BUILD UP Skills – Cyprus

National Roadmap

May, 2013

Disclaimer

This document has been translated from the original Greek edition prepared by the Build Up Skills – Cyprus project team.

Further information

More details on BUILD UP Skills can be found at www.buildupskills.eu

More details on the IEE programme can be found at http://ec.europa.eu/intelligentenergy

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1. Introduction

The **European initiative "Build Up Skills"** is part of the European "Intelligent Energy Europe" programme and is co-financed by the European Executive Agency for Competitiveness and Innovation (EACI).

The "Build Up Skills" initiative aims at the **continuing vocational education and training of employees in technical occupations in the Construction sector, as well as other related sectors, which relate to the installation and maintenance of energy efficiency, energy saving and renewable energy systems in buildings.** The main goal is the acquisition by these people of the necessary knowledge, skills and attitude, in order to render both the Construction sector, as well as other related sectors, capable of meeting the relevant targets of the "Europe 2020" strategy[1], such as buildings with nearly zero energy consumption.

The initiative aims to create a consortium in each European member-state which will undertake the task to **prepare a Roadmap for each country, with a time horizon for completion by 2020. The Roadmap will include all main actions and activities required for the identification and promotion of the necessary vocational education and training of employees in the Construction and other related sectors,** so that they can develop the appropriate skills.

Eight organisations with important contribution and experience in the areas of Construction, Energy and Human Resource Development **participate in the national consortium in Cyprus**. The participating organisations are:

- Cyprus Institute of Energy (CIE- Consortium coordinator)
- Human Resource Development Authority (HRDA)
- Scientific Technical Chamber of Cyprus (ETEK)
- Federation of the Building Contractors Associations of Cyprus (OSEOK)
- Cyprus Productivity Centre (CPC)
- Cyprus Chamber of Commerce and Industry (CCCI)
- Cyprus Labour Institute (INEK-PEO)
- Cyprus Workers' Confederation (SEK)

For the purposes of the project, a **steering committee** has been formed, which convenes regularly to review the progress of the project, coordinate tasks, examine the deliverables and submit

[1] http://ec.europa.eu/europe2020/

reviews and suggestions. The Steering Committee consists of representatives of the organizations in charge of the respective work packages of the project, namely the CIE, the HRDA, the ETEK and OSEOK.

1.1. Object of the report

This report is the second deliverable of the national consortium and is based on the results and conclusions of the report **"Analysis of the National Status Quo"** developed in the context of the project Build Up Skills - Cyprus and is available online[2] to the public.

The endpoint conclusion of the report "Analysis of the National Status Quo" was that the national set targets for energy and buildings are deemed to be attainable taking into consideration the important contribution expected from the building sector, but only on the condition that the necessary legislative and regulatory provisions will be promoted and the required structures for control and certification will be created. It was also found that there is promising evidence for the fulfilment of the quantitative and qualitative needs for human resources, taking into account the structure, capabilities, and flexibility of the Vocational Education and Training System of Cyprus

Additionally however, it was found that there is considerable ground for improvement of the coordination between the stakeholders that promote regulations and changes with regard to the energy targets in the Construction sector and the stakeholders that promote employment and skills development for workers in the sector. Therefore, it is deemed that for the achievement of the targets, it is necessary to continuously monitor the sector's enterprises needs in adequately skilled and trained human resources, as well as to take measures to meet these needs.

Taking into account the expected needs by 2020 in trained craftsmen with the identified critical skills for achieving the national energy targets as well as the difficulties and barriers identified in the previous step, this report aims to prepare a National Roadmap that will include all key measures and actions needed to promote the necessary vocational education and training of employees in technical occupations in the Construction sector**,** as well as in related sectors, and tackle the identified barriers and gaps for the achievement of the relevant national 2020 targets for energy and buildings.

1.2. Structure of the report

The report is structured into 6 distinct chapters. The first chapter outlines the purpose of the "Build Up Skills" project, the scope and objectives of the Roadmap, the structure and contents of each chapter as well as the methodology used for the preparation of this report.

The second chapter summarizes the findings of the report "Analysis of the National Status Quo" regarding the targets by 2020 for energy and buildings, the quantitative and qualitative skills needs for craftsmen in the Construction sector and the barriers and gaps in the achievement of the set targets.

[2] www.buildupskills.org.cy

The third chapter examines the provision of the identified critical skills by the existing system of initial and continuing vocational education and training, and in addition the competent certification authorities and the available relevant vocational qualifications for these skills are identified. Subsequently, concrete proposals are formulated which aim in the implementation of the national set targets for energy and buildings and actions and required measures are prioritised.

The fourth chapter presents the main barriers and gaps identified in the report "Analysis of the National Status Quo" which may lead to delays in the achievement of the energy targets for 2020 and the expected contribution of the Construction sector and concrete recommendations and actions for tackling them.

The fifth chapter discusses suggestions for actions and measures which aim towards the dissemination of the project's results and towards increasing public awareness about the benefits of energy efficiency improvement in buildings and the contribution of RES.

Finally, the report ends with the main conclusions in chapter six, while the action plan that includes specific actions and measures, the involved institutions and the implementation timeline follows as an annex.

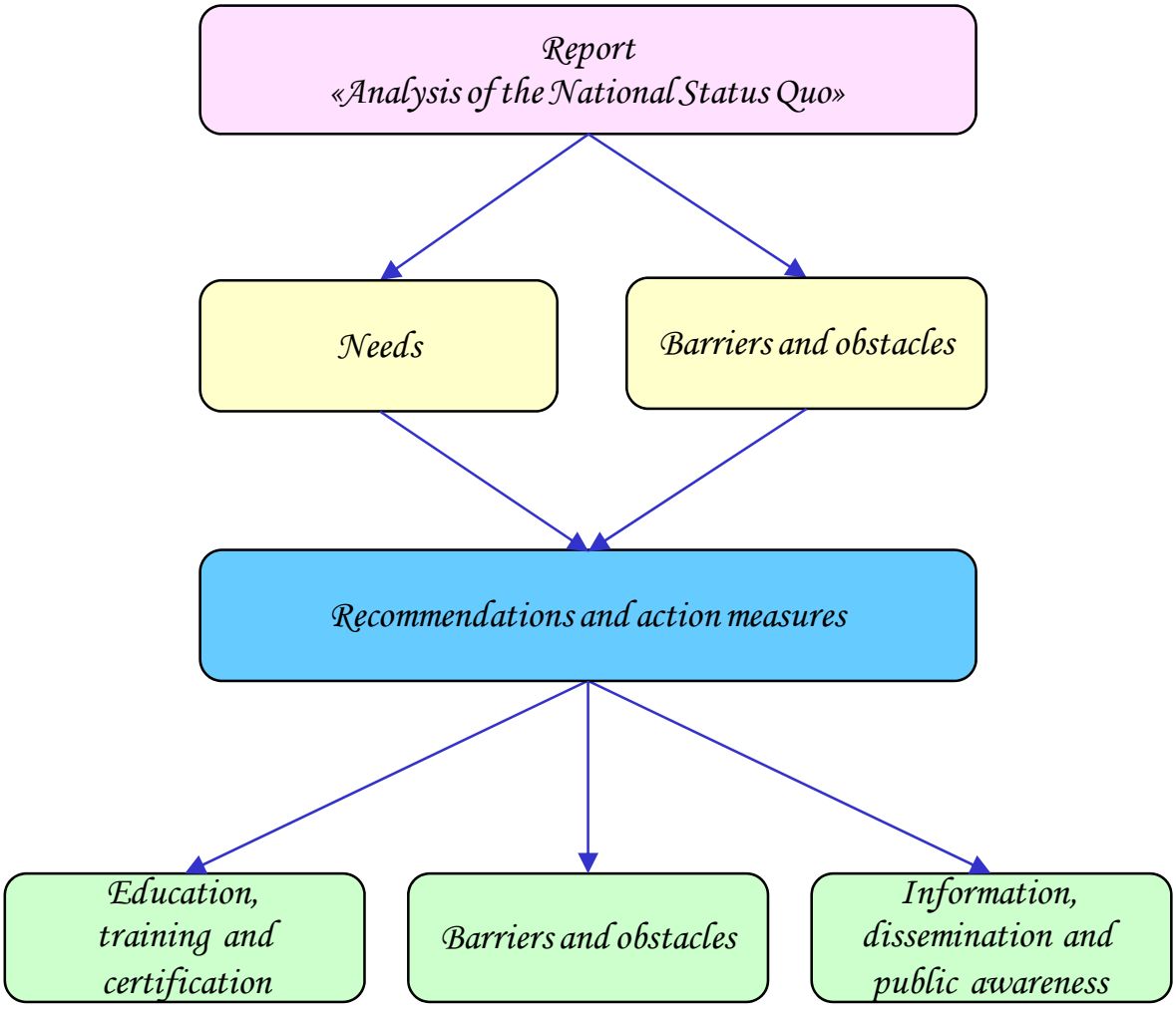
1.3. Methodology

For the preparation of this report, the findings of the report "Analysis of the National Status Quo" which was the first deliverable of the project Build Up Skills – Cyprus were extensively utilized. Specifically, the main results and conclusions concerning the status quo in the Construction sector and the vocational education and training system were utilized, along with the estimated quantitative and qualitative skill needs for trained craftsmen in the Construction sector, as well as the main barriers and gaps in the achievement of the national targets for energy and buildings.

The Steering Committee, taking into account the strengths and weaknesses of the existing system as well as the local peculiarities, selected and sorted the sections in which the analysis would focus and formulate specific recommendations and actions and assigned each section to the relevant competent consortium members and organisations. Subsequently, the responsible organizations, on the basis of agreed time schedules and workshops with involved institutions for submission of views and suggestions, proceeded with the drafting of the sections which were presented to the Steering Committee for comments and suggestions.

The final composition of the draft was undertaken by the project coordinator, who then presented the final draft of the Roadmap to the Steering Committee for validation and then forwarded it to the members of the Consortium for comments and suggestions. Finally, after the incorporation of any comments, the Roadmap was posted on the project website for use by all interested parts.

Graph 1
Diagrammatic Presentation of the Methodology



2. Findings from the report "Analysis of the National Status Quo"

In this chapter, the main results of the report "Analysis of the National Status Quo", which is the first deliverable of the Build Up Skills – Cyprus project, are briefly presented. Specifically, the national targets for 2020 relatively to energy and buildings, the quantitative and qualitative skill needs for trained craftsmen in the Construction sector and the main barriers and obstacles to achieve the set targets are presented.

