocational Education and Training (SNCFP) was esta¬blished by Spanish Organic Law 5/2002 of 19 June 2002. It consists of instruments and actions which are necessary to promote and develop the integration of Vocational Education and Training, as well as to assess and accredit professional competencies. Its objectives are to:

1. Adapt the professional training to the qualification demands of productive organizations;
2. Facilitate the adaptation of supply and demand to the labour market;
3. Extend lifelong learning beyond the traditional educational period; and
4. Promote the freedom of movement for workers.

For these reasons, it plays an essential role in the labour and education environment in Spain, and internationally across Europe.

The Spanish National Catalogue of Professional Qualifications (CNCP) is an instrument of the Spanish National System for Qualifications and VET, which arranges professional qualifications according to the competences that are appropriate for an occupational performance. These professional qualifications are identified in the productive system and they are susceptible to being recognized and accredited. Some of the main objectives of the CNCP are to integrate the existing programmes on VET in order to adapt them to the characteristics and demands of the Spanish productive system and to be a referent that can assess the professional competences.

The CNCP comprises the most important professional qualifications of the Spanish productive system. It includes VET contents that are related to each professional qualification. The contents are organized in modules which are included in a Spanish Modular Catalogue of Vocational Education and Training. The Spanish National Institute of Qualifications (INCUAL) is responsible for defining, drawing up and updating the CNCP and the corresponding Modular Catalogue of VET.

Figure 4

The CNCP consists of professional qualifications that are arranged into 26 professional families and 5 levels of qualification, all of which take into account specific EU criteria. The 26 professional families, which make up the CNCP, have been created according to professional competence affinity criteria. The 5 levels of professional qualification are based on professional competences that are required for each productive activity. These takes into account different criteria that are necessary for the accomplishment of every activity such as knowledge, initiative, autonomy, responsibility and complexity, among others.

Responsible Authorities for CVET in the country

There are two options:

1. CVET State Training Plan: funded by the SEPE (Public Service of Employment) and managed by FUNDAE (State Foundation for Training at Employment).
2. CVET Regional Training Plans: funded and managed by each Spanish region (Autonomous Communities).

Accreditation/licensing of providers of non-formal education

There is a register of VET providers, which are approved by the Public Service of Employment. These entities are entitled to get public funding for providing permanent non-formal training courses.

Who provides the certification of qualifications and through what means?

There are two ways to get a CVET certification:

1. Through Vocational Certificates: as mentioned above, this is a course from 260 to 800 hours mainly focused on the practical part of the trade.
2. Through working experience: the National Qualification System also considers the possibility to accredit one's qualification by going through an assessment procedure. The applicant must show his/her knowledge, skills and attitudes concerning a given professional activity. If she/he passes the exam, he/she gets the accreditation. It is possible to get partial accreditation, in the form of a Competence Unit, or a whole qualification.

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes	
Public	**Private**
The Ministry in charge of the Vocational Training management is the Ministry of Education, Culture and Sport. It certifies the centres that provide EE and RES vocational education. The Ministry in charge of the professional certificates management is the ministry of Labour, Migrations and Social Security. It certifies the centres that provide EE and RES vocational training.	Fundación Laboral de la Construcción is a private centre for vocational training and profesional certificates.

2.2. Indicative CVET Courses/Seminars for RES

CVT Provider: Training centers accredited by the Ministry of Education, Culture and Sport

Title of the Training/Seminar:

High-grade in Renewable Energies

Target Group:

Youngsters

Methodology (in class, on-site, e-learning):

Classroom / Workshop / Workplace training

Content/Training Modules:

- Electrical systems in power plants
- Electrical substations
- Telecontrol and automatisms
- Prevention of electrical risks
- Renewable energy systems
- Configuration of photovoltaic solar installations
- Management of the assembly of photovoltaic solar installations
- Management of the assembly of wind farms
- Operation and maintenance of wind farms
- Renewable energy project
- Training and career guidance
- Business and Entrepreneurship
- Workplace training

Duration:
2000h

Trainees per Cycle:
N/A

Certificate/Diploma:
Vocational Diploma

Courses per Year:
N/A

CVT Provider: Training centers accredited by the Ministry of Labour, Migrations and Social Security

Title of the Training/Seminar:
Assembly and maintenance of photovoltaic solar installations

Target Group:
Unemployed people

Methodology (in class, on-site, e-learning):
Classroom / Workshop / Workplace training

Content/Training Modules:
Rethink photovoltaic solar installations
Assemble photovoltaic solar installations
Maintain photovoltaic solar installations

