BUILD UP Skills Malta
National Status Quo Report

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MALTA CHAMBER FOUNDATION

BUILD UP Skills Malta
National Status Quo Report

Ian Borg Bellanti
Malta Chamber Foundation
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Executive Summary

The aim of the report is to map the vocational education and training (VET) provisions available locally as well as the skill gaps in the workforce for the green construction industry. The strategies to increase awareness of the cost benefits and investment in renewable energy sources and energy efficient practices have been analysed. In addition to this report, the 18 month project aims to create a National Education Platform that will develop a detailed National Qualifications Roadmap for the local construction industry to contribute to the EU 2020 energy targets.

The report was based on the collection of primary data which consisted of interviews with a variety of industry professionals. The secondary data was collected through academic research, reports commissioned by the European Union, governmental departments and other institutions.

The results have shown a lack of data about the green construction industry and low levels of awareness about RES and EE systems and the advantages of their use. Although the benefits are widely understood, the lack of awareness has caused companies to be cautious in investing in the relevant training. A sector composed of micro companies further aggravates this issue, as training would cause considerable strain on their human resources and financial capacities. It has been recommended that incentives are needed to encourage training of tradesmen and also for consumers to invest in both EE and RES systems.

The other significant observation is related to the lack of enforcement of existing legislation, particularly the EPC system. If enforced accordingly, this system could have a pronounced positive impact on the industry. Increases in both employment and economic activity would take place, together with a reduction in the energy demand of buildings.

Accreditation of the current workforce and the creation of a licensing system to easily regulate training of tradesmen could also be very beneficial to the industry. These would simplify the employment process, ease the comparison of skills and ensure attendance to CVET if required for the reissuing of the license.

Ian Borg Bellanti

Malta Chamber Foundation

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Building Industry Consultative Council	BICC
Building Regulations Office	BRO
Chief Executive Officer	CEO
Continuing Professional Development	CPD
Continuing Vocational Education and Training	CVET
Directorate For Life Long Learning	DLLL
Employment and Training Corporation	ETC
Energy Efficient	EE
Energy Performance Assessors for Buildings	EPB Assessors
Energy Performance Certificates	EPC
Energy Performance of Residential Dwellings Malta	EPRDM
European Centre for the Development of Vocational Training	CEDEFOP
European Credit Transfer System	ECTS
European Credit Transfer System for Vocational Education and Training	ECVERT
EU Emissions Training Scheme	ETS
European Higher Education Area	EHEA
European Qualification Framework	EQF
European Regional Development Fund	ERDF
European Social Fund	ESF
European Union	EU
Extended Skills Training Scheme	ESTS
Further And Higher Education	F&HE
Government Notice	GN
Gross Domestic Product	GDP
Gross Value Added	GVA
Information, Communication Technology	ICT
Initial Vocational Education and Training	IVET
Kilo Watt Hour	kWh
Kilo Watt Power	kWp
Kamra Tal Periti	KTP
Malta Chamber Foundation	MCF
Malta College Of Arts, Science and Technology	MCAST
Malta Group Of Professional Engineering Institutions	MGPEI
Malta Intelligent Energy Management Agency	MIEMA
Malta Qualification Council	MQC
Malta Qualification Framework	MQF
Malta Resource Authority	MRA

Mega Watt	MW
Mega Watt Power	MWp
Micro Wind Turbines	MWT
Ministry For Resources and Rural Affairs	MRRA
National Commission for Further and Higher Education	NCFHE
National Commission for Higher Education	NCHE
National Energy Efficiency Action Plan	NEEAP
National Qualification Framework	NQF
National Statistics Office	NSO
Nomenclature Generale Des Activites Economiques Dans Les Communautes Europeennes	NACE
Photovoltaic	PV
Public Private Partnership	PPP
Quality Assurance in the European Higher Education Area	ESG
Renewable Energy From Heating	RES - H
Renewable Energy Sources	RES
Secondary Education Certificate	SEC
Simplified Building Energy Model Malta	iSBEMmt
Solar Water Heater	SWH
Solar Water Heater Collector	SWHC
Steering and Advisory Committee	SAC
Task Leaders	TLs
Technical Apprenticeship Scheme	TAS Scheme
The Energy Performance of Buildings Directive	EPBD
The Malta Environment and Planning Authority	MEPA
The Project Coordinator/Manager	PCM
Vocational and Educational Training	VET

Chapter One
Introduction

1.1 BUILD UP Skills Malta

The BUILD UP Skills Project Malta is an alliance of four partners, namely: the Malta Chamber Foundation (MCF), the Building Industry Consultative Council (BICC), the Malta College of Arts, Science & Technology (MCAST) and the Malta Intelligent Energy Management Agency (MIEMA). Working in collaboration, these project partners have commenced a programme of research to ensure the construction, built environment and renewable energy sectors in Malta have the skilled workforce that is required to reach and meet the EU's 2020 energy targets.