2.1. National targets for 2020 on energy and buildings

As pointed out by the National Reform Programme, which presents the government policies for the achievement of the quantified national targets within the context of the "Europe 2020" strategy, energy efficiency constitutes a top priority for Cyprus, since until to-date the country relies almost exclusively on oil imports for power generation[3]. The Renewable Energy sector is expected to contribute to the reduction of greenhouse gases and to the establishment of security with regard to energy supply in Cyprus.

For the implementation of these policies, the Republic of Cyprus has set quantified national targets that are aligned with the binding targets set within the context of the "Europe 2020" strategy. The national targets are:

- Achieve an increase of 14,3% in energy savings in the projected primary energy consumption of the year 2020.
- Increase of the contribution of Renewable Energy Sources to 13% of the total energy consumption by the year 2020.
- Reduce greenhouse gas emissions by 21% in the installations included in the Emissions Trading System and by 5% for the sectors that are not included in the Emissions Trading System by 2020 compared to 2005.

For the achievement of these targets, the implementation of complementary measures and policies for the period until 2020 has been planned. These measures are directly related to the Construction sector and the activities of the "Build Up Skills" project which are briefly presented in the National Reform Programme. A further analysis and information on the national targets and the respective measures is provided by the National Action Plans for Renewable Energy and Energy Efficiency, as well as by the European Directive 2010/31/EU on the Energy Performance of Buildings that has been incorporated in national law in 2012 and which have been presented in the report «Analysis of the Status Quo».

2.2. Quantitative and qualitative skills needs for trained craftsmen in the Construction sector

As already mentioned, in the context of the preparation of the report "Analysis of the National Status Quo", the necessary **quantitative and qualitative skills needs for trained craftsmen in**

[3] 95,9% of primary energy consumption in 2010.

the Construction sector required for the successful achievement of the national targets for 2020 regarding energy and buildings have been estimated and are presented below.

These **skills which relate to technologies that will play a decisive role for the achievement of the energy targets for 2020,** have been identified through the Status Quo analysis and its comparison with the national targets and actions and are the following:

- Installation and maintenance of biomass systems
- Installation and maintenance of heat pumps and shallow geothermal systems
- Installation and maintenance of photovoltaic systems
- Installation and maintenance of solar systems for domestic hot water
- Installation and maintenance of solar systems for heating and air-conditioning
- Installation of conventional thermal insulation / thermo-insulation plaster
- Installation of external thermal insulation
- Installation of doors and windows
- Installation of solar protection systems
- Installation and maintenance of central heating or other types of heating
- Installation and maintenance of cooling and air-conditioning appliances
- Installation and maintenance of mechanical ventilation systems
- Installation and maintenance of automation systems and electronic monitoring and control systems for central heating and cooling and air-conditioning appliances, including BMS[4]

Furthermore, on the basis of recorded assumptions, the minimum annual number of persons who must have these specific skills by 2020 has also been estimated and presented in Table1.

It is emphasized that the estimates for the minimum annual number of people until 2020 is based on the approach that these skilled persons will practice their acquired skill.on a full-time employment basis However, given the small market size of Cyprus with regard to the above mentioned systems and services, as well as the small size of the labour market of Cyprus, which hinders further specialization, it is expected that these people will be actually employed in conventional areas of their occupation and the practice of their new skills will be only a part of their work. That means that an electrician will continue to undertake and execute works relating to the conventional electrical installation of a building, whereas by developing the skill for the installation of photovoltaic systems, he may also implement installations of photovoltaic systems. As a result, the number of people acquiring these new skills is expected to be larger than the minimum estimated needs presented in Table 1.

[4] Building Management Systems: Systems for the monitoring and control of the electromechanical systems of a building.

Table 1
Estimates on the minimum annual number of persons acquiring the identified critical skills

Skill	2013	2014	2015	2016	2017	2018	2019	2020
Installation and maintenance of biomass systems	46	50	54	59	63	67	71	75
Installation and maintenance of heat pumps and shallow geothermal systems	59	65	72	78	85	92	98	105
Installation and maintenance of photovoltaic systems	15	53	23	103	68	211	127	225
Installation and maintenance of solar systems for DHW	320	327	333	339	345	352	358	364
Installation and maintenance of solar systems for heating and air-conditioning	15	18	22	27	33	40	45	50
Installation of conventional thermal insulation / thermo-insulation plaster	523	628	733	837	942	1.047	1.151	1.151
Installation of external thermal insulation	52	70	92	105	135	174	230	288
Installation of doors and windows	105	115	126	136	147	157	167	178
Installation of solar protection systems	52	63	73	84	89	94	99	105
Installation and maintenance of central heating or other type of heating	353	416	481	549	620	693	769	848
Installation and maintenance of cooling and air-conditioning appliances	294	351	409	471	535	602	671	743
Installation and maintenance of mechanical ventilation systems	59	70	82	94	107	120	134	149
Installation and maintenance of automation and electronic systems	115	133	152	172	192	213	234	257

2.3. Barriers and gaps in achieving the objectives

In the report "Analysis of the National Status Quo" the barriers and gaps that may lead to delays in achieving the national energy targets for 2020 and the anticipated contribution of the Construction sector are identified and reported. These barriers are classified in three categories relating to the broader institutional and economic environment, the characteristics of the Construction sector and the quantitative and qualitative fulfillment of skills as follows:

- **Broader institutional and economic environment**
    - Economic crisis
    - Poor enforcement of town planning and building regulations
    - Weaknesses of the policies for the improvement of energy efficiency and energy saving
    - Small market for energy saving and RES systems
- **Characteristics of the Construction sector**
    - Fragmentation of the Construction Sector
    - Large number of small enterprises and self-employed in the sector
    - Large number of EU and third country nationals employed in Cyprus
- **Quantitative and qualitative fulfilment of skills needs**
    - Low enrolment percentage in technical vocational education
    - Technical vocational education and training infrastructure and trainers
    - Absence of a framework for the regulation and certification of technical occupations

Taking into account the estimates for the quantitative and qualitative skills needs as well as the barriers and obstacles that may lead to delays in the achievement of the energy targets for 2020, specific suggestions and actions are made in the following chapters which aim at the upgrading of the skills of craftsmen in the Construction sector. The suggestions and actions have been classified into three main pillars that cover the following sections:

- Education, training and certification of craftsmen (Chapter 3).
- Addressing the main challenges in the effort to upgrade their skills (Chapter 4).
- Informing and raising awareness of competent stakeholders, employers, trade unions and professional organizations as well and the general public (Chapter 5).

3. Education, training and certification

In the report "Analysis of the Status Quo", the skill needs relating to technologies that will play a key role in the achievement of the 2020 targets were identified through the analysis of the status quo and the comparison with the national targets and actions.

The minimum annual number of persons who must have these specific skills by 2020 has been estimated and additionally, these skills have been matched to occupations, according to the International Standard Classification of Occupations ISCO 88 (COM).

On the basis of the above results, this chapter examines the provision of the identified critical skills from the existing system of initial and continuing vocational education and training while additionally, the competent certification bodies and the available relevant vocational qualifications for these skills are identified. Subsequently, specific recommendations aimed at the realization of the registered national targets for energy in buildings are presented.

3.1. Installation and maintenance of biomass systems

Employment needs

The installation and maintenance of biomass systems is expected to be performed primarily by trained qualified Plumbers. Specifically, it is estimated that for the installation and maintenance of the required number of systems as calculated in the “Analysis of the Status Quo”, 46 qualified individuals are required in 2013 with their number expected to increase to 75 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation and maintenance of biomass systems

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Plumbers	46	50	54	59	63	67	71	75

Vocational Education and Training

- Current situation

As can be concluded from the examination of the initial vocational education system, this skill is not included in the curricula of Technical Schools and of the Apprenticeship system. Additionally, it is not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to continuing vocational training, it is estimated that the limited number of vocational training programmes for the installation of biomass systems that have been implemented in the framework of the HRDA’s training schemes, do not adequately cover the estimated number of skilled individuals required for the achievement of the project’s objectives.

- Suggestions

It is suggested that in order to cover the estimated needs for qualified craftsmen for the installation and maintenance of biomass systems by 2020, to promote the design and implementation of 5 training programmes for this specific skill with the participation of 15 persons per programme.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of introducing this specific subject in the curricula of the initial vocational education for Plumbers and specifically at Technical Schools and/or in the curriculum of the Post-Secondary Institutes of Vocational Education and Training.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification of biomass systems installers, it is realized that there is no vocational standard covering this skill. However, for the purpose of harmonization with EU Directive 2009/28/EC, the Energy Service has promoted to Parliament a harmonizing draft bill, which includes a provision for the certification of small scale renewable energy systems installers in buildings, including biomass systems and the maintenance of a relevant register of installers.

It is deemed advisable to examine the possibility of preparing a Standard of Vocational Qualification in the framework of the System of Vocational Qualifications (SVQ) established by the HRDA in order to cover the installation and maintenance of biomass systems or to upgrade an existing standard, such as Plumbing, with the addition of this skill with the form of an additional work field.

This standard could be used with the conform opinion of the competent authority (Energy Service), in the application of the law for the certification of biomass systems installers.

3.2. Installation and maintenance of heat pumps and shallow-depth geothermal Systems

Employment needs

The installation and maintenance of heat pumps and shallow-depth geothermal systems is expected to be performed primarily by trained qualified Plumbers. Specifically, it is estimated that 59 qualified individuals are required in 2013 with their number increasing to 105 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation and maintenance of heat pumps and shallow-depth geothermal systems

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Plumbers	59	65	72	78	85	92	98	105

Vocational Education and Training

- Current situation

As can be concluded from the examination of the initial vocational education system, this skill is only partially included in the curriculum of the specialisation Plumbing, heating and cooling systems of Technical Schools in the context of the course Plumbing Technology, heating and cooling systems but with limited number of teaching periods (4 periods) and range of content. This skill is not included in the curriculum of the Apprenticeship System and is not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to continuing vocational training, a number of Multi-company continuing training programmes has been implemented for the handling and use of refrigeration, air conditioning and heat pump equipment, but they did not however include in their training programmes the installation of heat pumps and shallow depth geothermal systems

- Suggestions

It is suggested that in order to cover the estimated needs for qualified craftsmen for the installation and maintenance of heat pumps and shallow depth geothermal by 2020, to promote the design and implementation of 7 training programmes for this specific skill with the participation of 15 persons per programme.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of upgrading and enriching the curricula of the initial vocational education system for Plumbing and specifically at Technical Schools and/or introduce the skill in the curriculum of the Post-Secondary Institutes of Vocational Education and Training.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification of heat pumps and small depth geothermal installers, it is realized that the Standard of Vocational Qualification for Central heating systems (Level 2) partially covers this skill as it includes as a work field the installation of central heating and hot water systems with the use of electric boilers and heat pumps. However, for the purpose of harmonization with EU Directive 2009/28/EC, the Energy Service has promoted to Parliament a harmonizing draft bill, which includes a provision for the certification of small depth geothermal systems and heat pumps installers and the maintenance of a relevant register of installers.