Duration:
540h

Trainees per Cycle:
N/A

Certificate/Diploma:
Vocational certificate

Courses per Year:
N/A

CVT Provider: Training centers accredited by the Ministry of Labour, Migrations and Social Security

Title of the Training/Seminar:
Assembly and maintenance of solar thermal installations

Target Group:
Unemployed people

Methodology (in class, on-site, e-learning):
Classroom / Workshop / Workplace training

Content/Training Modules:
Alternative energy systems technician. Installer of solar energy through pipes. Solar energy plate assembler. Solar thermal installations assembler. Installer of solar thermal energy systems. Maintainer of solar thermal installations.

Duration:
580h

Trainees per Cycle:
N/A

Certificate/Diploma:
Vocational certificate

Courses per Year:
N/A

CVT Provider: Training centers accredited by the Ministry of Labour, Migrations and Social Security

Title of the Training/Seminar:

Organization and projects of solar thermal installations

Target Group:

Unemployed people

Methodology (in class, on-site, e-learning):

Classroom / Workshop / Workplace training

Content/Training Modules:

Determine the viability of solar installation projects

Develop solar thermal installation projects

Organize and control the assembly of solar thermal installations

Organize and control the maintenance of solar thermal installations

Duration:	Trainees per Cycle:
630h	N/A.
Certificate/Diploma:	**Courses per Year:**
Vocational certificate	–

CVT Provider: Training centers accredited by the Ministry of Labour, Migrations and Social Security

Title of the Training/Seminar:

Organization and projects of photovoltaic solar installations

Target Group:

Unemployed people

Methodology (in class, on-site, e-learning):

Classroom / Workshop / Workplace training

Content/Training Modules:

Determine the viability of solar installation projects

Develop photovoltaic solar installation projects

Organize and control the assembly of solar photovoltaic installations

Organize and control the maintenance of solar photovoltaic installations

Duration:	Trainees per Cycle:
630h	N/A
Certificate/Diploma:	**Courses per Year:**
Vocational certificate	N/A

CVT Provider: Labour Foundation for Construction (FLC)

Title of the Training/Seminar:

Renewable Energy Systems in buildings

Target Group:

Installers willing to upgrade their skills

Methodology (in class, on-site, e-learning):

Classroom / Workshop

Content/Training Modules:

1. General concepts
2. Application of renewable energies with thermal purposes
3. Application of renewable energies to produce electricity
4. Combined application of renewable energies in buildings

Duration:

30h

Trainees per Cycle:

N/A

Certificate/Diploma:

Certificate of attendance

Courses per Year:

N/A

CVT Provider: Labour Foundation for Construction (FLC)

Title of the Training/Seminar:

Installation and maintenance of geothermal installations

Target Group:

Installers willing to upgrade their skills

Methodology (in class, on-site, e-learning):

Classroom / Workshop

Content/Training Modules:

1. Fundamentals of geothermal energy
2. Fundamentals of a geothermal installation
3. Assembly and execution of heat production equipment
4. Assembly and execution of distribution networks for air-conditioning installations
5. Start-up and maintenance of the system
6. Occupational risk prevention and environmental protection standards

Duration:

90h

Trainees per Cycle:

N/A

Certificate/Diploma:

Certificate of attendance

Courses per Year:

N/A

CVT Provider: Labour Foundation for Construction (FLC)

Title of the Training/Seminar:

Biomass Systems Installer

Target Group:

Installers willing to upgrade their skills

Methodology (in class, on-site, e-learning):

Classroom / Workshop

Content/Training Modules:

1. Biomass

2. Biomass systems

3. Combustion and boilers

4. Other boiler components

5. Calculations

6. Installations

7. Maintenance and management of biomass systems

8. Regulations applicable to the biomass boiler

Duration:

60h

Trainees per Cycle:

N/A

Certificate/Diploma:

Certificate of attendance

Courses per Year:

N/A

2.3. Indicative CVET Courses/Seminars for EE

CVT Provider: Training centers accredited by the Ministry of Education, Culture and Sport

Title of the Training/Seminar:

Expert in Energy Efficiency and Solar Thermal Energy

Target Group:

Youngsters

Methodology (in class, on-site, e-learning):

Classroom / Workshop / Workplace training

Content/Training Modules:

- Thermal equipment and installations
- Processes of assembly of installations
- Graphical representation of installations
- Energy efficiency of installations
- Energy certification of buildings
- Efficient management of water in buildings
- Configuration of solar thermal installations
- Management of the assembly and maintenance of solar thermal installations
- Promotion of the efficient use of energy and water
- Energy efficiency and solar thermal energy project
- Training and career guidance
- Company and entrepreneurial initiative
- Workplace training

Duration:

2000h

Trainees per Cycle:

N/A

Certificate/Diploma:

Vocational Diploma

Courses per Year:

N/A

CVT Provider: Training centers accredited by the Ministry of Labour, Migrations and Social Security

Title of the Training/Seminar:

Energy Efficiency in buildings

Target Group:

Unemployed people

Methodology (in class, on-site, e-learning):

Classroom / Workshop / Workplace training

Content/Training Modules:

Assess the energy efficiency of building installations

Collaborate in the process of energy certification of buildings

Manage the efficient use of water in buildings

Determine the viability of solar installation projects

Promote the efficient use of energy

Duration:

920h

Trainees per Cycle:

N/A

Certificate/Diploma:

Vocational certificate

Courses per Year:

N/A

CVT Provider: Labour Foundation for Construction (FLC)

Title of the Training/Seminar:

Installer of aluminium carpentry and PVC

Target Group:

Installers willing to upgrade their skills

Methodology (in class, on-site, e-learning):

Classroom / Workshop

Content/Training Modules:

1. Energy efficiency in the installation of aluminium and PVC windows

2. Fundamentals of Efficient Aluminum and PVC Window Installation

3. Installation of aluminium and PVC windows

4. Completion of work

Duration:

60h

Trainees per Cycle:

15

Certificate/Diploma:

Certificate of attendance

Courses per Year:

N/A

CVT Provider: Labour Foundation for Construction (FLC)

Title of the Training/Seminar:

Insulation for rehabilitation of buildings

Target Group:

Installers willing to upgrade their skills

Methodology (in class, on-site, e-learning):

Classroom / Workshop

Content/Training Modules:

1. General concepts

2. Insulation materials

3. Regulations and reception of work

4. Basic installation guidelines for insulation materials

5. Execution of different constructive solutions

Duration:
60h

Trainees per Cycle:
15

Certificate/Diploma:
Certificate of attendance

Courses per Year:
N/A

CVT Provider: Labour Foundation for Construction (FLC)

Title of the Training/Seminar:
Energy efficiency for buildings

Target Group:
Building workers willing to upgrade their skills

Methodology (in class, on-site, e-learning):
Classroom / Workshop

Content/Training Modules:

1. Language and terminology related to energy efficiency
2. The building as an energy system
3. Characteristics of materials related to energy efficiency
4. Energy efficiency parameters in the construction project
5. Evaluation of alternative solutions
6. Energy efficiency in façade construction
7. Energy efficiency in the implementation of roofs
8. Energy efficiency in the execution of interior partitions and party walls
9. Energy efficiency in the execution of windows and skylights
10. Energy efficiency in the execution of constructive encounters
11. Energy efficiency in ventilation systems

Duration:
60h

Trainees per Cycle:
15

Certificate/Diploma:
Certificate of attendance

Courses per Year:
N/A

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation				X	
Energy planning				X	
Energy audits		X			
RE Technologies			X		
EE Technologies			X		
Installation of RE systems			X		
Installation of EE systems			X		
Size of the RE market		X			
Size of the EE market		X			
Integration of RE and EE in buildings		X			

5.13. TUNISIA

1. Country Overview

1.1. Adult Education System

Adult Education in Tunisia includes all organized learning activities for adults which aim to enrich their knowledge, develop and improve their skills and abilities, develop their personality and facilitate their active participation as citizens and to help mitigate any educational, social and unequal consequences. This education is provided by formal and non-formal education institutions.

The Adult Education System can also be considered as part of lifelong learning (LLL). All forms of LLL activities are aimed at acquiring or developing knowledge, actions, skills and abilities that contribute towards integrated personality in the main strategic orientation of employability, development of social cohesion and the ability to participate actively in citizenship as well as socio-economic and cultural development. This includes formal education, non-formal education and informal learning.

1.2. Technical and Vocational Education and Training (TVET)

At the structural level, the Tunisian education system is comprised of:

- A 9-year compulsory basic education given in colleges which consists of an initial 6-year primary cycle and a second cycle or preparatory cycle;
- A high school education that lasts 4 years and culminates in the baccalaureate;
- University education leading to bachelor's, master's and doctorate's degrees, other than specific diplomas;
- A vocational training system that delivers three levels of diplomas following basic education (CAP, BTP and BTS) and a set of non-degree certificates.

