

BUILD UP Skills Malta

National Roadmap for Energy Training of Workers in the Building Industry

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Building Industry Consultative Council**

Project partners:



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List of abbreviations and acronyms

BICC	Building Industry Consultative Council
BRO	Building Regulations Office
CEDEFOP	European Centre for the Development of Vocational training
CVET	Continuous Vocational Education and Training
EC	European Commission
EE	Energy Efficiency
EPBD	Energy Performance Building Directive
EPC	Energy Performance Certificate
ESD	Education for Sustainable Development
ETC	Employment and Training Corporation
EQF	European Qualifications Framework
EU	European Union
FoBC	Federation of Building Contractors
HE	Higher Education
HVAC	Heating, Ventilation and Air Conditioning
ILO	International Labour Office
IVET	Initial Vocational Education and Training
MCAST	Malta College of Arts, Science and Technology
MRA	Malta Resources Authority

MQF	Malta Qualifications Framework
NCHFE	National Commission for Higher and Further Education
RES	Renewable Energy Sources
SMEs	Small and Medium Enterprises
STEM	Science, Technology, Engineering and Mathematics
VET	Vocational Education and Training

1. Introduction

Malta is committed to make significant reductions in its energy consumption. It is recognised that to achieve these targets a new approach towards the construction of new buildings as well as retrofitting activities must be implemented. This means that those working in or entering the construction sector will require new knowledge, skills and competences to achieve the required standards.

The Roadmap for energy training sets out the strategy and action plan for bringing the knowledge, skills and competences of construction workers to the level that will allow them to produce low energy buildings meeting the latest requirements and, therefore, contribute significantly to Malta's energy reduction targets. It addresses not only the training and qualification issues, but proposes the associated measures required for successful implementation of the training.

The Roadmap for energy training has five main objectives:

1. Investigate EU policy documents, legislation and directives focusing on low carbon buildings and associated VET skills
2. Identify the knowledge, skills and competences needed for low carbon buildings
3. Evaluate critically the low carbon skill gaps that exist within the local VET scenario

For the first three objectives, the outcome is a skill gap analysis for six specific occupational profiles.

4. Analyse the barriers that might hinder local VET provision towards low carbon buildings. These have been structured into five main themes.
5. Formulate recommendations of how VET may be carried out to achieve low carbon buildings. Nine main recommendations are drawn up and for each a rationale and specific actions measures are proposed.

2. Background

The National Status Quo Report was the first document published by the consortium forming the BUILD UP Skills Malta Project. The research carried out for the report indicates that within the green construction industry a number of skill and knowledge gaps exist. These gaps could potentially hinder the country's efforts to increase the energy efficiency of building stock and consequently reach the 2020 EU energy targets. This overview brings together all the observations and conclusions from the entire report and forms the backbone of the National Qualifications Roadmap, which aims to set a predetermined path for Malta to follow to reach its energy targets.

Lack of Data and Awareness

A lack of specific data pertaining to green jobs, employment and skills was evident from the start of the project. The available data relates to the construction industry as a whole and is not subdivided according to specific activities. This is emphasised by the lack of a formal definition for the green construction industry, green jobs and green skills, which has led to further misconceptions about this specific industry. The results have indicated low levels of awareness about RES and EE systems and the benefits of their use. The consequence of this has caused companies to be cautious of investing in the relevant training, until consumer awareness and demand has increased. The lack of consumer demand therefore becomes a barrier for VET providers and can be solved by adopting a number of measures, which are elaborated upon within this document.

Training

Different approaches to the provision of training by stakeholders have been noted during the collection of data. While some of the stakeholders within the industry choose to send their employees to their principals overseas for training, a small portion does not understand the importance of training in their line of work. A lack of

initiative to attend training was also identified by the workforce and some employers have attempted to solve this by offering free training on condition the workers passed the relevant examinations. Although the benefits are widely understood, since formal training is not mandatory, a small portion of the interviewed stakeholders feel that the informal training received on site is sufficient. This is further aggravated by the fact that the sector is largely made up of micro companies. For such companies training may be a considerable strain on their human resources and financial capacities of the firms. Funding initiatives related to training must cater for firms of all sizes and should account for potential participation barriers. A variety of barriers, both direct and indirect are discussed at length in Section 4 of this document. The local VET provisions are regularly updated and include training about the latest building systems. The institutions providing this training should conduct forecasting exercises to identify future areas of growth and address identified needs appropriately. The training provisions for site workers needs to be updated to include training to anticipate future needs as well as cross cutting skills, which is discussed in Section 3 of this report. The opening of VET courses every other year is acceptable when the feasibility threshold is not met. Temporary apprenticeships or placements within the sector should be provided until the course reopens, enabling workers to get an insight into the industry. To reduce fluctuations in the demand for CVET, the introduction of mandatory attendance of CPD for tradesmen could be an option that would require further research.