It is deemed advisable to examine the possibility of preparing a Standard of Vocational Qualification in the framework of the System of Vocational Qualifications (SVQ) established by the HRDA in order to cover the installation and maintenance of heat pumps and shallow depth geothermal systems or to upgrade the existing standard for Central heating systems with the addition of this skill with the form of an additional work field.

This standard could be used with the conform opinion of the competent authority (Energy Service), in the application of the law for the certification of heat pumps and small depth geothermal systems installers.

3.3. Installation and maintenance of photovoltaic systems

Employment needs

The installation and maintenance of photovoltaic systems is expected to be performed primarily by trained qualified Building electricians and to a smaller extent by qualified Plumbers. Specifically, it is estimated that for the installation and maintenance of the required number of systems as calculated in the "Analysis of the Status Quo", 15 qualified individuals are required in 2013 with their number expected to increase significantly to 75 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation and maintenance of photovoltaic systems

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Building Electricians	11	37	16	72	48	148	89	158
Plumbers	4	16	7	31	20	63	38	67
Total	**15**	**53**	**23**	**103**	**68**	**211**	**127**	**225**

Vocational Education and Training

- Current situation

As can be concluded from the examination of the initial vocational education system, this skill is not included in the curricula of Technical Schools and the Apprenticeship system, as the only reference to it, is the inclusion to the curriculum of the specialisation Electrical machines, automations and control systems of the course Introduction to photovoltaic modules. Contrary, this skill is part of the curricula of the Post-Secondary Institutes of Vocational Education and Training within the specialisation Technical installation and maintenance of photovoltaic systems and wind turbines.

As regards to the vocational training system, it is realised that a significant number of vocational training programmes has been implemented for craftsmen in the framework of the HRDA's training schemes. The training programmes were carried out by the Cyprus Productivity Centre (CPC) for the initial vocational training of unemployed for the specialisation of photovoltaic systems technician in the framework of the Emergency Scheme for Training the Unemployed.

- Suggestions

As regards to the needs up to 2020, it is estimated that these can be covered to a large extent from the vocational training system through the initial training programmes carried out by the CPC as well as through continuing training programmes, both single-company and multi-company, that can be implemented by enterprises and training institutions. Therefore, it is suggested to examine the content of the initial training programme carried out by the CPC and consider its enrichment and upgrading. It is estimated that the implementation of 12 training programmes for the specific skill with the participation of 15 persons per programme will cover to a significant extend the short and medium term needs.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of introducing this specific subject in the curricula of the initial vocational education in Technical Schools where students following the specialisations of Building Electrician or Plumbing can select it as an optional subject. Additionally, the specialisation offered by the Post-Secondary Institutes of Vocational Education and Training can be upgraded to be offered as a senior technical specialty or supervisor.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification of photovoltaic systems installers, it is realized that there is no vocational standard covering this skill. However, for the purpose of harmonization with EU Directive 2009/28/EC, the Energy Service has promoted to Parliament a harmonizing draft bill, which includes a provision for the certification of photovoltaic systems installers and the maintenance of a relevant register of installers.

In addition, due to the relevance with the installation of photovoltaic systems, it is noted that the competent authority for examination, certification and licensing with regard to the occupation of Building electricians is the Department of Electrical and Mechanical Services of the Ministry of Communications and Works. The Department is responsible to carry out regular examinations for the certification of the technical competency of the examinees at the level of their qualifications and the issuance of a certificate of competency and of a registration certificate which is the licence to practise the occupation.

It is deemed advisable to examine the possibility of preparing a Standard of Vocational Qualification to cover the installation and maintenance of photovoltaic systems or to upgrade an existing standard, such as Plumbing, with the addition of this skill with the form of an additional work field.

This standard could be used with the conform opinion of the competent authority (Energy Service), in the application of the law for the certification of photovoltaic systems installers.

3.4. Installation and maintenance of solar thermal systems for DHW

Employment needs

The installation and maintenance of solar thermal systems for DHW is expected to be performed mainly by trained qualified Plumbers. Specifically, it is estimated that for the installation and maintenance of the required number of systems as calculated in the "Analysis of the Status Quo", 320 qualified individuals are required in 2013 with their number expected to increase to 364 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation and maintenance of solar thermal systems for DHW

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Plumbers	320	327	333	339	345	352	358	364

Vocational Education and Training

- Current situation

As can be concluded from the examination of the initial vocational education system, this skill is included in the curricula of Technical Schools and of the Apprenticeship system and specifically of the specialisation of Plumbing, heating and cooling systems where students are trained in the installation of domestic hot water systems with the use of solar heaters. However, it is not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to the vocational training system, it is realised that a significant number of vocational training programmes has been implemented for hydraulic and thermal installations technicians which include the installation of domestic hot water systems with the use of solar thermal systems.

- Suggestions

As can be deduced, the needs for individuals can be met by the education and training system as both the existing workforce as well as new graduates of the education system are trained to install solar thermal systems for hot water generation. Therefore, the recommendation is the continuance of the existing vocational training programmes.

Certification

As regards to the certification of solar thermal systems for hot water installers, it is realized that the specific skill is included in two Standards of Vocational Qualifications which are also related to each other, namely Plumbing (Level 2) and the Central Heating Systems (Level 2). In particular, the standard for Plumbing includes the installation of hot water systems with the use of solar panels and similarly, the corresponding standard for Central heating systems, includes the

installation of central heating and hot water systems with the use of solar energy. Additionally, for the purpose of harmonization with EU Directive 2009/28/EC, the Energy Service has promoted to Parliament a harmonizing draft bill, which includes a provision for the certification of solar thermal systems for hot water installers and the maintenance of a relevant register of installers.

It is suggested that the Standard of Vocational Qualification for Plumbing is used, with the approval of the competent authority (Energy Service), for the application of the law for the certification of installers of solar thermal systems for hot water generation.

3.5. Installation and maintenance of solar thermal systems for space heating and air conditioning

Employment needs

The installation and maintenance of solar thermal systems for space heating and air conditioning is expected to be performed mainly by trained qualified[5] Plumbers and to a lesser extent by specialized Air-conditioning and refrigeration mechanics. Specifically, it is estimated that for the installation and maintenance of the required number of systems as calculated in the "Analysis of the Status Quo", 15 qualified individuals are required in 2013 with their number expected to increase to 50 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation and maintenance of solar thermal systems for space heating and air conditioning

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Plumbers	11	13	15	19	23	28	32	35
Air-conditioning and refrigeration mechanics	4	5	7	8	10	12	13	15
Total	**15**	**18**	**22**	**27**	**33**	**40**	**45**	**50**

Vocational Education and Training

- Current situation

As can be concluded from the examination of the initial vocational education system, this skill is not included in the curricula of Technical Schools and of the Apprenticeship system. Additionally, it is not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

[5] Certified and licensed in the appropriate class for handling stationary refrigeration, air conditioning and heat pumps from the Department of Environment.

As regards to the vocational training system, it is realized that only a limited number of vocational training programmes for the installation of solar thermal systems for space heating and air conditioning have already been implemented, with their majority however aimed at higher level occupations.

- Suggestions

It is suggested that in order to cover the estimated needs for qualified craftsmen for the installation and maintenance of solar thermal systems for space heating and air conditioning by 2020, to promote the design and implementation of 3 training programmes for this specific skill with the participation of 15 persons per programme.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of introducing this specific subject in the curricula of the initial vocational education for Plumbers and specifically at Technical Schools and/or in the curriculum of the Post-Secondary Institutes of Vocational Education and Training.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification of installers of solar thermal systems for space heating and air conditioning, it is realized that there is no vocational standard covering this skill. However, the Parliament recently approved the amendment of the Law for the Energy Performance of Buildings for harmonization with EU Directive 2010/13/EC which includes several provisions regarding buildings' technical systems, including their proper installation, proper sizing, adjustment and control to optimize their energy use in buildings. The technical systems regulated include heating, refrigeration, air conditioning and large scale ventilation systems. The law also provides for the adoption of regulations by the Council of Ministers which will govern the qualifications of installers of technical systems in buildings.

It is deemed advisable to examine the possibility of preparing a standard of vocational qualification in the framework of the System of Vocational Qualifications (SVQ) established by the HRDA in order to cover the installation and maintenance of solar thermal systems for space heating and air conditioning or to upgrade an existing standard, such as Plumbing, with the addition of this skill with the form of an additional work field.

This standard could be used with the conform opinion of the competent authority (Energy Service), in the application of the law for the certification of installers of solar thermal systems for space heating and air conditioning.

3.6. Placement of conventional thermal insulation / thermo-insulation plaster

Employment needs

The placement of conventional thermal insulation / thermo-insulation plaster is expected to be performed primarily by trained qualified Builders and to a smaller extent by skilled Insulation workers. Specifically, it is estimated that for the placement of conventional thermal insulation in the required number of buildings as calculated in the "Analysis of the Status Quo", 523 qualified individuals are required in 2013 with their number expected to increase significantly to 1.151 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the placement of conventional insulation / thermo-insulation plaster

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Builders	471	565	660	753	848	942	1,036	1,036
Insulation workers	52	63	73	84	94	105	115	115
Total	**523**	**628**	**733**	**837**	**942**	**1.047**	**1.151**	**1.151**

Vocational Education and Training

- Current Situation

As can be concluded from the examination of the initial vocational education system, this skill is partially included in the curricula of Technical Schools and of the Apprenticeship system and specifically of the specialisation of Building where there is reference to the use of conventional thermal insulation but without however a practical application of conventional insulation in masonry. Moreover, the skill is not included of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to the vocational training system, it is realized that a number of vocational training programmes for the use of insulation materials and insulation of buildings have been implemented but with their majority however addressed to higher level occupations and to a lesser extent to technical occupations of the Construction sector.

- Suggestions

It is suggested that in order to cover the estimated needs for qualified craftsmen for the placement of conventional thermal insulation / thermo-insulation plaster by 2020, to promote the design and implementation of 50 training programmes for this specific skill with the participation of 15 persons per programme.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of upgrading and enriching the curricula of the initial vocational education programme for Building at Technical Schools and at the Apprenticeship System so as to include the use of thermo-insulation plaster and the practical application of conventional insulation in masonry.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification of conventional insulation installers, it is realized that the placement of conventional thermal insulation is included in the Standard of Vocational Qualification for Building (Level 2 and 3) with the use of insulation materials in the building of walls and roofs while there is no mention in the use of insulating plaster.

It is deemed advisable to examine the possibility of upgrading and enriching the current standard for Building so as to include the correct use of insulating plaster.