The reform of the Tunisian educational system was defined by the law n° 91-65 promulgated on July 29th 1991 which replaced the previous law n° 58-118 of November 4th 1958. In article 7, the law of July 29th 1991 stipulates that basic education is compulsory from the age of 6 until the age of 16. Thus, in application of this law, Tunisian children must spend a minimum of ten years at school. However, the 1991 reform, which introduced basic education, led to the gradual abandonment of short branches of vocational and technical secondary education and the creation of a vocational training curriculum. Only the field of technical sciences has survived this reform. Designed as an introductory session, technical education has been offered in groups since 1991, from the second cycle of basic education for an hour or a couple of hours per week. In 1992, a technical sector was created. The Orientation Law No. 2002-80 of July 23rd 2002, on Education and School Education, establishes a new educational reform and is presented as the legal framework for the renovation and revitalization of the Tunisian school . The new orientation law makes education an absolute national priority and education a fundamental right that is guaranteed to everyone. Article 20 of the law states that basic education is compulsory, as long as the pupil is able to continue his studies normally. This obligation results in two duties. Since 2002, Vocational Training, as well as basic and high school education belong to the same Ministry: the Ministry of Education and Vocational Training (Decree No. 2002-2057 of September 10th 2002). Among the powers of the new Ministry (Decree No. 2002-2950 of November 11th 2002), there are some that involve a link between vocational training and basic education as well as higher education.

After more than twenty years of initiatives to make vocational training a priority for economic and social development and to register it according to demand, Tunisia has just adopted a new strategy. Its aim is to tackle some of the difficulties that have emerged in recent years and to cope with the new priorities that have been identified following the Revolution in 2011. The education system, particularly vocational training in Tunisia, is part of an initiative that has been launched by the European Commission, under the name of the GEMM project (Governance for Employability in the Mediterranean), and which focuses on the Southern and Eastern regions of the Mediterranean.

This vocational training system is placed under the supervision of the Ministry of Vocational Training and Employment (MFPE) which manages it with the support of four major public agencies: the Tunisian Agency for Vocational Training

(ATFP) , the National Centre for Training of Trainers and Engineering Training (CENAFFIF), the National Centre for Continuing Education and Professional Promotion (CNFCPP), in charge of continuing education developments with companies and individuals, and the National Agency for Employment and Self-Employment (ANETI), responsible for active measures for employment. In addition, some ministries have specialised training institutions, as does the private sector. All these organisations mentioned above are coordinated by a permanent commission involving other ministries and organisations such as the Ministry of Higher Education, Scientific Research and Technology, the Ministry of Tourism, Trade and Handicrafts, the Ministry of Public Health, the Ministry of Agriculture, Environment and Water Resources, the Tunisian General Labour Union, the Tunisian Union of Industry, Commerce and Crafts and the Tunisian Union of Agriculture and Fishing. A Senior Human Resources Development Council, with an advisory role, brings together ministries in charge of education and training and the social partners at least once a year.

Self-analysis of the governance of vocational training (VT)

The national VT system still has its shortcomings which prevent it from fully playing its role as a facilitator for skills development and as a pillar for the national economy. The major issues of the system are: the absence of a common global vision that clearly defines the objectives of the VT and its place within the system; the low reactivity of the system to changes in the needs of companies, individuals and society; the shortcomings in the steering of the national VT system.

2. Infrastructures for EE and RES Professional Training

2.1. Public or/and Private Training Bodies

Training Institutes	
Public	**Private**
• National Agency for Energy Conservation (ANME) through national experts (ANME and others) and international ones) • Higher Institutes of Technological Studies (ISETs) • Technopole Management Company of BorjCedria • Khlédia Training and Development Centre • Professional and Self-Employment Training Centre, El Hamma - Gabes (ATFP) • Sector Training Centre for Energy of Jerba (ATFP) • Sectoral Training Centre in Electricity Maintenance and Biomedical Equipment (ATFP) • Sectoral Training Centre for Energy in Kairouan (ATFP) • Kébili Training and Professional learning Centre (ATFP) • Technical Centres (e.g. Technical Centre for Building Materials, Ceramics and Glass (CTMCCV) - Technical Centre for Mechanical and Electrical Industries (CETIME)) • Engineering schools (ENIT, ENIM)	• Mediterranean Renewable Energies Centre (MEDREC) • KHADAMET Training Office • NT Consulting Training Office • Photovoltaik Technik-Training & Consulting - PVT FC • Africa Coaching & Capacity Building - ACCB • Perfect Training Skills Consulting - PTSC • Regional Training Centre for Energy Management Trades - CR.FOR.MME • Integrated Training Centre, the Tunisian company Biome Solar Industry (BSI) • Tunisian Studies Office approved by ANME • Mediterranean Polytechnic School: Professional Master in Audit and Energy Efficiency