Enforcement of Existing Legislation

The general consensus is that there is insufficient enforcement of existing legislation related to energy efficient construction. This has led to a lack of coordination within the industry with some stakeholders abiding to the required regulations, whilst others choose not to. The most alarming issue is related to the extreme lack of awareness that exists about the EPC system. If enforced, it is felt it could have a very positive effect on the industry by increasing employment and economic activity, whilst simultaneously contributing positively to the energy targets. Once appropriately

enforced, the efficiency of a building will become a marketing tool as current legislation states that a certificate must be issued during the construction, sale or rental of a property.

Accreditation and Skill Cards

The recommended introduction of the skills card system, in Section 5, would significantly facilitate the process of accreditation as it is essentially a document that lists the competences of each individual. The accreditation process and the introduction of the skill card could benefit all the stakeholders within this industry. The introduction of the skill card system and accreditation of existing skills would benefit nationals and non-nationals alike. The local construction industry must not underestimate the value of non-national workers in this industry. The flexibility of non-national workers to fill gaps wherever they may be required and their habitual good work ethic means that they are an asset to the local industry.

Required Workforce

The need to draft occupational profiles for the construction industry has been made very clear, as they play a critical role in the preparation of the workforce to reach the EU's 2020 energy targets. Feedback received directly from stakeholders has enabled the drafting of five proposed occupational profiles, as outlined by the Malta Qualification Framework. Each proposal is accompanied by the requirements for the each of the following criteria; namely the required knowledge, skills, competences and the desired learning outcomes. The tabulated data was collected from all the data sources utilised for the drafting of this report. This data represents the size of the current workforce, the current output from the VET providers and also the additional workforce required to reach the EU's 2020 targets. This data is critical and has been studied extensively to ensure the feasibility of all presented recommendations in Section 5 of this Roadmap.

Current Workforce	
Number of workers in the construction industry	11,099 ¹
Number of workers in the target group	4,885 ²
Number of persons entering the labour force after IVET	161
Number of persons trained per year - CVET	386

Table 1: The Size of the Current Workforce within the Construction Industry

Proposed Workforce	Low Estimate	High Estimate
Percentage of the workforce requiring training	75%	100%
Number of workers requiring training in RES and EE by 2020	3,664	4,885
Number of workers requiring training per year (2013-2020)	523	698

Table 2: The Size of the Proposed workforce for the construction industry

Industry Growth

Although a recent decrease in the rate of construction and employment has been experienced, the data collected at the initial stages of this project has indicated strong potential for growth in the eco-construction sector of the industry within the next five years. It is therefore felt that the country needs to pre-empt these requirements and address any shortages in the provision of VET before the possible sudden surge in demand. The introduction of a strategy for the way forward is required which must reflect the needs of both public as well as private stakeholders. The process of carrying out such tasks must be facilitated to ensure increased demand by consumers which in turn may lead to a possible increase in attendance at relevant VET training. For healthy economic growth to be experienced a number of issues need to be dealt with which have been discussed within the entirety of the report. These deal with a variety of issues ranging from the need to draft appropriate occupational profiles, to the need introduce the skill cards system and mandatory CPD.

3. EU policy context

Europe's 2020 headline targets outlined in the 2020 strategy include the reduction of GHG emissions, the increase of renewable energy share and increase of energy efficiency, all by 20%. Simultaneously, shifting towards a low carbon economy, accelerating innovative technical solutions, and enhancing Europe's competitiveness, are sought objectives of EU policy documents.

In order to boost economic growth, and hence develop high quality jobs, EU policy provides a specific focus on information and training, and recommends a country specific response strategy in order to achieve national targets. As a central task of this work three specific EU directives (Directive 2012/27/EU on energy efficiency, Directive 2010/31/EU on the energy performance of buildings, and Directive 2009/28/EC on the promotion of the use of renewable sources) were reviewed. The main objective was to identify the key thematic areas linked with low carbon buildings.

This section provides a concise overview of each directive, and more importantly highlights the main thematic areas identified from the directives. These thematic areas provide the basis of the content analysis exercise.

Energy performance building directive (EPBD)

The EPBD sets ambitious targets in stating that all new buildings should be nearly zero energy by 2020. Additionally, all new public buildings should reach this target by 2018. This directive recognises the critical importance of installers and builders, particularly in the implementation phase of the directive itself.

This directive also defines a clear methodology to calculate the energy performance of buildings, subject to minimum requirements set by each respective EU member state. Moreover, the EPBD places particular emphasis on the calculation of cost-optimal levels of minimum energy requirements for buildings.

Energy performance certificates, together with optimisation of technical building systems, are the main features of this directive. Four main thematic areas from this directive were identified and are represented in table 3.