3.7. Installation of external thermal insulation

Employment needs

The fitting of external thermal insulation is estimated to be performed primarily by trained qualified Builders and to a smaller extent by skilled Insulation workers. Specifically, it is estimated that for the placement of external thermal insulation in the required number of buildings as calculated in the "Analysis of the Status Quo", 52 qualified individuals are required in 2013 with their number expected to increase significantly to 288 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the placement of external thermal insulation

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Builders	47	63	83	94	121	157	207	259
Insulation workers	5	7	9	11	14	17	23	29
Total	**52**	**70**	**92**	**105**	**135**	**174**	**230**	**288**

Vocational Education and Training

- Current Situation

As can be concluded from the examination of the initial vocational education system, this skill is not included in the curricula of Technical Schools and of the Apprenticeship system.

Additionally, it is not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to the vocational training system, it is realized that a number of vocational training programmes for the use of insulation materials and insulation of buildings have been implemented but with their majority however addressed to higher level occupations of the Construction sector.

- Suggestions

It is suggested that in order to cover the estimated needs for qualified craftsmen for the installation of external thermal insulation by 2020, to promote the design and implementation of 10 training programmes for this specific skill with the participation of 15 persons per programme.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of upgrading and enriching the curricula of the initial vocational education programme for Builders at Technical Schools and at the Apprenticeship System so as to include the specific skill.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification of external thermal insulation installers, it is realized that there is no vocational standard covering this skill despite the inclusion of the use of insulating materials in the building of walls and roofs in the Standard of Vocational Qualification for Building (Level 2 and 3).

It is deemed advisable to examine the possibility of upgrading and enriching the current standard for Building so as to include the fitting of external thermal insulation.

3.8. Installation of doors and windows

Employment needs

The installation of doors and windows is expected to be carried out primarily by trained qualified Sheet-metal workers and to a smaller extent by skilled Builders. Specifically, it is estimated that for the installation of the required number of Doors and Windows on buildings as calculated in the "Analysis of the National Status Quo", 105 qualified individuals are required in 2013 with their number expected to increase to 178 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation of doors and windows

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Sheet-metal workers	79	86	94	102	110	118	125	133
Builders	26	29	32	34	37	39	42	45
Total	**105**	**115**	**126**	**136**	**147**	**157**	**167**	**178**

Vocational Education and Training

- Current Situation

As can be concluded from the examination of the initial vocational education system, this skill is not included in the curricula of Technical Schools and of the Apprenticeship system despite the significant relevance with the content of the curricula of the specialisations of Welding and metal construction (which includes the manufacturing of aluminium frames) and Building.

Specifically, while the curriculum of the specialisation of Welding and metal construction includes the construction of various types of frames, it does not however include their installation. Similarly, the curriculum for the specialisation of Building includes the installation of frames but not the installation of windows. The skill is also not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to the vocational training system, it is realized that a number of vocational training programmes for the Manufacturing of aluminium frames as well as initial vocational training programmes for Builders have been implemented, but they did not however include the proper installation of doors and windows frames.

- Suggestions

It is suggested that in order to cover the estimated needs for qualified craftsmen for the proper installation of doors and windows frames by 2020, to promote the design and implementation of 8 training programmes for this specific skill with the participation of 15 persons per programme.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of upgrading and enriching the curricula of the initial vocational education programmes for Welding and metal construction as well as Building at Technical Schools and at the Apprenticeship System so as to include the specific skill.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification of installers of doors and window frames, it is realized that there is no vocational standard covering this skill, as the Standard of Vocational Qualification for Building does not cover the installation of frames, the preparation of the standard for the Manufacturing and installation of aluminium frames is set to begin in 2014 while the standard for Glazing only includes the glazing of door and window frames.

It is deemed advisable to examine the possibility of upgrading and enriching the current Standard of Vocational Qualification for Building as to include the installation of frames and to streamline the process for the quick preparation of the standard for the Manufacturing and installation of aluminium frames to cover this particular skill.

3.9. Installation of solar protection systems

Employment needs

The installation of solar protection systems is expected to be carried out primarily by trained qualified Sheet-metal workers and to a smaller extent by skilled Builders. Specifically, it is estimated that for the installation of the required number of solar protection systems as calculated in the "Analysis of the National Status Quo", 52 qualified individuals are required in 2013 with their number expected to increase to 105 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation of solar protection systems

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Sheet-metal workers	39	47	55	63	67	70	74	79
Builders	13	16	18	21	22	24	25	26
Total	**52**	**63**	**73**	**84**	**89**	**94**	**99**	**105**

Vocational Education and Training

- Current situation

As can be concluded from the examination of the initial vocational education system, this skill is not included in the curricula of Technical Schools and of the Apprenticeship system despite the significant relevance with the content of the curricula of the specialisations of Welding and metal construction (which includes the manufacturing of aluminium frames) and Building. The skill is also not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to the vocational training system, it is realized that a number of vocational training programmes for the Manufacturing of aluminium frames as well as initial vocational training programmes for Builders have been implemented, but they did not however include the installation of solar protection systems.

- Suggestions

It is suggested that in order to cover the estimated needs for qualified craftsmen for the installation of solar protection systems by 2020, to promote the design and implementation of 6 training programmes for this specific skill with the participation of 15 persons per programme.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of upgrading and enriching the curricula of the initial vocational education programme for Welding and metal construction as well as Building at Technical Schools and at the Apprenticeship System so as to include the specific skill.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification for the installation of solar protection systems, it is realized that there is no vocational standard covering this skill, as the Standard of Vocational Qualification for Building does not cover the installation of solar protection systems and the preparation of the standard for the Manufacturing and installation of aluminium frames is set to begin in 2014.

It is deemed advisable to examine the possibility of upgrading and enriching the current Standard of Vocational Qualification for Building as to include the installation of solar protection systems and to streamline the process for the quick preparation of the standard for the Manufacturing and installation of aluminium frames to cover this particular skill.

3.10. Installation and maintenance of central heating or other types of heating systems

Employment needs

The installation and maintenance of central heating or other systems is expected to be carried out primarily by trained qualified Plumbers. Specifically, it is estimated that for the installation and maintenance of the required number of systems as calculated in the “Analysis of the National Status Quo”, 353 qualified individuals are required in 2013 with their number expected to increase significantly to 848 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation and maintenance of central heating or other types of heating systems

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Plumbers	353	416	481	549	620	693	769	848

Vocational Education and Training

- Current Situation

As can be concluded from the examination of the initial vocational education system, this skill is included in the curricula of Technical Schools and of the Apprenticeship system and specifically of the specialisation of Plumbing, heating and cooling systems where students are trained in the installation of central heating systems with water and air as well as hybrid central heating systems with DHW. Contrary, it is not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to the vocational training system, it is realised that a number of vocational training programmes has been implemented for hydraulic and thermal installations technicians that include the installation of central heating systems.

- Suggestions

As can be deduced, the needs for individuals can be met by the education and training system as both the existing workforce as well as new graduates of the vocational education system are trained to install central heating or other types of heating systems. Therefore, the recommendation is to examine the curricula of the vocational education system for possible enrichment and upgrading and the continuance of the existing vocational training programmes.

Certification

As regards to the certification of installers of central heating or other heating systems, it is realized that the specific skill is included in the Standard of Vocational Qualification for Central heating systems (Level 2) with the installation of various types of central heating systems.

Additionally, the Parliament recently approved the amendment of the Law for the Energy Performance of Buildings for harmonization with EU Directive 2010/13/EC which includes several provisions regarding buildings' technical systems, including their proper installation, proper sizing, adjustment and control to optimize their energy use in buildings. The technical systems regulated include heating, refrigeration, air conditioning and large scale ventilation systems. The law also provides for the adoption of regulations by the Council of Ministers which will govern the qualifications of installers of technical systems in buildings.

It is suggested that the Standard of Vocational Qualification for Central Heating Systems is used, with the approval of the competent authority (Energy Service), for the application of the law for the certification of central heating systems installers.

3.11. Installation and maintenance of cooling and air-conditioning appliances

Employment needs

The installation and maintenance of cooling and air-conditioning appliances is expected to be carried out primarily by trained qualified[6] Plumbers and Air-conditioning and refrigeration mechanics. Specifically, it is estimated that for the installation and maintenance of the required number of systems as calculated in the "Analysis of the National Status Quo", 294 qualified individuals are required in 2013 with their number expected to increase to 743 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation and maintenance of cooling and air-conditioning appliances

Profession	2013	2014	2015	2016	2017	2018	2019	2020
Plumbers	147	175	204	235	267	301	335	371
Air-conditioning and refrigeration mechanics	147	176	205	236	268	301	336	372
Total	294	351	409	471	535	602	671	743

Vocational Education and Training

- Current Situation

As can be concluded from the examination of the initial vocational education system, this skill is included in the curricula of Technical Schools and of the Apprenticeship system and specifically of the specialisation of Plumbing, heating and cooling systems where students are trained in the installation of air conditioning – cooling systems, such as local air conditioning units, central air conditioning – cooling units, multi-split air conditioning units, VRV air conditioning systems and hybrid systems. The skill however, is not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to the vocational training system, it is realised that a number of initial and continuing vocational training programmes has been implemented for air conditioning – cooling technicians that include the installation and maintenance of autonomous and central air conditioning and cooling systems.

- Suggestions

As can be deduced, the needs for individuals can be met by the education and training system as both the existing workforce as well as new graduates of the vocational education system are

[6] Certified and licensed in the appropriate class for handling stationary refrigeration, air conditioning and heat pumps from the Department of Environment.

trained in the installation and maintenance of cooling and air-conditioning appliances. Therefore, the recommendation is to examine the curricula of the vocational education system for possible enrichment and upgrading and the continuance of the existing vocational training programmes.

Certification

As regards to the certification of cooling and air-conditioning appliances installers, it is realized that the specific skill is included in the Standard of Vocational Qualification for Cooling and air conditioning systems (Level 2) with the installation of various types of air conditioning and cooling systems, such as split type air conditioners, multi-split and central air conditioning and cooling systems, small cooling systems, large central air conditioning systems and refrigeration systems for large commercial and industrial facilities.

Additionally, the Parliament recently approved the amendment of the Law for the Energy Performance of Buildings for harmonization with EU Directive 2010/13/EC which includes several provisions regarding buildings' technical systems, including their proper installation, proper sizing, adjustment and control to optimize their energy use in buildings. The technical systems regulated include heating, refrigeration, air conditioning and large scale ventilation systems. The law also provides for the adoption of regulations by the Council of Ministers which will govern the qualifications of installers of technical systems in buildings.