2.2. Indicative CVET Courses/Seminars for RES

CVT Provider: ANME and CEA / INSTN in collaboration with the National School of Engineers of Tunis (ENIT), the Tunisian Company of Electricity and Gas (STEG), the National Institute of Solar Energy (INES), the French Institute of Tunisia (French Embassy in Tunisia) and the University of Versailles (IUT)

Title of the Training/Seminar:

Mediterranean school of Energy : "Energy Transition and Sustainable Development in the Mediterranean"

Target Group:

Teachers, Researchers, Engineers and Research Engineers working in the field of energy, ProgrammeManagers Energy in Energy Institutions and Enterprises, Energy Project Managers in the engineering and consulting companies

Methodology (in class, on-site, e-learning):

In classroom and on site

Content/Training Modules:

The objective of the 2014 edition (second session of the school) is to study the pricing of energy. The main steps (intermediate objectives) are:

- estimate and analyze the costs of producing energy
- identify the infrastructure needed to produce, store and distribute electrical energy
- compare financing solutions
- analyze existing pricing policies
- propose solutions adapted to the regional contexts of the Mediterranean countries

Duration:

60h

Trainees per Cycle:

30

Certificate / Diploma:

Attendance certificate

Courses per Year:

1st edition in 2014

2nd edition scheduled in 2019

CVT Provider: ANME-Technopol of BorjCedria

Title of the Training/Seminar:

Installer-Maintainer of photovoltaic systems connected to networks

Target Group:

Holders of a higher technician diploma (TS, BTS), Bachelor's degree or more, in the following technical fields: physics, mathematics, electricity, electronics, electrical engineering, electromechanics, mechanics, industrial maintenance, computer science, automation, energy, agricultural machinery, or similar

Methodology (in class, on-site, e-learning):

In classroom and on site

Content/Training Modules:

- Market and solar field
- Photovoltaic modules
- Installation, commissioning and maintenance of PV systems
- Protection organs
- Electrical wiring and connection
- Design and dimensioning of PV installations
- Security
- "On-Grid" PV Inverters

Duration:

60h

Trainees per Cycle:

—

Certificate / Diploma:

Attendance certificate

Courses per Year:

1 (more than one, as needed)

CVT Provider: ANME

Title of the Training/Seminar:

Study and planning of PV installations

Target Group:

Holders of a higher technician diploma (TS, BTS), Bachelor's degree or more, in the following technical fields: physics, mathematics, electricity, electronics, electrical engineering, electromechanics, mechanics, industrial maintenance, computer science, automation, energy, agricultural machinery, or similar

Methodology (in class, on-site, e-learning):

In classroom and on site

Content/Training Modules:

- Determination of the field and inverters of photovoltaic systems connected to the network
- Sizing PV systems connected to the network
- Economic analysis of PV systems connected to the networkEct.

Duration:

60h

Trainees per Cycle:

—

Certificate / Diploma:

Attendance certificate

Courses per Year:

As needed

CVT Provider: ANME

Title of the Training/Seminar:

Economic analysis of PV systems connected to the network

Target Group:

Holders of a higher technician diploma (TS, BTS), Bachelor's degree or more, in the following technical fields: physics, mathematics, electricity, electronics, electrical engineer-

ing, electromechanics, mechanics, industrial maintenance, computer science, automation, energy, agricultural machinery, or similar

Methodology (in class, on-site, e-learning):

In classroom and on site

Content/Training Modules:

- PV project development in Tunisia - trend and market
- Engineering of PV plants connected to the MV network
- Technico-economic studyEct.

Duration:

34h

Trainees per Cycle:

—

Certificate / Diploma:

Attendance certificate

Courses per Year:

As needed

CVT Provider: ANME

Title of the Training/Seminar:

Installation, reception and maintenance of grid-connected photovoltaic systems

Target Group:

Holders of a higher technician diploma (TS, BTS), Bachelor's degree or more, in the following technical fields: physics, mathematics, electricity, electronics, electrical engineering, electromechanics, mechanics, industrial maintenance, computer science, automation, energy, agricultural machinery, or similar

Methodology (in class, on-site, e-learning):

In classroom and on site

Content/Training Modules:

- Preparation and planning of installation work
- Implementation of the installation work of a grid-connected photovoltaic systemEtc.