Theme	Thermal performance	Technical building systems	Passive elements	Energy
Associated technical issues	Thermal capacity Insulation Passive heating Cooling elements Thermal bridging	Heating installations Hot water supplies Air conditioning installations Ventilation systems	Natural lighting Shading Design, positioning and orientation Climatic conditions Passive solar systems	Electricity by co-generation District or block heating/cooling Heat pumps Decentralised systems based on renewable sources

Table 3 : Thematic areas identified from the EPBD (EU, 2010).

Energy efficiency directive

The aim of the energy efficiency directive is to establish a common framework of measures that will enable EU member states to achieve the target of 20% energy efficiency improvement. Additionally, in line with EU 2020 strategy, it aims at promoting smart, sustainable and inclusive growth. It also targets the development of high quality jobs in several sectors related to energy efficiency.

While a country specific response strategy in achieving the improved energy efficiency target is recommended, an integrated approach to energy efficiency measures is required. In particular, a strong emphasis on energy saving opportunities within the building stock is made. Energy performance in buildings, the renovation construction market, and associated training provision are strongly stressed in this directive.

Table 4 below outlines the main themes embedded within this directive to formulate an integrated approach towards improving energy efficiency.

- Improving energy performance in buildings
- Creating cost effective building renovations
- Training and qualification schemes
- Energy auditing
- Energy management systems
- Co-generation and district heating
- Energy efficient obligation schemes
- Promoting of efficiency in heating and cooling
- Energy services

Table 4: Main themes embedded within the Energy efficiency directive (Source: EU, 2012)

Renewable energy directive

Moving towards decentralised energy generation, apart from increasing security of energy supply and reducing energy transmission losses, also contributes to reducing energy consumption derived from fossil fuels. In fact the RES directive, which sets a minimum target of 20% renewable energy share, aims to promote use of renewable energy sources also within buildings. Specifically the RES directive states that:

Information and training gaps, especially in the heating and cooling sector, should be removed in order to encourage the deployment of energy from renewable sources.

Additionally, this directive places an obligation on EU member states to ensure certification schemes for installers. Moreover, RE installers should be certified through specific training programmes, as summarised in table 5 below.

Technology	Occupational profiles	Training needs
Biomass	Plumber Pipe-fitter Heating engineer/technician	Market situation of biomass Ecological aspects Design, installation and maintenance of biomass boilers and stoves Knowledge of related European standards
Heat pump/ Shallow geothermal	Plumber Refrigeration engineer/technician	Market situation Basic understanding of physical and operational principles of heat pumps Design, install and maintain heat pump systems
Solar photovoltaic and Solar thermal	Plumber Electrician	Market situation Characteristics of solar systems Design, install and maintain solar systems

Table 5: Certification demands for renewable energy installers (Source: EU, 2009)

4. Skill gap analysis

This section presents the results of a skills gap analysis that was conducted. The needed skills, identified from the content analysis exercise, were analysed against existing IVET programmes. The extent of the skill gaps was then classified according to the table 6 shown below.

Extent of gap	Legend	Definition
Not Covered (NC):		Skills which are not covered within existing training provision
Partly Covered (PC):		Skills which are partly covered within existing training provision
Totally Covered (TC):		Skills which are covered within existing training provision

Table 6: Analysis framework for necessary skills to achieve low carbon buildings

This analysis was conducted by reviewing existing IVET courses related to construction and the built environment. The CVET courses have not been reviewed for the scope of this exercise, since the latter focus on short training periods, and curriculum development can be developed ‘ad hoc’ as required.

- L3 MCAST-BTEC Diploma in Construction Engineering
- L4 MCAST-BTEC Extended Diploma in Construction and the Built Environment
- L5 MCAST-BTEC Higher National Diploma in Construction and the Built Environment

- L3 MCAST Diploma in Plumbing
- L3 MCAST Diploma in Heating Ventilation and Air-Conditioning
- L4 MCAST Diploma in Heating Ventilation and Air-Conditioning
- L3 MCAST Diploma in Construction in Stone
- L3 MCAST Diploma in Masonry Heritage Skills

The analysis also reviews cross-cutting skills, which by definition, are not technical skills related to a specific occupational profile. The analysis of cross-cutting skills, (classified into generic and generic green) was also based on IVET provision.

Whereas the central importance of vocational training is well understood, one should also recognise that architects and engineers need a proper understanding of energy efficient concepts for the design of buildings and buildings systems. The effectiveness of training at vocational level could be undermined by ineffective energy efficient design due to inadequate competence of the architect and engineer on energy efficiency. It is therefore recommended that training is also organised for architects and engineers, although it should be noted that this will not fall under Pillar II.