It is suggested that the Standard of Vocational Qualification for Cooling and air conditioning systems is used, with the approval of the competent authority (Energy Service), for the application of the law for the certification of cooling and air-conditioning appliances installers.

3.12. Installation and maintenance of mechanical ventilation systems

Employment needs

The installation and maintenance of mechanical ventilation systems is expected to be carried out primarily by trained qualified Plumbers and to a smaller extent by skilled Building electricians. Specifically, it is estimated that for the installation and maintenance of the required number of systems as calculated in the "Analysis of the National Status Quo", 59 qualified individuals are required in 2013 with their number expected to increase to 149 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation and maintenance of mechanical ventilation systems

Occupation	2013	2014	2015	2016	2017	2018	2019	2020
Plumbers	53	63	74	85	96	108	121	134
Buildings electricians	6	7	8	9	11	12	13	15
Total	**59**	**70**	**82**	**94**	**107**	**120**	**134**	**149**

Vocational Education and Training

- Current Situation

As can be concluded from the examination of the initial vocational education system, this skill is partially included in the curricula of Technical Schools and of the Apprenticeship system and specifically of the specialisation of Plumbing, heating and cooling systems where students are trained in ventilation systems and especially the installation and configuration of air-ducts. The skill however, is not part of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to the vocational training system, it is realized that a small number of vocational training programmes for the installation of ventilation systems have been implemented but with their majority however addressed to higher level occupations.

- Suggestions

It is suggested that in order to cover the estimated needs for qualified craftsmen for the installation and maintenance of mechanical ventilation systems by 2020, to promote the design and implementation of 8 training programmes for this specific skill with the participation of 15 persons per programme.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of upgrading and enriching the course for the ventilation systems for the specialisation of Plumbing, heating and cooling systems at Technical Schools so as to include the installation of mechanical ventilation systems.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification of mechanical ventilation systems installers, it is realized that the specific skill is included in the Standard of Vocational Qualification for Cooling and air conditioning systems (Level 2) with the installation, operation and regulation of ventilation, aeration and heat recovery systems.

Additionally, the Parliament recently approved the amendment of the Law for the Energy Performance of Buildings for harmonization with EU Directive 2010/13/EC which includes several provisions regarding buildings' technical systems, including their proper installation, proper sizing, adjustment and control to optimize their energy use in buildings. The technical systems regulated include heating, refrigeration, air conditioning and large scale ventilation systems. The law also provides for the adoption of regulations by the Council of Ministers which will govern the qualifications of installers of technical systems in buildings.

It is suggested that the Standard of Vocational Qualification for Cooling and air conditioning systems is used, with the approval of the competent authority (Energy Service), for the application of the law for the certification of mechanical ventilation systems installers.

3.13. Installation and maintenance of automation and electronic monitoring and control systems of central heating and air conditioning and refrigeration equipment

Employment needs

The installation and maintenance of automation and electronic monitoring and control systems of central heating and air conditioning and refrigeration equipment is expected to be performed primarily by trained qualified Plumbers, Building electricians and Electrical mechanics and fitters. Specifically, it is estimated that for the installation and maintenance of the required number of systems as calculated in the "Analysis of the Status Quo", 115 qualified individuals are required in 2013 with their number expected to increase to 257 people by 2020.

Minimum number of individuals per occupation that must hold the skill for the installation and maintenance of automation and electronic monitoring and control systems

Profession	2013	2014	2015	2016	2017	2018	2019	2020
Plumbers	45	53	60	68	76	85	94	103
Building electricians	35	40	46	52	58	64	70	77
Electrical mechanics and fitters	35	40	46	52	58	64	70	77
Total	**115**	**133**	**152**	**172**	**192**	**213**	**234**	**257**

Vocational Education and Training

- Current Situation

As can be concluded from the examination of the initial vocational education system, this skill is included in the curricula of all the specialisations of the branch of Electrical Engineering of Technical Schools which includes Electrical installations, Domestic appliances, refrigeration and air conditioning, Electrical machinery, automations and control systems and Electronic communications, with the students trained in electrical and electronic automation, control systems, the use of sensors and electro-pneumatic automation systems. A course relevant to automation systems is also included in the curricula of the specialisation Plumbing, heating and cooling systems of Technical Schools which however focuses more on the theory of automatic control functions systems, but also covers integrated automatic function control systems in electromechanical installations of buildings with the use of a computer (Building Management Systems). Contrary, the skill is not included of the curricula of the Post-Secondary Institutes of Vocational Education and Training.

As regards to the vocational training system, it is realized that a small number of vocational training programmes for the installation of automation and electronic monitoring and control systems have been implemented but with their majority however addressed to higher level occupations.

- Suggestions

It is suggested that in order to cover the estimated needs for qualified craftsmen for the installation and maintenance of automation and electronic monitoring and control systems by 2020, to promote the design and implementation of 10 training programmes for this specific skill with the participation of 15 persons per programme.

At the same time, in order to cover the long-term needs after 2020 it is required to examine the possibility of upgrading and enriching the curricula of the specialisation of Plumbing, heating and cooling systems so as to include practical training in the installation of these systems and of the curricula of all the specialisations of the branch of Electrical Engineering so as to cover integrated automatic function control systems in electromechanical installations of buildings.

With this option, a significant part of the short term and medium term needs is covered by the vocational training system and allows the time required by the vocational education system to readjust and enrich the curricula, which constitutes a long term process.

Certification

As regards to the certification of installers of automation and electronic monitoring and control systems, it is realized that there is no vocational standard covering this skill.

It is deemed advisable to examine the possibility of preparing a Standard of Vocational Qualification in the framework of the System of Vocational Qualifications (SVQ) established by the HRDA in order to cover the installation and maintenance of automation and electronic monitoring and control systems or to upgrade an existing standard, such as Central heating systems or Cooling and air conditioning systems, with the addition of this skill with the form of an additional work field.

3.14. Conclusions

As can be concluded from the above analysis, the need to implement training programmes for skills that are covered satisfactorily by the vocational education system is limited as both the majority of the technical workforce as well as new graduates are considered to be adequately proficient for these specific skills. Moreover, the relevant Standards of Vocational Qualifications for these skills are already available for utilization.

Contrary, for relatively new skills that are not yet included in the curricula of the vocational education system, it was found that there are significant training needs for the technical workforce which are expected to be covered by the vocational training system and additionally the relative Standards of Vocational Qualifications do not cover or only partially cover these skills.

Regarding the legislative framework governing the qualifications of technical installers, it seems that despite the existence of relevant laws to harmonize with EU directives, their implementation has not yet started, due to the lack of relevant regulations that regulate their qualifications.

Concerning the suggestions for the implementation of vocational training programmes, it is noted that these were made taking into consideration the required number of trained technicians for the installation and maintenance of the necessary systems and technologies as calculated in the report "Analysis of the Status Quo". These estimates were based on the existing national targets for energy and energy efficiency and the current number of trained technicians. For this purpose, in case of failure of meeting the national targets in a particular category or amendment of the national targets or even the emergence of new technologies to replace or upgrade existing technologies, the data should be reevaluated for the programming of future operations.

Furthermore, the prevailing conditions in the labour market must be examined and taken into consideration when selecting participants for the vocational training programmes. Specifically, the participants may be unemployed with expertise in the relevant subject or employed craftsmen aiming at the acquisition of a new skill.

Table 2 summarizes the skills that are expected to play a key role in the achievement of the energy targets for 2020 sorted in priority order for the uptake of actions and measures. The table also includes the quantitative needs for trained technical personnel needed by 2020 per skill, the suggested estimated total number of vocational training programmes to be implemented and the corresponding number of participants per programme as well as the certification and regulation framework.

Table 2
Skills sorted by priority to implement training programmes

	Skill	Needs for individuals in 2020	Proposed number of programmes	Number of participants per programme	Certification	Legislation
High priority	Installation and maintenance of photovoltaic systems	225	12	15	N/A	Ongoing
	Installation of conventional thermal insulation / thermo-insulation plaster	1.151	50	15	Partially covered by SVQ[7] for Building	N/A
	Installation of external thermal insulation	288	10	15	N/A	N/A
	Installation of doors and windows	178	8	15	N/A	N/A

[7] Standard of Vocational Qualification.

	Skill	Needs for individuals in 2020	Proposed number of programmes	Number of participants per programme	Certification	Legislation
Medium priority	Installation and maintenance of biomass systems	75	5	15	N/A	Ongoing
	Installation and maintenance of heat pumps and shallow geothermal systems	105	7	15	Partially covered by SVQ for Central heating systems	Ongoing
	Installation and maintenance of solar systems for heating and air-conditioning	50	3	15	N/A	Yes, expected regulations for qualifications
	Installation and maintenance of solar protection systems	105	6	15	N/A	N/A
Small priority	Installation and maintenance of mechanical ventilation systems	149	8	15	SVQ for Heating and Cooling Systems	Yes, expected regulations for qualifications
	Installation and maintenance ofautomation and electronic systems	257	10	15	N/A	N/A
Low priority	Installation and maintenance of solar systems for DHW	364	-	-	SVQ for Plumbing and Central heating systems	Ongoing
	Installation and maintenance of central heating or other type of heating	848	-	-	SVQ for Central heating systems	Yes, expected regulations for qualifications
	Installation and maintenance of cooling and air-conditioning appliances	743	-	-	SVQ for Heating and cooling systems	Yes, expected regulations for qualifications

4. Overcoming Barriers and Gaps

The overcoming of the main barriers and gaps identified in the report "Analysis of the National Status Quo" which may lead to delays in the achievement of the energy targets for 2020 and the expected contribution of the Construction sector is the subject of this chapter.

Specifically, the main barriers and gaps that were identified and affect the upgrading of the skills of the human resources are presented and concrete recommendations and actions to overcome them are suggested.

4.1. Absence of a regulatory framework for technical occupations

One of the basic barriers to the implementation of the targets of the "Build Up Skills" project is the absence of a regulatory framework for technical occupations in Cyprus. The only technical professions that relate to the project and require certification and licensing by a competent authority are those of a Building Electrician and Cooling technician.

Additionally, the System of Vocational Qualifications, which is implemented by the HRDA and is expected to play an important part in the achievement of the project's target, is in its early stages of implementation and development, whereas its voluntary character must be underlined.

This situation, however, is expected to change soon due to the harmonization of the national legislation with the European Directives 2010/31/EC for the Energy Performance of Buildings and 2009/28/EC on the Promotion and Encouragement of the utilization of RES. These two directives include provisions relating to the regulation of the qualifications of technical systems installers and installers of renewable energy systems in buildings as well as the maintenance of a register of installers.