Duration:

30h

Trainees per Cycle:

—

Certificate / Diploma:

Attendance certificate

Courses per Year:

As needed

CVT Provider: ANME

Title of the Training/Seminar:

PV systems for rural electrification and public lighting

Target Group:

Holders of a higher technician diploma (TS, BTS), Bachelor's degree or more, in the following technical fields: physics, mathematics, electricity, electronics, electrical engineering, electromechanics, mechanics, industrial maintenance, computer science, automation, energy, agricultural machinery, or similar

Methodology (in class, on-site, e-learning):

In classroom and on site

Content/Training Modules:

- Design of photovoltaic systems for rural electrification and public lighting and preparation and planning of installation work
- Design of photovoltaic systems for rural electrification and public lighting and preparation and planning of installation work

Duration:

24h

Trainees per Cycle:

—

Certificate / Diploma:

Attendance certificate

Courses per Year:

—

CVT Provider: ANME/ADEME/INES

Title of the Training/Seminar:

The generalities of solar thermal energy

Target Group:

Institutions: public and private, hotels, finance, teaching, research, studies, installation

Methodology (in class, on-site, e-learning):

e-learning

Content/Training Modules:

–

Duration:

3 weeks

Trainees per Cycle:

40

Certificate / Diploma:

No

Courses per Year:

1

CVT Provider: ANME/ADEME/INES/BSI (integrated training centre)

Title of the Training/Seminar:

Collective solar water heating: Study, design and engineering

Target Group:

Engineers from design offices and monitoring offices

Methodology (in class, on-site, e-learning):

1) e-learning: 3 weeks **2)** in classroom: 6h **3)** on-site: visit hotel El Manara: 6h

Content/Training Modules:

1) Training from distance **2)** Class room **3)** Visit of studies

Duration:

1) e-learning: 3 weeks **2)** in classroom: 6h **3)** on-site: visit hotel El Manara: 6h

Trainees per Cycle:

20

Courses per Year:

1

Certificate / Diploma:

Attendance certificate

CVT Provider: ANME/ADEME/INES

Title of the Training/Seminar:

Collective Solar Water heating: take the Opportunity to Save Energy at Your company

Target Group:

Hotelkeepers through the Tunisian Federation of Hotels

Methodology (in class, on-site, e-learning)

1) e-learning: 3 weeks **2)** in classroom and on-site: 12h

Content/Training Modules:

The objective of the training was to inform the participants about the advantages of the realization of a collective solar installation for water heating in their establishments from a technical point of view by detailing the choice of the technology and the simplicity of its integration with the existing and, from an economic point of view, by addressing decision support criteria and the monitoring of energy saving indicators

Duration:

1) e-learning: 3 weeks

2) in classroom and on-site: 12h

Certificate / Diploma:

Attendance certificate

Trainees per Cycle:

43

Courses per Year:

1

NB: The training courses, mentioned above, are organized by ANME within the framework of international cooperation projects, in collaboration with the key players in the sector (professional, academic, private sectors (consulting offices, etc.)).

2.3. Indicative CVET Courses/Seminars for EE

CVT Provider: CITET/ONUDI/SECO-Swiss

Title of the Training/Seminar:

Training workshop on energy efficiency in the textile and clothing sector

Target Group:

Young engineers (male or female) jobseekers

Methodology (in class, on-site, e-learning):

In class room and laboratory

Content/Training Modules:

—

Duration:

60h

Trainees per Cycle:

—

Certificate/Diploma:

Attendance certificate

Courses per Year:

1

Energy Efficiency in Buildings

CVT Provider: ANME/CTMCCV

Title of the Training/Seminar:

Implementation of the thermal insulation and waterproofing complexes at roof level of existing and new homes, as part of the “PROMO-ISOL” programme

Target Group:

Applicators from companies installing thermal insulation and waterproofing systems on the roofs of buildings

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

–

Duration:

30h

Trainees per Cycle:

15

Certificate/Diploma:

Attendance certificate

Courses per Year:

1

CVT Provider: ANME/STEG

Title of the Training/Seminar:

Energy Audit of Existing Buildings.

Target Group:

Two groups of technical executives from STEG

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

Air conditioning and air conditioning in the building: The most answered systems

Duration:	Trainees per Cycle:
30h	15
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	2

CVT Provider: ANME / "FORMATECH" private training office

Title of the Training/Seminar:

Incentives and benefits granted by the state in the context of the application of the thermal regulation of buildings.