It is the intention of the relevant agency to introduce formal recognition of plumbing and this is likely to be introduced before the end of 2017. To be accepted for training for energy efficiency for plumbers, persons will have to demonstrate recognition for plumbing from the relevant agency. If such recognition is not available prior to the start of training, recruitment for training shall be by means of interviewing to establish that persons attending the course have the required plumbing skills.

Occupational Profile:	Builder/Mason/Heritage Restorer		
MQF/EQF Accreditation Level:	Level Three		
Learning outcome	Extent of gap		
	NC	PC	TC
Apply external insulation to elements of the building fabric			
Apply internal insulation to elements of the building fabric			
Install cavity wall insulation in accordance to technical requirements			
Know about the different materials that can be used for insulation purposes			
Prepare surfaces prior to applying insulation			
Comply with relevant legislation and technical guidance when applying insulation			
Understand low carbon buildings and describe legislative requirements related to historic and new buildings			
Install effectively draught-proofing to openings			
Prepare work area prior to installing draught-proofing			
Apply external finishes			

Table 7: Skill gap analysis for the occupational profile of builder/mason/heritage restorer

Occupational Profile:	HVAC Technician		
MQF/EQF Accreditation Level:	Level Four		
Learning outcome	Extent of gap		
	NC	PC	TC
Handle fluorinated gases and ozone depleting substances			
Know about the effects of ozone depletion, global warming potential and climate change			
Apply leak detection tests, recharge refrigerants and keep records			
Apply pressure tests and keep records			
Recover refrigerants and dispose refrigerants effectively, in accordance to technical requirements			
Install efficiently ventilation systems for domestic and non-domestic buildings			
Understand renewable energy technologies including solar thermal, solar photovoltaic, heat pumps			
Understand different types of building services systems and controls			
Install, design and commission heat pumps for buildings			

Table 8 Skill gap analysis for the occupational profile of HVAC technician

Occupational Profile:	Construction Technician		
MQF/EQF Accreditation Level:	Level Four		
Learning outcome	Extent of gap		
	NC	PC	TC
Understand legislative and technical requirements related to energy assessment, including energy performance certificates, for buildings			
Know about the factors that have an effect on the overall energy performance of buildings			
Calculate energy performance of building fabric in accordance to minimum requirements			
Inspect buildings to determine energy performance			
Use effectively software specifically approved to measure building energy performance			
Understand the processes and operations for issuing energy performance certificates			
Formulate recommendations to improve the energy performance of the building fabric			
Understand passive building design features including, natural lighting, cooling/heating, ventilation, shading, orientation, thermal capacity and thermal bridging			
Design buildings by incorporating passive features			
Integrate renewable energy sources in building design			

Table 9: Skill gap analysis for the occupational profile of construction technician

Occupational Profile:	Building services Technician		
MQF/EQF Accreditation Level:	Level Four		
Learning outcome	Extent of gap		
	NC	PC	TC
Understand the importance of adequate indoor climatic conditions including air quality and ventilation			
Understand renewable energy technologies including solar thermal, solar photovoltaic, heat pumps			
Understand different types of building services systems and controls			
Know about energy use in buildings and associated legislative and technical requirements			
Assess the impact of air-tightness in buildings			
Design building services systems by understanding energy efficiency and renewable energy technologies			
Apply electrical and water regulations to building services			
Understand and effectively implement principles of waste management and water efficiency in domestic and non-domestic buildings			

Table 10: Skill gap analysis for the occupational profile of building services technician

Occupational Profile:	Plumbing Technician		
MQF/EQF Accreditation Level:	Level Four		
Learning outcome	Extent of gap		
	NC	PC	TC
Understand principles of water efficiency in domestic and non-domestic, including wastewater recycling, grey water and rainwater harvesting			
Install wastewater recycling, grey water and rainwater harvesting systems within buildings			
Detect and resolve water leakage issues in plumbing installations			
Install and commission smart meters monitoring energy consumption in domestic and non-domestic buildings			
Install and commission low pressure natural gas smart meters monitoring energy consumption in domestic and non-domestic buildings			
Apply leak detection tests and keep records			
Install, design and commission solar thermal systems for buildings			
Install, design and commission biomass stoves for buildings			
Install, design and commission heat pumps for buildings			
Install and design combined heat and power systems			

Table 11: Skill gap analysis for the occupational profile of plumbing technician

Occupational Profile:	Facilities technician/manger		
MQF/EQF Accreditation Level:	Level Five		
Learning outcome	Extent of gap		
	NC	PC	TC
Understand legislative and technical requirements related to energy assessment, including energy performance certificates, for domestic and non-domestic buildings			
Understand main factors to undertake energy efficiency improvements			
Know about the effects of energy efficiency improvements in domestic and non-domestic buildings and associated services			
Understand different insulation and surface treatment methods			
Understand the importance of adequate indoor climatic conditions including air quality and ventilation			
Understand different types of building services systems and controls			
Carry out inspections on building fabric and associated services			
Formulate recommendations for energy reduction through energy efficiency priorities			
Know about efficient use of lighting, appliances, controls			
Understand renewable energy technologies including solar thermal, solar photovoltaic, heat pumps and biomass			