The European Directive 2010/31/EC for the Energy Performance of Buildings has already been incorporated into national legislation with the **Law N.202 (I) / 2012 (Amendment) on the Energy Performance of Buildings** in late 2012. The law includes provisions regarding the technical systems in buildings including proper installation and sizing, adjustment and control to optimize their energy use. The technical systems regulated include at least the following systems:

- Heating Systems
- Hot water system
- Air conditioning systems
- Large scale ventilation systems

The law also provides for the adoption of regulations by the Council of Ministers which will govern the qualifications of installers of technical systems in buildings.

The law also provides for the right of the Council of Ministers to issue regulations which will govern the qualifications, duties and responsibilities of installers of technical systems in buildings as well as the establishment of a relevant register of installers by the competent authority (Energy Service). The regulations, although not specified in the law, may be separate for each category of technical systems. The law also specifies that the regulation and control of heating and air

conditioning systems must be performed by a licensed technical systems installer who must issue a relevant certificate to the owner of the building. It is noted however that the relevant regulations have not yet been issued by the Council of Ministers.

As regards to the **Directive 2009/28/EC on the Promotion and Encouragement of the utilization of RES** is expected to be soon transposed into national legislation as the Energy Agency has promoted to Parliament a harmonizing draft bill.

According to the harmonizing bill, the competent authority, according to the provisions of the Recognition of Professional Qualifications Act, may issue licenses for installers of small-scale biomass boilers or stoves and solar and photovoltaic and solar thermal systems or shallow geothermal systems and heat pumps which will certify the competence of installers according to the regulations to be issued by the Council of Ministers. The regulations also specify the qualifications, knowledge, obligations and duties of the installers as well as the programme and content of their training.

It is also noted that the competent authority is required to maintain a register of installers of renewable energy systems and upon request, must evaluate the relevant qualifications or certification of an installer from another Member State and to decide on his/her registration to the Register.

More details about the two laws are presented in Appendix 2.

The expected implementation of the two laws is expected to be supportive to the objectives of the Build Up Skills project as they will provide the relevant regulations for the qualifications of installers of technical systems and small-scale renewable energy in buildings and the establishment of a relevant register by the competent authority. These conditions are expected to contribute to the upgrade of the education and training level of the installers, ensure that the added value of a more skilled workforce is recognized and at the same time contribute to the improvement of the quality of the installed systems.

But as the relevant regulations have not yet been prepared by the competent authority, it is suggested that for synergy purposes to link where possible the required qualifications, skills and abilities mentioned in the regulations with the existing Standards of Vocational Qualifications that cover the specific skill. This measure is expected to have significant benefits, both in terms of saving resources (time and public funds) and simplifying procedures since a craftsman that is evaluated in the framework of the System of Vocational Qualifications will meet the legislative requirements and can be registered in the relevant register .

Taking the above into consideration, it is noted that from the skill set identified as critical to the achievement of the national targets for energy and buildings, the skills listed below are not regulated by law or other applicable certification process:

- Installation of conventional thermal insulation / thermo-insulation plaster
- Installation of external thermal insulation
- Installation of doors and windows

- Installation of solar protection systems
- Installation and maintenance of automation systems and electronic monitoring and control systems for central heating and cooling and air-conditioning appliances, including BMS

For the above skills, it is deemed that the recommendations of Chapter 3 should be adopted regarding the preparation or upgrading of Standards of Vocational Qualifications and the vocational education and training of the technical workforce to meet the needs.

Table 3 summarizes the legislative framework regulating the identified critical skills in Cyprus with the skills sorted by priority order for the uptake of actions and measures.

Table 3
Legislative framework regulating the critical skills

	Skill	Regulated by the Law for the Energy Performance of Buildings	Will be regulated by the Law for the promotion of RES	Other relevant legislation
High priority	Installation and maintenance of photovoltaic systems **	NO	YES	YES
	Installation of conventional thermal insulation / thermo-insulation plaster	NO	NO	-
	Installation of external thermal insulation	NO	NO	-
	Installation of doors and windows	NO	NO	-
Medium priority	Installation and maintenance of biomass systems	YES	YES	-
	Installation and maintenance of heat pumps and shallow geothermal systems *	YES	YES	YES
	Installation and maintenance of solar systems for heating and air-conditioning	YES	YES	-
	Installation of solar protection systems	NO	NO	-
Small priority	Installation and maintenance of mechanical ventilation systems	YES	NO	-
	Installation and maintenance of automation systems and electronic monitoring and control systems for central heating and cooling and air-conditioning appliances, including BMS ***	NO	NO	YES
Low priority	Installation and maintenance of solar systems for domestic hot water	YES	YES	-
	Installation and maintenance of central heating or other types of heating	YES	NO	-
	Installation and maintenance of cooling and air-conditioning appliances *	YES	NO	YES

* Regulations for the occupation of Air-conditioning and refrigeration mechanics.

**Regulated occupation for Electricians. The installation of systems may be performed by other occupations such as Plumbers, according to Directive 2009/28/EC.

*** Regulations for the occupation of Building electrician.

4.2. Financing

The continuing economic crisis has led to a slowdown in the Construction sector, which hinders the effort for the development and training of the employees, as financial survival is a priority for the sector's enterprises and the self-employed. At the time, education, training and the acquisition of skills may be considered to be an unnecessary luxury, especially if it requires additional expenses.

Furthermore, the self-employed are not covered by the sphere of competence of the HRDA, as they do not contribute the relevant levy to the Human Resource Development Fund, and therefore they cannot be subsidized for their participation in continuing vocational training programmes. This arrangement, results in the self-employed having to bear the full cost of their training and specialization, which is an additional barrier.

Additionally, due to the negative impact of the economic crisis on public finances, the financing of training activities for large numbers of people can be considered as a barrier.

For this purpose, it is necessary for now to use the existing training structures to the greatest possible extent and to incorporate the required skills in the current vocational education and training system, whereas the possibility of financing training through European funds must be examined.

Regarding the self-employed, it is suggested to examine the possibility of including them in the sphere of competence of the HRDA and to encourage them to organize continuing vocational training programmes through the professional associations to which they are registered in order to allocate the total cost to all members.

4.3. Implementation of Town Planning and Building Regulations

The relatively poor enforcement of town planning and building regulations by the competent authorities is an important barrier to the achievement of the national targets and the effective contribution of the Construction sector. The selective implementation of the Streets and Buildings Law, the inherent weaknesses in the enforcement of the building regulations and the deviations observed in the application of the minimum requirements of energy performance lead to irregularities and low quality in construction. Additional problems originate from the subcontracting of projects by competent contracting companies, which assign contracted works to less competent companies.

To tackle this issue, a possible solution would be to establish a central body of building inspectors with extensive duties to supervise and control the implementation of the legislation

relating to the construction of buildings including energy efficiency. This body of inspectors could function complementary to the existing authorities responsible for the enforcement of the building legislation and thus relieving significantly the workload of the local authorities and other relevant bodies and assisting in the full implementation of the legislation.

Significant contribution to the effort for the implementation of the building legislation is expected through the recently formed Advisory Board for the promotion of energy saving in buildings and the promotion of nearly zero energy buildings in the context of the law on the Energy Performance of Buildings.

On the basis of the provisions of the relevant law, the Advisory Board advises the Minister of Commerce, Industry and Tourism for the improved implementation of the legislation and prepares and recommends measures and incentives to increase the energy efficiency of existing buildings, the promotion of nearly zero energy buildings, the implementation of energy saving measures in buildings occupied by public authorities and to inform the public on energy saving issues in buildings.

4.4. Incentives to increase the demand for energy efficiency systems and RES

An important component in the effort to upgrade the skills of craftsmen in the Construction sector is the expansion of the market demand for the installation and maintenance of energy efficiency and renewable energy systems through the provision of incentives to both the enterprises of the sector and consumers. The increase in demand is expected to act as a catalyst for the attraction of young people to the sector and to upgrade the skills of the existing workforce to cover the expected needs.

Consumers, particularly because of the relatively high initial capital cost for the installation of energy efficiency systems and RES in buildings but also due to the lack of information about the advantages and benefits they provide, are mainly limited to the application of the systems required by law. Additionally, the slow diffusion and penetration of these technologies in Cyprus and the small market size have resulted in the limited demand for these systems and the lack of a critical mass of enterprises for their installation and a limited number of skilled workers.

Considering all the above, it is suggested to consider the possibility of reintegration of the thematic of energy conservation and thermal insulation of buildings in the Grants Schemes of The Special Fund for promoting Energy Conservation and utilization of RES of the Ministry of Commerce, Industry and Tourism as well as a reduced rate of VAT on major energy renovations.

The return of the saving energy and thermal insulation thematic in the Grants Scheme should be accompanied by significant changes in the provisions of the plan. Specifically, it should cover existing legal requirements for insulation and gradually the increased future requirements in accordance with the Law on the Energy Performance of Buildings and the Law for the Promotion of Renewable Energy and as the same time promote the increase of the number of nearly zero energy buildings.

As regards to the reduced VAT rate for major energy renovations, it is estimated that the cost reduction will be an incentive for energy upgrading of the existing stock of buildings by

installing energy saving systems or technical high performance systems. This will result in increased demand for energy efficient technical systems and RES and thereby help increase the number of trained technicians to cover the demand.

4.5. Technical Vocational Education and Training Infrastructure and Trainers

A potential barrier in the effort to upgrade the skills of craftsmen in the Construction sector is the quantitative and qualitative adequacy of the existing vocational education and training infrastructure for skilled workers in the Construction sector and their training equipment. Obtaining the necessary skills requires suitable workshop infrastructure, where apart from the theoretical education, practical training will be provided for each subject/skill.

For this purpose, it is necessary to upgrade and modernize the existing infrastructure and training programmes, so that they conform to technological advancements and market trends. Moreover, despite the economic constraints and the difficult conditions in the Construction sector due to the economic crisis, the creation of new vocational training centres must be examined, in order to meet any quantitative training needs that may arise.

Additionally, the knowledge and skills of trainers must be upgraded and enriched through suitable training programmes in order to conform to the planned changes in the curriculum. Their participation in the System of Vocational Qualifications for their certification as trainers should be also examined, in order to ensure the quality and the upgrade and systematic provision of training.

5. Information, awareness and dissemination of results

Prerequisite for the successful implementation of the Roadmap is the dissemination of the findings of the Build Up Skills - Cyprus project with primary emphasis on the identified training needs. The aim of this action is to enable the competent authorities and the social partners within their sphere of competence to contribute to the achievement of the targets of the Roadmap, to inform organizations, enterprises and professional associations operating in the sector, to mobilize the training institutions and business consultants to promote human resource development and training actions on issues relating to energy and buildings and finally to inform and raise awareness to the general public.