This document is a skill gap analysis about the green construction industry in Malta. To ensure the 2020 energy targets are met, Malta requires a clear understanding of what is needed to achieve these targets as well as comprehensive data about the current state of the building industry. It was the author's responsibility to provide all the available information for these two sets of data from national legislation and publications as well as from feedback directly from the stakeholders within the industry.

Once analysed, this data provided the consortium with a better understanding of the skill gaps and barriers that exist. Upon identification of the challenges, remedial actions and recommendations to bridge these gaps are being presented. The proposed recommendations relate to an increase in Initial Vocational Education and Training (IVET), where young students, who are prospective entrants in the labour market are provided with skills directly relevant to the industry. Other proposed recommendations include an increase in Continuing Vocational Education and Training (CVET), where re-skilling and updating of the competences of the existing workforce would take place. The appropriate course of action for Malta to adopt will be identified and analysed at length in the National Qualifications Roadmap which will commence upon formal publication of this document.

1.2 Malta

The Maltese Islands are located in the centre of the Mediterranean Sea, south of the island of Sicily. The archipelago consists of three inhabited islands: Malta, Gozo and Comino. With a population of 416,055 (Government of Malta, Research and Methodology Unit, National Statistics Office, 2012) and an area of 315.1 km^2 (Government of Malta, Research and Methodology Unit, National Statistics Office, 2007), Malta has the highest population density amongst all EU member states at 1,320 persons per km^2.

The climate is typically Mediterranean and therefore comparable in nature to that found in southern regions of Italy and Greece. Malta experiences hot, humid summers and short cool winters, characterised by inadequate amounts of rainfall. The majority of rain falls during the period from October to March. The temperatures experienced range from approximately 12°C to 31°C and occasionally the weather becomes windy, which is predominately concentrated over a three day period. The construction methods and renewable energy solutions (RES) utilised reflect the characteristics of the local weather. (Government of Malta, Malta Resources Authority, 2009)

1.3 The Sector

The definition of this sector is one that is yet to be clearly defined by either a government or non-government body in Malta. A proposed definition should encapsulate both the sectors of construction and maintenance of buildings whilst also including the installation and retrofitting of energy saving measures and technologies into building envelopes.

The construction industry is one that is formally understood and classified as being the industry which is responsible for both the construction and maintenance of the buildings and roads. Unfortunately the installation of energy efficient systems and RES is not usually included in the data about the industry. More often than not it has been viewed as being an accessory to a building and has only recently been included in national reports.

The definition of a low energy building is far from being a uniform one throughout the European Union. In 2008, the Danish Building Research Institute at Aaborg University stated:

> *The low energy building definition was introduced at various times across Europe. Some countries have even had different definitions of low energy buildings at different periods of time.*
>
> *The 22 answers received included 7 countries with an existing official definition and 7 countries with a planned official definition. Four countries have "only" an existing non-governmental definition. Four countries have both existing official and non-governmental definitions of low energy buildings.*
>
> *The following countries have an official definition concerning very low energy buildings: Austria, Czech Republic, Denmark, Finland, France, Germany and United Kingdom (England and Wales). (Thomsen, Wittchen, & EuroACE, 2008, p. 5)*

Within the same document it is stated that:

> *The definition of very low energy buildings varies significantly across Europe even though the EPBD (Energy Performance of Buildings Directive) give guidelines for the calculations. (Thomsen, Wittchen, & EuroACE, 2008, p. 6)*

Another definition which is yet to become mainstream in the local industry is that of eco-construction. According to Ernst and Young's Environment and Sustainability report published in 2006, eco-construction is:

> *The construction of (or a part of) any infrastructure with a reduced impact on the environment compared to typical, classic construction. It covers:*
>
> - *The construction activity itself (workshop),*
> - *The selection of materials,*
> - *The consumption, emissions and other environmental impacts during the use phase of the infrastructure,*
> - *The management of construction waste.*
>
> *The construction activity can concern new construction, light renovation or heavy renovation.*

> *In the EU-15, market share of new construction is 25% and 75% for renovation. In the new member states, many existing buildings have a poor quality level and there is therefore much new construction.*
>
> *(Ernst & Young - Environment and Sustainability Services (France), 2006)*

Malta is yet to publish a definition for low energy or eco construction which has been endorsed by the government and subsequently used and endorsed throughout the local industry.

1.4 BUILD UP Skills Malta Programme

The research programme will be delivered through a series of work packages as outlined below:

Work Package 1 - This work package covers the project management activities and the overall co-ordination of communication activities of the project.