Comply with auditing and monitoring requirements set out by energy assessment in accordance with legislative and technical requirements			
Collect, analyse and monitor data related to energy consumption			
Understand and effectively implement principles of waste management on facility			
Monitor and inspect water usage in facility			
Understand and effectively implement principles of water efficiency on facility, including wastewater recycling, grey water and rainwater harvesting			
Understand and monitor energy generated from combined heat and power systems			

Table 12: Skill gap analysis for the occupational profile of facilities technician/manager

Occupational Profile:	Construction Site Manager		
MQF/EQF Accreditation Level:	Level Five		
Learning outcome	Extent of gap		
	NC	PC	TC
Understand legislative and technical requirements related to energy assessment, including energy performance certificates, for domestic and non-domestic buildings			
Understand main factors to undertake energy efficiency improvements			
Know about the effects of energy efficiency improvements in domestic and non-domestic buildings and associated services			
Understand the processes and operations for issuing energy performance certificates			
Formulate recommendations to improve the energy performance of the building fabric			

Table 13: Skill gap analysis for the occupational profile of construction site manager

Cross-cutting skills

Another important issue in skills development associated with essential skills needed to achieve low carbon buildings is the need for training provision to include other non-technical, generic green skills. Various studies (Meer, 2007; EC, 2010; Eurydice, 2012; EC, 2013) stress the importance of key competencies and promoting generic skills and attitudes for sustainability.

In fact CEDEFOP (2009a) classify such skills broadly into two categories; generic skills (such as management, leadership and communication) and generic green skills (such as resource efficiency, and environmental legislation requirements). Table 14 below and overleaf presents a list of such skills which was compiled following a review of existing literature.

Cross-cutting skills are particularly relevant for on-site middle management / site managers.

Type of skills	What the skills incorporate
Generic	The ability to: Communicate verbally and in written form effectively Apply a systems thinking approach Lead and manage Working in teams Resolve conflicts Solve problems Adapt and to be flexible Develop Interpersonal skills Manage change

<p>Generic green</p>	<p>The ability to:</p> <p>Use resources efficiency</p> <p>Recycle, reuse and reduce</p> <p>Understand environmental requirements</p> <p>Understand and apply sustainability principles</p> <p>Produce reports for audits and account for sustainability</p> <p>Conduct life cycle assessments</p>
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Table 14: Generic skills and generic green skills

5. Barriers to VET provision

In order to satisfy the objective of analysing the barriers identified, data was categorised into two broad categories, namely direct and indirect barriers. For the purpose of this report, barriers can also be perceived as the main challenges that need to be addressed in order to provide effective and efficient VET provision with respect to 2020 energy targets within the built environment. The former category includes barriers which have a direct effect on the efficiency and effectiveness of local VET provision to meet the demands of low carbon buildings. Within this category, three main themes, namely structural, financial and participation barriers, were identified as described in table 15 below.

The indirect category, groups those barriers which are beyond the control of vocational education and training institutions. They nevertheless provide additional, indirect barriers to effective VET provision. This category was further sub-divided into two other main themes, namely institutional and industry-market factors (table 15 below).

Category	Direct barriers			Indirect barriers	
Theme	Structural	Participation	Financial	Institutional	Industry-market
Sub-themes	Curriculum development Human resources Qualification structures	Awareness Industry VET	-	Policy Regulation Strategic	Market structure Industry

Table 15: Category, themes and sub-themes for analysis of barriers identified

Direct barriers

Structural barriers

The barriers analysed within this theme have a direct effect on the quality of VET provision mostly because they are totally dependent on the overall operation of the education and training institution. Table 16 below lists the structural barriers identified, which are further categorised into four sub-themes namely, Curriculum development, Human resources, Qualification structures and Mobility.

Structural barriers	
Curriculum development	Lack of clearly defined occupational profiles at a national level Lack of internal structure to develop curriculum and implement changes Lack of time to update course materials Lack of finance for upgrading teaching resources (equipment, materials)
Human resources	Lack of internal expertise Lack of human resources Basic skills level of existing workforce IT competence of existing workforce Weak HR skills in SMEs Construction site managers non-technical skills Inadequate on-site middle management Ageing workforce Language barriers Multi-cultural workforce
Qualification structures	Lack of defined structure for lifelong learning to HE Accreditation structures Qualifications not portable between EU states Flexibility of courses
Mobility	Lack of new entrants in sector Low job mobility to other EU member states

Table 16: Structural barriers

Participation barriers

The participation of learners in construction related courses is relatively low in comparison to other vocational fields. Moreover, the construction industry is also affected by a workforce that has significant skill gaps as identified in the previous section. Barriers to participation in VET courses related to construction were further categorised into three sub-themes namely, Awareness, Industry and VET.