5.1. Gatherings with government stakeholders and social partners

Gatherings with relevant governmental and other stakeholders and social partners will be scheduled and held to present the findings of the project and of the Roadmap with particular emphasis on emerging training needs. Their aim is to initiate creative discussion and exchange of views so that these **stakeholders, acting within their competences, to actively promote the idea of upgrading the skills of the technical workforce in the Construction sector** and to encourage the installation of equipment and systems for heating, cooling and RES during the planning, design, building and refurbishment process of industrial and residential areas or other developments. An indicative list of such stakeholders is the following:

- Ministry of Labour and Social Insurance
- Ministry of Education and Culture
- Ministry of Commerce, Industry and Tourism
- Ministry of the Interior
- Department of Planning
- Department of Public Works
- Association of Municipalities
- Employer organizations and links
- Trade Union organizations

5.2. Gathering with organizations and enterprises operating in the Construction sector

A gathering with organizations and enterprises operating in the Construction sector will be arranged to present the findings of the project and the Roadmap with particular emphasis on the emerging training needs and the legislative regulation of the qualifications of installers of technical systems and small-scale renewable energy systems in buildings. The aim is to **inform the organizations and enterprises** of the need to train and upgrade the skills of their employees in order to be prepared for both the construction of new buildings and the energy renovation of existing buildings to meet the requirements for nearly zero energy buildings by 2020.

5.3. Gathering with professional associations of the Construction sector

A gathering with the professional associations relevant with the Construction sector, such as ETEK, the Association of Mechanical Engineers and the Association of Civil Engineers and Architects, will be arranged to present the findings of the project and the Roadmap as well as the national energy targets and requirements for buildings until 2020. The aim is to inform them about the **need to train and upgrade the skills of craftsmen in the Construction sector**, as well as **the skills of the scientific personnel**, such as architects and engineers, so they will be prepared for both the construction of new buildings and the energy renovation of existing buildings to meet the requirements for nearly zero energy buildings by 2020. Additionally, through their employment status, they will be able to inform their clients about the benefits of the use of energy efficient systems or RES, thus contributing towards the achievement of the set targets.

5.4. Gathering with training institutions and business consultants

A gathering with the training institutions and organizations and business consultants will be arranged to present the findings of the project and the Roadmap with particular emphasis on the emerging training needs. The aim is to raise awareness and mobilize them into **planning and implementing training programmes** that will help craftsmen in the Construction sector to acquire the necessary knowledge and skills to contribute to the achievement of the national energy targets for 2020.

5.5. Information and public awareness

Information sessions for the public will be arranged with the participation of other relevant agencies and organizations, which will present the findings of the project and the Roadmap, the national targets and commitments by 2020, such as nearly zero energy buildings, and will highlight the advantages and benefits of using energy efficient systems and RES in buildings. The aim is to **raise awareness and inform the public** of the need to upgrade the skills of the workforce and the benefits arising from energy upgrade of buildings.

6. Conclusions

The **Roadmap** constitutes the second deliverable of the national consortium Build Up Skills - Cyprus and is based on the results and conclusions of the report "Analysis of the National Status Quo". The aim of the Roadmap is to identify, analyze and promote all major actions and measures needed in order to promote the necessary vocational education and training of craftsmen in the Construction sector and other related sectors and address the identified barriers and obstacles for the achievement of the relevant national targets for energy and buildings by 2020.

In this context, taking into consideration the quantitative and qualitative estimates on skills needs as well as the barriers and obstacles that have been identified, recommendations and measures are put forward on the basis of three main pillars of action aimed at upgrading the skills of craftsmen in the Construction sector. The three pillars of action focus on education, training and certification of craftsmen, the tackling of the main challenges in the effort to upgrade their skills and the information and awareness of the relevant stakeholders, employers, trade unions and professional organizations and the public in general.

As can be concluded from the analysis of the vocational education and training system and the certification framework, the need to implement training programmes for skills that are covered satisfactorily by the vocational education system is limited as both the majority of the existing technical workforce as well as new graduates are considered to be adequately proficient for these specific skills. Moreover, the relevant Standards of Vocational Qualifications for these skills are already available for utilization.

Contrary, for relatively new skills that are not yet included in the curricula of the vocational education system, it was found that there are significant training needs for the technical workforce which are expected to be covered by the vocational training system and additionally the relative Standards of Vocational Qualifications do not cover or only partially cover these skills.

Regarding the legislative framework governing the qualifications of technical installers, it seems that despite the existence of relevant laws to harmonize with EU directives, their implementation has not yet started, due to the lack of relevant regulations to regulate their qualifications. However, it is expected that the legislative regulation will be supportive of the objectives of the Build Up Skills project as it will regulate the qualifications of installers of technical systems and small-scale renewable energy systems in buildings, while at the same time, a relevant register will be maintained by the competent authority.

Significant benefits are also expected from the proposal to link the legislative regulations with the Standards of Vocational Qualifications. The benefits include resource conservation and the simplification of procedures, since a craftsman that is evaluated in the framework of the System of Vocational Qualifications will meet the legislative requirements and can be registered in the relevant register.

An important obstacle in the effort to upgrade the skills of craftsmen is the continuing economic crisis and its negative impact on public finances but also on the enterprises and the self-employed of the Construction sector. For this purpose, it is necessary for now to use the existing training structures to the greatest possible extent and to incorporate the required skills in the current vocational education and training system, whereas the possibility of financing training through European funds, such as the European Social Fund, must be examined. Additionally, the possibility of including the self-employed in the sphere of competence of the HRDA must be examined and to encourage them to organize continuing vocational training programmes through the professional associations to which they are registered in order to allocate the total cost to all members.

In order to address the phenomenon of the relatively poor enforcement of town planning and building regulations by the competent authorities, which leads to building irregularities and lower quality construction, it is suggested to establish a central body of building inspectors with extensive duties to supervise and control the implementation of the legislation relating to the construction of buildings including their energy efficiency and which will function complementary to the existing authorities.

An important component in the effort to upgrade the skills of craftsmen in the Construction sector is the expansion of the market demand for the installation and maintenance of energy efficiency and renewable energy systems through the provision of incentives to both the enterprises of the sector and consumers. For this purpose, it is suggested to consider the possibility of reintegration of the thematic of energy conservation and thermal insulation of buildings in the Grants Schemes of The Special Fund for promoting Energy Conservation and utilization of RES of the Ministry of Commerce, Industry and Tourism as well as a reduced rate of VAT on major energy renovations.

Another potential barrier is the quantitative and qualitative adequacy of the existing vocational education and training infrastructure and their training equipment. For this purpose, it is necessary to upgrade and modernize the existing infrastructure and training programmes, so that they conform to technological advancements and market trends. Moreover, the creation of new vocational training centres must be examined, in order to meet any quantitative training needs that may arise for new skills.

Additionally, the knowledge and skills of trainers must be upgraded and enriched through suitable training programmes in order to conform to the planned changes in the curriculum. Their participation in the System of Vocational Qualifications for their certification as trainers should be also examined, in order to ensure the quality and the upgrade and systematic provision of training.

Finally, it is foreseen that the main action pillar for the successful implementation of the Roadmap is the dissemination of the findings of the project Build Up Skills - Cyprus with primary emphasis on the emerging training needs. The aim is to initiate actions by the competent authorities and the social partners, to inform organizations, enterprises and professional associations that are active in the sector, to mobilize the training institutions and business consultants and to inform and raise awareness to the general public.

Appendix 1 presents the main actions and measures required for the promotion of the necessary vocational education and training of craftsmen in the Construction sector and related sectors and to address the identified barriers and obstacles in the upgrading of the skills of the workforce. The actions and measures have been classified into three main action pillars that cover the topics of **education, training and certification of craftsmen**, the **main challenges in the effort to upgrade their skills** and the **information and awareness of the relevant stakeholders, employers, trade unions and professional organizations and the public in general**, as they have been presented in the report. Also, the proposed stakeholders and timeframe for implementation are presented.

ANNEXES

ANNEX 1
TABLE OF ACTIONS AND MEASURES

Axis 1: Education, training and certification

Action	Stakeholder	Timeframe	Comments
Installation and maintenance of photovoltaic systems : Enrichment and upgrading of the initial training programme carried out by the CPC and implementation of 12 training programmes with the participation of 15 persons per programme. Examine the possibility of introducing the skill in the curricula of the initial vocational education in Technical Schools and upgrading the specialisation offered by the Post-Secondary Institutes of Vocational Education and Training as a senior technical specialty or supervisor.	HRDA, CPC Ministry of Education and Culture	2013-2020	There is no vocational standard covering the skill and a harmonizing draft bill has been promoted to Parliament which includes a provision for the certification of PV installers.
Placement of conventional thermal insulation / thermo-insulation plaster: Design and implementation of 50 training programmes with the participation of 15 persons per programme. Upgrade and enrich the curricula of the initial vocational education programme for Building at Technical Schools and at the Apprenticeship System so as to include the use of thermo-insulation plaster and the practical application of conventional insulation in masonry.	HRDA, training institutions and organizations Ministry of Education and Culture	2013-2020	The Standard of Vocational Qualification for Building (Levels 2 and 3) includes the placement of conventional thermal insulation while there is no mention in the use of insulating plaster. There is no legislative regulation of the skill.

Action	Stakeholder	Timeframe	Comments
Installation of external thermal insulation: Design and implementation of 10 training programmes with the participation of 15 persons per programme. Upgrade and enrich the curricula of the initial vocational education programme for Building at Technical Schools and at the Apprenticeship System so as to include the specific skill.	HRDA, training institutions and organizations Ministry of Education and Culture	2013-2020	There is no vocational standard covering the skill. There is no legislative regulation of the skill.
Installation of Doors and Windows: Design and implementation of 8 training programmes with the participation of 15 persons per programme. Upgrade and enrich the curricula of the initial vocational education programmes for Welding and metal construction as well as Building at Technical Schools and at the Apprenticeship System so as to include the specific skill.	HRDA, training institutions and organizations Ministry of Education and Culture	2013-2020	There is no vocational standard covering the skill. There is no legislative regulation of the skill.
Installation and maintenance of biomass systems: Design and implementation of 5 training programmes with the participation of 15 persons per programme. Introduce the skill in the curricula of the initial vocational education programme for Plumbing and specifically at Technical Schools and/or in the curriculum of the Post-Secondary Institutes of Vocational Education and Training.	HRDA, training institutions and organizations Ministry of Education and Culture	2013-2020	There is no vocational standard covering the skill and a harmonizing draft bill has been promoted to Parliament which includes a provision for the certification of biomass systems installers.