Target Group:

A group of technical executives from various ministries and property developers

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

Application of the Thermal Regulation of New Buildings

Application of the Energy Audit on Plan

Duration:	Trainees per Cycle:
24h	10
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	2

CVT Provider: Council of the Tunisian Architects association in collaboration with ANME

Title of the Training/Seminar:

Amélioration de la performance énergétique des bâtiments neufs

Target Group:

Private sector architects

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

Compliance with the thermal regulations of new buildings in Tunisia. The energy audit plan: Requirements, terms of application and financial incentives “and” Getting Started with the software “CLIP” compliance with the RTBNT

Duration:

30h

Trainees per Cycle:

20

Certificate/Diploma:

Attendance certificate

Courses per Year:

January 2011

Nov. & Dec. 2010

CVT Provider: Private training office “CIFEDE”

Title of the Training/Seminar:

The reduction of the electric bill of the company.

Target Group:

Group of technical staff of the National Office of Broadcasting, the Transport Company of Tunis and the Central Laboratory of Analysis and Experiments.

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

Electrical consumption stations in the building,

Practical solutions for controlling the electrical consumption in the building, .Ciphering the electrical consumption in the building,

Optimization of the STEG contract for the supply of electricity

Duration:

24h

Trainees per Cycle:

20

Certificate/Diploma:

Attendance certificate

Courses per Year:

October 2009

CVT Provider: ANME

Title of the Training/Seminar:

Initiation to the application of the thermal regulation of new buildings in Tunisia.

Target Group:

Executives of the Ministry of Equipment, housing and Territory planning

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:
18h

Trainees per Cycle:
15

Certificate/Diploma:
Attendance certificate

Courses per Year:
June 2008

CVT Provider: ANME

Title of the Training/Seminar:
Energy rational use in public buildings.

Target Group:
Central energy managers of Tunisian ministries.

Methodology (in class, on-site, e-learning):
In class room and On-site

Content/Training Modules:
The determination of the energy class of an existing building according to the RTBNT.

Duration:
18h

Trainees per Cycle:
15

Certificate/Diploma:
Attendance certificate

Courses per Year:
February 2006

CVT Provider:ANME/GIZ

Title of the Training/Seminar:
Energy Efficiency in Buildings

Target Group:
Group of participants from the Maghreb region.

Methodology (in class, on-site, e-learning):
In class room and On-site

Content/Training Modules:
“The national strategy of energy management in the building sector in Tunisia” and “Introduction to the use of simplified software” CLIP, “compliance with the RTBNT”.

Duration:
24h

Trainees per Cycle:
20

Certificate/Diploma:
Attendance certificate

Courses per Year:
February 2012

Energy Efficiency in Industrial Applications

CVT Provider: ANME

Title of the Training/Seminar:

Training on the EE on the generation network and the distribution of the steam

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:	Trainees per Cycle:
40h	15
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	2

CVT Provider: ANME

Title of the Training/Seminar:

EE training on the generation network and cold distribution

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:	Trainees per Cycle:
40h	15
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	2

CVT Provider: ANME

Title of the Training/Seminar:

Compressed air training

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:	Trainees per Cycle:
40h	15
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	2

CVT Provider: ANME

Title of the Training/Seminar:

Training on the sizing of cogeneration systems in the industrial and tertiary sectors

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:	Trainees per Cycle:
40h	12
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	2

CVT Provider: ANME

Title of the Training/Seminar:

Training on energy performance monitoring and maintenance of cogeneration systems

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:	Trainees per Cycle:
30h	10
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	1

CVT Provider: ANME

Title of the Training/Seminar:

Training on energy performance monitoring and maintenance of cogeneration systems.

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists.

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:	Trainees per Cycle:
24	15
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	October 2017

CVT Provider: ANME

Title of the Training/Seminar:

Training on IRCA ISO50001

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists.

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:	Trainees per Cycle:
40h	10
Certificate/Diploma:	**Courses per Year:**
Certificate	2

CVT Provider: ANME

Title of the Training/Seminar:

CMVP initiation training

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists.

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:	Trainees per Cycle:
24h	15
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	1

CVT Provider: ANME

Title of the Training/Seminar:

CMVP certification training

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists.

Methodology (in class, on-site, e-learning):

On-site

Content/Training Modules:

—

Duration:

30h

Trainees per Cycle:

10

Certificate/Diploma:

Certificate

Courses per Year:

1

CVT Provider: ANME

Title of the Training/Seminar:

Training on Monitoring and Verification of Energy Savings

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists.