Participation barriers	
Awareness	Lack of awareness of provision of building training Information gap Lack of awareness of what can be achieved by EE and RE
Industry	Generally poor uptake of training in building industry Marketing of training courses Commitment of business sector Lack of motivation among workforce for continuous development Workers in sector risk averse - reluctant to participate in training
VET	Image of VET in relation to construction engineering Training modes High cost of CVET courses

Table 17: Participation barriers

Financial barriers

The efficiency of education and training systems is also dependent on monetary input and also on the level of human capital of the educational practitioner such as educational leaders, managers, lecturing and technical personnel. Table 18 below lists the main financial barriers identified in this research.

Financial barriers
Cost of equipment Funding of training Access to training Funding for trainers Funding of course development

Table 18: Financial barriers

Indirect barriers

Institutional barriers

Table 19 below lists indirect barriers which are institutional in nature, but nevertheless have an effect on VET provision. Interrelationships amongst themes exist. For instance, better enforcement and monitoring of legislative requirements in relation to energy performance certificates also acts a driver for increased participation rates in VET. Additionally, higher participation rates also increases allocative financial resource for education and training. The institutional barriers identified were further categorised into three sub-themes (policy, regulation and strategic) as tabulated below.

Institutional barriers	
Policy	Weak public procurement standards Fragmented policy
Regulation	Weak enforcement practices in relation to EPC Regulatory barriers such as planning
Strategic	Uncertainty regarding future policy developments Lack of synergy between governmental departments and agencies Lack of up to date quantification of skills within workforce

Table19: Institutional barriers

Industry-market barriers

The construction industry itself also provides additional barriers to VET provision. For instance, market forces have an effect on the type of skills needed within the construction workforce. Hence a market which does not encourage energy efficiency and/or uptake of renewable energy technologies ultimately provides a barrier to VET provision. Table 20 below categorises indirect barriers associated with industry-market factors into two sub-themes (market structure and industry factors).

Industry – market barriers	
Market structure	Fragmentation of building services and design markets High proportion of SMEs in sector Untrained immigrants working in construction sector Energy market distortions
Industry	Low valuation of skilled work Poor safety record Lack of systems thinking in sector Lack of job security Lack of familiarity with new technology

Table 20: Industry-market barriers

6. Recommendations

1. Develop curriculum to address skill gaps identified.
 - 1A. Carry out training programmes for the training of trainers.
2. Introduce skill cards as part of accreditation structures.
 - 2A. Review existing assessments for current registrations to ensure that green energy issues are addressed
3. Offer flexible VET programmes for the existing construction workforce.
4. Formulate European Social Fund (ESF) and European Regional Development Fund (ERDF) proposals specifically to train workers and upgrade physical resources respectively.
5. Set up construction skills unit at a national level.
6. Set up energy consultation network within the existing building industry consultative council.
7. Offer financial incentives to building contractors and SMEs to send workers for formal training.
 - 7A. Critically evaluate the possibility of introducing paritarian funds
8. Ensure better enforcement of building legislation within the labour market.
9. Increase awareness, highlighting benefits of low carbon buildings, for consumers.

Recommendation 1	Develop curriculum to address skill gaps identified		
Rationale	Skill gaps in the provision for VET exist across occupational profiles reviewed in this research. Developing curriculum to address the gaps identified is therefore a critical task. This also includes a curriculum for the training of site managers.		
Action Measures			
Operational	Structural	Supporting	
<p>Analysis of skills gap</p> <p>Development of learning content</p> <p>Identification of teaching resources</p> <p>Embed skill gaps into existing initial VET.</p> <p>Training programme for Building Regulations office personnel and other relevant public officials, particularly on legislation related to energy efficiency of buildings.</p>	<p>Set up curriculum team</p> <p>Allocation of human resources from quality assurance department of educational institutions</p>	<p>Consultation with building industry consultative council</p> <p>Consultation with building industry stakeholders</p>	
Potential Implementing agencies	<p>Malta College of Arts, Science and Technology (MCAST)</p> <p>University of Malta</p> <p>Building Industry Consultative Council (BICC)</p> <p>Malta Chamber of Commerce, Enterprise and Industry</p>		
Time-frame	January 2014 – December 2016.		