Action	Stakeholder	Timeframe	Comments
Installation and maintenance of heat pumps and shallow-depth geothermal systems: Design and implementation of 7 training programmes with the participation of 15 persons per programme. Upgrade and enrich the curricula of the initial vocational education programme for Plumbing and specifically at Technical Schools and/or introduce the skill in the curriculum of the Post-Secondary Institutes of Vocational Education and Training.	HRDA, training institutions and organizations Ministry of Education and Culture	2013-2020	Partially covered by the Standard of Vocational Qualification for Central heating systems (Level 2) and a harmonizing draft bill has been promoted to Parliament which includes a provision for the certification of shallow geothermal systems and heat pumps installers.
Installation and maintenance of solar thermal systems for space heating and air conditioning: Design and implementation of 3 training programmes with the participation of 15 persons per programme. Introduce the skill in the curricula of the initial vocational education programme for Plumbing and specifically at Technical Schools and/or in the curriculum of the Post-Secondary Institutes of Vocational Education and Training.	HRDA, training institutions and organizations Ministry of Education and Culture	2013-2020	There is no vocational standard covering the skill and legislative regulations are expected to regulate the qualifications of installers in accordance with the Law on the Energy Performance of Buildings.
Installation of solar protection systems: Design and implementation of 6 continuing training programmes with the participation of 15 persons per programme. Upgrade and enrich the curricula of the initial vocational education programmes for Welding and metal construction as well as Building at Technical Schools and at the Apprenticeship System so as to include the specific skill.	HRDA, training institutions and organizations Ministry of Education and Culture	2013-2020	There is no vocational standard covering the skill. There is no legislative regulation of the skill.

Action	Stakeholder	Timeframe	Comments
Installation and maintenance of mechanical ventilation systems: Design and implementation of 8 training programmes with the participation of 15 persons per programme. Upgrade and enrich the course for the ventilation systems for the specialisation of Plumbing, heating and cooling systems at Technical Schools so as to include the installation of mechanical ventilation systems.	HRDA, training institutions and organizations Ministry of Education and Culture	2013-2020	Included in the Standard of Vocational Qualification for Cooling and air conditioning systems (Level 2) and legislative regulations are expected to regulate the qualifications of installers in accordance with the Law on the Energy Performance of Buildings.
Installation and maintenance of automation and electronic monitoring and control systems: Design and implementation of 10 training programmes with the participation of 15 persons per programme. Upgrade and enrich the curricula of the specialisation Plumbing, heating and cooling systems and of all the specialisations of the branch of Electrical Engineering at Technical Schools.	HRDA, training institutions and organizations Ministry of Education and Culture	2013-2020	There is no vocational standard covering the skill. There is no legislative regulation of the skill.

Axis 2: Overcoming Barriers and Gaps

Action	Stakeholder	Timeframe	Comments
Absence of a regulatory framework for technical occupations: Preparation of the relevant regulations for the qualifications of installers of technical systems and small-scale renewable energy systems in buildings in accordance with the provisions of the Law on the Energy Performance of Buildings and of the draft harmonizing bill promoted to Parliament for the Promotion of RES and their link where possible with the existing Standards of Vocational Qualifications covering the specific skill. Preparation or upgrade of Standards of Vocational Qualifications and promotion of vocational education and training of craftsmen to meet the needs of skills that are not regulated by law or applicable certification process.	Energy Service HRDA	2013-2020	The critical skills that are not regulated by legislation or applicable certification process are: • Placement of conventional thermal insulation / thermo-insulation plaster • Installation of external thermal insulation • Installation of Doors and Windows • Installation of solar protection systems • Installation and maintenance of automation and electronic monitoring and control systems
Financing: Use to the greatest possible extent of the existing training structures and incorporation of the required skills in the current vocational education and training system. Examination of the possibility of financing training through European funds such as the European Social Fund. Examine the possibility of including the self-employed in the sphere of competence of the HRDA and encouragement to organize continuing vocational training programmes through the professional associations to which they are registered.	Ministry of Labour and Social Security, Ministry of Education and Culture, HRDA Planning Bureau, Ministry of Labour and Social Insurance HRDA	2013-2020	-

Action	Stakeholder	Timeframe	Comments
Implementation of Town Planning and Building Regulations: Establishment of a central body of building inspectors with extensive duties to supervise and control the implementation of the legislation relating to the construction of buildings including energy efficiency. Preparation and recommendation of measures and incentives by the Advisory Board for the promotion of energy saving in buildings and the promotion of nearly zero energy buildings.	Ministry of Interior, Energy Service, Department of Planning, Department of Public Works, Association of Municipalities	2013-2020	-
Incentives to increase the demand for energy efficiency systems and RES: Examine the possibility of reintegration of the thematic of energy conservation and thermal insulation of buildings in the Grants Schemes of The Special Fund for promoting Energy Conservation and utilization of RES of the Ministry of Commerce, Industry and Tourism as well as a reduced rate of VAT on major energy renovations.	Energy Service, Ministry of Finance	2013-2020	The provisions of the plan should cover existing legal requirements for insulation and gradually the increased future requirements for nearly zero energy buildings.
Technical Vocational Education and Training Infrastructure and Trainers: Upgrade and modernize the existing infrastructure and training programmes, so that they conform to technological advancements and market trends. Creation of new vocational training centres to meet any quantitative training needs that may arise in new skills.	Ministry of Labour and Social Security, Ministry of Education and Culture, HRDA	2013-2020	

Action	Stakeholder	Timeframe	Comments
Upgrade and enrich the knowledge and skills of trainers through suitable training programmes in order to conform to the planned changes in the curriculum. Participation of trainers in the System of Vocational Qualifications for their certification as trainers			

Axis 3: Information, awareness and dissemination of results

Action	Stakeholder	Timeframe	Comments
Gatherings with government stakeholders and social partners: Gatherings with relevant governmental and other stakeholders and social partners will be scheduled and held to present the findings of the project and of the Roadmap with particular emphasis on emerging training needs	Energy Service	2014	Indicative list of stakeholders who will participate in the gatherings are: • Ministry of Labour and Social Insurance • Ministry of Education and Culture • Ministry of Commerce, Industry and Tourism • Ministry of the Interior • HRDA • Department of Planning • Department of Public Works • Association of Municipalities • Employer organizations • Trade Union organizations
Gathering with organizations and enterprises operating in the Construction sector: A gathering with organizations and enterprises operating in the Construction sector will be arranged to present the findings of the project and the Roadmap with particular emphasis on the emerging training needs and the legislative regulation of the qualifications of installers of technical systems and small-scale renewable energy systems in buildings	OSEOK, OEB, CCCI.	2014	-

Action	Stakeholder	Timeframe	Comments
Gathering with professional associations of the Construction sector: A gathering with the professional associations relevant with the Construction sector will be arranged to present the findings of the project and the Roadmap as well as the national energy targets and requirements for buildings until 2020	Energy Service	2014	Indicative list of stakeholders who will participate in the gatherings are: • ETEK • Association of Mechanical Engineers • Association of Civil Engineers and Architects
Gathering with training institutions and business consultants: A gathering with the training institutions and organizations and business consultants will be arranged to present the findings of the project and the Roadmap with particular emphasis on the emerging training needs	HRDA, training institutions and organizations, Business consultants	2014	-
Information and public awareness: Information sessions for the public will be arranged with the participation of other relevant agencies and organizations, which will present the findings of the project and the Roadmap, the national targets and commitments by 2020 and will highlight the advantages and benefits of using energy efficient systems and RES in buildings	Energy Service, ETEK OSEOK, OEB, CCCI.	2014	-

ANNEX 2
LEGISLATIVE REGULATIONS

Law N.202 (I) / 2012 (Amendment) on the Energy Performance of Buildings

The amendment of the Regulation of the Energy Performance of Buildings Act has been recently approved to harmonize with EU Directive 2010/13/EC. The law contains several provisions with regard to building's technical systems including the proper installation, sizing, adjustment and control in order to optimize their energy use. The technical systems include at least the following systems:

- Heating Systems
- Hot water system
- Air conditioning systems
- Large ventilation systems

The law also provides for the right of the Council of Ministers to issue regulations which will govern the qualifications, duties and responsibilities of installers of technical systems in buildings as well as the establishment of a relevant register of installers by the competent authority (Energy Service). The regulations, although not specified in the law, may be separate for each category of technical systems. The law also specifies that the regulation and control of heating and air conditioning systems must be performed by a licensed technical systems installer who must issue a relevant certificate to the owner of the building.

The Act also contains provisions for the issuance of regulations for inspectors of heating systems and inspectors of air conditioning systems. The regulations intend to regulate the qualifications of inspectors, their obligations and duties and the procedures to be followed for the inspection of the systems.

In summary, the competent authority will be promote in the future regulations regarding:

- Installers of building's technical systems
- Inspectors of heating systems
- Inspectors of air conditioning systems

Moreover, the competent authority (Energy Agency) is responsible for the content and management of the registers for both the technical systems installers and of the inspectors of heating systems and air conditioning systems or any other registry it considers should be maintained for the proper management of the inspections control system.

Draft Law to Promote and Encourage the Use of Renewable Energy

The draft law in reference constitutes the transposition of EU Directive 2009/28/EC on the promotion and encouragement of the use of energy from renewable sources. The law explicitly states the national set targets for the contribution of RES in the gross final energy consumption by 2020 and the share of energy from renewable sources in all forms of transport.

In order to achieve the set targets, the energy efficiency of buildings and energy saving is promoted and encouraged through the following laws:

- The Promotion of energy efficiency in buildings Act of 2006 (which has been modified with the aforementioned Act Amending the Energy Performance of Buildings)
- The Promotion of Cogeneration Act of 2006
- The Energy Performance of End-Use Efficiency and Energy Services Law of 2009

According to the harmonizing bill, the competent authority, according to the provisions of the Recognition of Professional Qualifications Act, may issue licenses for installers of small-scale biomass boilers or stoves and solar and photovoltaic and solar thermal systems or shallow geothermal systems and heat pumps which will certify the competence of installers according to the regulations to be issued by the Council of Ministers. The regulations also specify the qualifications, knowledge, obligations and duties of the installers as well as the programme and content of their training.

It is also noted that the competent authority is required to maintain a register of installers of renewable energy systems and upon request, must evaluate the relevant qualifications or certification of an installer from another Member State and to decide on his/her registration to the Register.

The law also provides that the Council of Ministers will issue regulations which will include:

- The qualifications, skills, obligations and duties of the installers.
- The procedure, terms and conditions for the issuance, renewal, expiration, suspension and termination of the license and registration of the installer in the register.
- The determination of the categories of the licensed installers and the scope of work of each category, as well as the specific requirements for each category.
- The content and manner of maintaining the register of installers and any other registry that the competent authority considers necessary to implement the Act.
- The programme and content of the basic training of installers of biomass systems, heat pumps, shallow geothermal, solar photovoltaic systems and thermal solar systems.