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:

40h

Trainees per Cycle:

10

Certificate/Diploma:

Attendance certificate

Courses per Year:

1

CVT Provider: ANME

Title of the Training/Seminar:

Training on energy audit

Target Group:

Design office, company technical manager and energy man, group of Tunisian industrialists.

Methodology (in class, on-site, e-learning):

In class room and On-site

Content/Training Modules:

—

Duration:
40h

Trainees per Cycle:
15

Certificate/Diploma:
Attendance certificate

Courses per Year:
1

CVT Provider: ANME

Title of the Training/Seminar:
EE Financing Training

Target Group:
Banks and Financial institutions

Methodology (in class, on-site, e-learning):
In class room

Content/Training Modules:
—

Duration:
24h

Trainees per Cycle:
15

Certificate/Diploma:
Certificate

Courses per Year:
1

CVT Provider: ANME

Title of the Training/Seminar:
Training for partner banks on Energy Transition Fund

Target Group:
Banks and Financial institutions

Methodology (in class, on-site, e-learning):
In class room

Content/Training Modules:
—

Duration:
24h

Trainees per Cycle:
15

Certificate/Diploma:
Attendance certificate

Courses per Year:
1

Climate Change

CVT Provider: ANME/GiZ

Title of the Training/Seminar:

MRV training in the cement industry

Target Group:

Tunisian cement factories and ANME

Methodology (in class, on-site, e-learning):

In class room

Content/Training Modules:

—

Duration:	Trainees per Cycle:
16h	14
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	2

CVT Provider: ANME/UNDP/GiZ

Title of the Training/Seminar:

Training on alternative fuels in cement plants

Target Group:

Tunisian cement factories; Ministry of Local Affairs and Environment; ANGED; ANME

Methodology (in class, on-site, e-learning):

In class room

Content/Training Modules:

–

Duration:	Trainees per Cycle:
16h	14
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	2

CVT Provider: ANME/UNDP

Title of the Training/Seminar:

Training on the Green Climate Fund

Target Group:

Ministry of Local Affairs and Environment; Ministry of finances; Tunisian banks; cement plants; CDC; BCT; Mr. equipment; ANGED; MDICI; ANME

Methodology (in class, on-site, e-learning):

In class room

Content/Training Modules:

–

Duration:	Trainees per Cycle:
16h	20
Certificate/Diploma:	**Courses per Year:**
Attendance certificate	2

NB: The training courses, mentioned above, are organized by ANME within the framework of international cooperation projects, in collaboration with the key players in the sector (professional, academic, private sectors (consulting offices, etc.).

2.4. Evaluation of Existing Training

	Very Poor	Poor	Adequate	Good	Very Good
Energy policy/legislation					X
Energy planning					X
Energy audits				X	
RE Technologies			X		
EE Technologies			X		
Installation of RE systems				X	
Installation of EE systems				X	
Size of the RE market				X	
Size of the EE market				X	
Integration of RE and EE in buildings				X	

This publication is a product of the meetMED (Mitigation Enabling Energy Transition in the Mediterranean region) project which is funded by the European Union and jointly implemented by the Mediterranean Association of the National Agencies for Energy Management (MEDENER) and the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE). The conclusions of this report result from the analysis of the Country Policy Papers prepared by the meetMED Regional Expert Network (REN) – a network composed by experts coming from 13 Mediterranean countries – the aim of which is to support national governments in the implementation of EE and RE policies enhancing national programmes and frameworks in the region. Since 2012, the eight target countries (Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine and Tunisia) have improved their energy efficiency and renewable energy sectors, having put in place long-term national energy strategies that set ambitious targets for energy savings and renewable energy penetration. Nevertheless, several challenges still hinder the development of EE and RE, particularly related to governmental, technical or information aspects. This report identifies a set of recommendations that can be implemented to promote the development of both sectors. Awareness of the population for EE and RE benefits should be one of the main objectives of the countries since the lack of knowledge is a clear barrier to the dissemination of good practices. Regional cooperation should be encouraged to facilitate the energy transition in the Southern and Eastern Mediterranean Countries (SEMCs) – cooperation will accelerate the implementation of common measures and help overcome shared barriers.

meetMED

www.meetmed.org

info@meetmed.org @meetmed1

meetMED Secretariat - c/o MEDENER
Rue de Namur 72, 1000 Bruxelles