Recommendation 1A	Carry out training programmes for the training of trainers.
Rationale	With the appropriate curriculum developed, a programme of training of trainers will be carried out. The number of trainers that will be required for each respective skill will be identified. Every effort will be made to ensure that existing trainers at MCAST and at the University of Malta shall receive training but this shall not be limited to current trainers. Moreover, people from the industry, particularly architects and engineers, would already have some understanding of the course content of the curriculum because of their direct involvement. Efforts will be made also to train people from the industry as trainers.
Potential Implementing agencies	Malta College of Arts, Science and Technology (MCAST) University of Malta
Time-frame	January 2014 – December 2015

Recommendation2	Introduce skill cards as part of accreditation structures		
Rationale	<p>The introduction of skill cards across occupational profiles within the construction industry offers the opportunity of recognition of learning undertaken and setting of occupational standards</p> <p>It is intended to introduce the green construct label for contractors who satisfy minimum requirements (still to be established) in relation to personnel having skill cards in respective competencies. The label can only be introduced after the relevant skill card recognition is duly established and operational and this unlikely to be in place prior to 2018. Although this will not fall within the parameters of Pillar II in view of timeframe, it will need to be kept in mind because of the added incentive it will create for contractors to send workers for training.</p>		
Action Measures	Operational	Structural	Supporting
	<p>Analysis of occupational profiles</p> <p>Development of occupational standards</p>	<p>Endorsement from government</p> <p>Set up of unit within NCHFE for the formulation of occupational standards</p>	<p>Vocational education and training organisation input</p> <p>Consultation with Building Industry Consultative Council</p>
Potential Implementing agencies	<p>National Commission for Higher Education (NCHFE)</p> <p>Building Regulations Office</p> <p>Building Industry Consultative Council (BICC)</p> <p>Ministry for Education and Employment</p>		
Time-frame	October 2014 – September 2016		

Recommendation 2A	Review existing assessments for current registrations to ensure that green energy issues are addressed
Rationale	Every building site requires the presence of a mason. To become a mason one is assessed by the Masons Board and this includes assessment of practical work. The assessment as currently carried out needs to be reviewed. Where there are deficiencies in terms of green skills, these deficiencies are to be addressed and the required training programmes to address those deficiencies developed. Similarly to work as an electrician one requires a license. The entry requirements to obtain the license shall be reviewed and, if found lacking in terms of green skills, the relevant deficiencies will be addressed.
Potential Implementing agencies	Building Regulations Office Building Regulations Board
Time-frame	January 2014 – December 2014

Recommendation 3	Offer flexible VET programmes for the existing construction workforce	
Rationale	One of the main barriers for existing workforce is to attend formal training after work hours. Offering flexible training modes, possibly including training on site encourages participation and increases the attractiveness of vocational training	
Action Measures		
Operational	Structural	Supporting
<p>Development of curriculum and flexible learning process</p> <p>Allocation of human resource 'ad hoc' to offer flexible training</p>	<p>Accreditation process of flexible training modes</p> <p>Changing pedagogic practices to provide on-site learning</p> <p>Establish 'mobile' unit</p>	<p>Coordination and assistance from BICC to organise courses</p> <p>Building contracts, SMEs and employers to encourage workers</p> <p>Consultation with trade unions for endorsement</p> <p>Carry out pilot programme</p>
Potential Implementing agencies	<p>Malta College of Arts, Science and Technology (MCAST)</p> <p>National Commission for Higher Education (NCHFE)</p> <p>Building Industry Consultative Council (BICC)</p>	
Time-frame	January 2015 – December 2016	

Notes: The outcome of the pilot programme training is to be evaluated and the resulting feedback will be fed into the curriculum development to improve and refine it.

Recommendation 4	Formulate European Social Fund (ESF) and European Regional Development Fund (ERDF) proposals specifically to train workers and upgrade physical resources respectively.		
Rationale	Building internal capacity of vocational education and training institutions is essential to upgrade its' human and physical resources through European funding		
Action Measures	Operational	Structural	Supporting
	<p>Identification of trainers to be trained</p> <p>Identification of training programmes</p> <p>Formulation of ESF proposal and application</p>	<p>Set up partnership to compile application</p> <p>Allocation of resources for project management</p>	<p>Endorsement by Parliamentary Secretariat for EU funds</p>
Potential Implementing agencies	<p>Malta College of Arts, Science and Technology (MCAST)</p> <p>Building Industry Consultative Council (BICC)</p> <p>University of Malta</p> <p>Ministry for Education and Employment</p> <p>Parliamentary secretariat for EU funds</p> <p>National Commission for Higher Education (NCHFE)</p> <p>Malta Chamber Foundation</p>		
Time-frame	January 2014 – December 2015		

Recommendation 5	Set up construction skills unit at a national level		
Rationale	Development of new technology and materials, together with future legislative requirements will create a drive for new knowledge, skills and competences within the construction industry		
Action Measures	Operational	Structural	Supporting
	<p>Monitoring of new technology within the market</p> <p>Monitoring of new materials within the market</p> <p>Monitoring of new EU legislation</p> <p>Identification of new essential skills</p>	<p>Setting up of unit at a national level based on an intra-national partnership</p> <p>Building internal capacity to monitor developments</p> <p>Building internal capacity to upgrade curriculum</p>	<p>Endorsement by Ministry of Education and Employment</p> <p>Support from building industry consultative council</p>
Potential Implementing agencies	<p>Malta College of Arts, Science and Technology (MCAST)</p> <p>Building Industry Consultative Council (BICC)</p> <p>University of Malta</p> <p>Employment and Training Agency</p> <p>Ministry for Education and Employment</p> <p>NCFHE</p> <p>Malta Chamber of Commerce, Enterprise and Industry</p>		
Time-frame	January 2016 – December 2016		

Recommendation 6	Set up energy consultation network within the existing building industry consultative council		
Rationale	Monitoring of energy targets at a national level in synergy with national action plans on energy efficiency and renewable energy		
Action Measures	Operational	Structural	Supporting
	<p>Collection and analysis of data on the building industry</p> <p>Monitoring of energy targets</p> <p>Identification of strategic actions</p>	<p>Set up of network within existing consultative structures</p> <p>Building internal capacity to collect and analyse data</p> <p>Allocation of human resources for project management</p>	<p>Endorsement by building industry consultative council</p>
Potential Implementing agencies	<p>Building Industry Consultative Council (BICC)</p> <p>Ministry for Energy and Conservation of Water and/or Malta Resources Authority</p> <p>The Malta Chamber of Commerce, Enterprise and Industry</p>		
Time-frame	January 2014 – December 2014		

Recommendation 7	Offer financial incentives to building contractors and SMEs to send workers for formal training		
Rationale	Ensuring that employers encourage workers to attend formal training requires facilitation and financial incentives		
Action Measures	Operational	Structural	Supporting
	Identification of employers within the construction industry Allocation of human resources	Formulation of strategy	Endorsement from trade unions
Potential Implementing agencies	Malta Chamber of Commerce, Enterprise and Industry Building Industry Consultative Council (BICC)		
Time-frame	January 2015 - December 2017		

Recommendation 7A	Critically evaluate the possibility of introducing paritarian funds
Rationale	Paritarian funds are funds collected from building contractors with the specific and sole purpose for the training of workers. It is a system which has been used for a long time in several EU countries including France and Luxembourg. It is proposed that the BICC holds discussions with all stakeholders to consider whether this system would be appropriate for Malta, with the funds being used primarily for green skills. It will involve a very small part of a company's turnover but it can make available significant funds for training. This would be a long term solution towards improving the quality of working and enhancing green skills across the board.
Potential Implementing agencies	Building Industry Consultative Council in consultation with a wide range of stakeholders
Time-frame	January 2014 – December 2014

Recommendation 8	Ensure better enforcement of building legislation within the labour market		
Rationale	Achieving low carbon buildings also requires the effective implementation of legislation related to minimum thermal performance in buildings and energy efficiency		
Action Measures	Operational	Structural	Supporting
	<p>Monitoring of new building development applications</p> <p>Building surveys to monitor construction process, development and operation</p> <p>Identification of strategic action</p>	<p>Building internal capacity to effectively enforce regulation</p>	<p>Education and training institutions to embed within learning processes</p> <p>Endorsement by governmental agencies</p> <p>Government buildings to provide example of best practices</p>
Potential Implementing agencies	Building Regulations Office (BRO)		
Time-frame	January 2014 – December 2016		

Recommendation 9	Increase awareness, highlighting benefits of low carbon buildings, primarily aiming for foremen/directors of construction companies		
Rationale	Informing consumers of the associated economic and environmental benefits of low carbon buildings to influence market choices and real estate demands.		
Action Measures	Operational	Structural	Supporting
	Formulation of promotional material	Development of promotional strategy at a national level	
Potential Implementing agencies	Ministry for Consumer affairs Building Industry Consultative Council (BICC) Ministry for Energy and Conservation of Water		
Time-frame	January 2014 – December 2015		

7. Conclusion

This report has highlighted skill gaps that currently exist within the local VET scenario across occupational profiles that fall within the scope of the Build Up Skills project. Moreover, barriers that might hinder VET provision in achieving set targets were identified and thematically analysed.

On this basis, a set of recommendations were formulated. Each recommendation is supported by action measures, providing a time plan for implementation. In particular, recommendations 1, 1A, 3, 5 and 9 outlined in the previous section, fall within scope of Pillar 2 of the Build Up Skills project. The other recommendations outlined, together with recommendations that may be implemented and resourced through Pillar 2, form the complete roadmap for energy training for workers in the building industry.