The management structure of the proposed BUILD Up Skills Malta project will encompass the following coordination bodies; the Steering and Advisory Committee (SAC), the Project Co-ordinator/Manager (PCM), the Project Secretariat and the Task leaders (TLs).

Every project partner will have assigned roles in the project which correspond to its competencies, although the project will entail close collaboration on all tasks from all partners.

Work Package 2 - This work package will carry out an analysis of the National Status Quo Report in Malta regarding education, training and certification in the building industry. The study is the first major output of the project and shall require a wide range of competences. At the end of the study the detailed report highlighting the current situation in the Maltese Islands shall be presented during a national conference. The conference shall also be the start of consultations in the formation of the National Qualifications Roadmap.

Work Package 3 - The third work package will consist of the setting up a National Education Platform regarding the building industry. This work package will be launched at the start of the project so that stakeholders are involved from the start of the project. The aim is to keep in constant contact with the stakeholders and consult them on the development of the National Status Quo Report. Many of the stakeholders who form part of the platform have already been briefed and have pledged their support and/or participation in the Platform. The short-term objective of the platform is to provide a forum for the

drafting of the National Qualifications Roadmap and to ensure its endorsement by the relevant bodies. This forum will also enable constant feedback to be received about findings in the National Status Quo Report.

Work Package 4 - This task will focus on the development of a National Qualifications Roadmap, with the aim of having a better-qualified workforce in the building industry to achieve the 2020 energy targets. The roadmap, which will be developed according to the BUILD UP Skills Initiative guidelines, will explain how to overcome the barriers and identified skills gaps in the various identified professions.

The process will start after the publication of the results of the second Work Package, namely the National Status Quo report. The roadmap will include identified measures for all target groups, from the National Status Quo Report.

Work Package 5 – The endorsement of the roadmap will commence through the activities in the third and fourth work packages, namely the setting up and the development of the National Qualifications Platform and Roadmap. The endorsement is formally planned to commence upon completion of the fourth work package. However by doing so prior to its completion, it is felt that both the endorsement and also its implementation will be facilitated.

Work Package 6 – The sixth package covers resources to create added value at the European level through targeted exchange activities, which will be organised by the EACI.

1.5 The Author

The Malta Chamber Foundation, the foundation of the Malta Chamber of Commerce, Industry and Enterprise was registered as a voluntary organisation in 2011. This entity was responsible for the analysis of the National Status Quo Report and appointed Ian Borg Bellanti to carry out this task, in its entirety, on their behalf.

The report represents the findings and conclusions from this phase of the research programme. Furthermore, the report encapsulated different tasks, including: the drafting of the required survey tools and eventual data collection from stakeholders; the collection of data published in national reports and the eventual compilation and analysis of all the data to create one homogeneous document which addresses the aim set out by the Intelligent Energy Europe programme.

Chapter Two
Objectives and Methodology

2.1 Introduction

This section outlines the objectives of the report and the methodology used to obtain the required data for a comprehensive analysis of the local building and renewable energy industry. The different streams of collected data are explained, together with the method of analysis.

2.2 Purpose of the Report

The National Status Quo Report is a skill gap analysis about the green construction industry in Malta. The collected data presents a comprehensive review of existing training and qualification provisions that are on offer to the workforce in Malta. This, together with data pertaining to the local building and energy sectors has been used to locate and quantify the skill gaps that may exist within the said industry. **The identification of these gaps allows for the eventual drafting of the National Qualifications Roadmap to address these needs and to ensure Malta meets its 2020 energy targets.**

2.3 Research Objectives

The research consisted of two segments:

The Skills Analysis

This segment consists of a review and eventual analysis of the existing vocational education system within the construction and renewable energy sector. Furthermore, national energy policies, strategies related to green skills and jobs, research into the current workforce that form this sector were also examined.

The Sector Analysis

The compilation of data regarding the building stock, energy efficiency standards, EE and RES systems for buildings and the national policies and strategies for the construction and renewable energy sector, all form part of the report.

The objectives of this research project are to:

- Present the characteristics of the construction and renewable energy sector in Malta, including national policies and strategies to contribute to the EU's 2020 energy targets
- Present statistics and data related to the historic, current and anticipated future characteristics of the construction and renewable energy sector and the related workforce
- Establish the current provisions and extent of supply of vocational and educational training (VET), particularly in relation to EE and RES.
- Analyse the trends and developments in the construction and related industries, specifically focusing on the occupations at all qualification levels that are affected by the green economy
- Analysis of the current education and training system relevant for building sector in Malta, including training and accreditation institutions, existing qualifications and certifications, responsible authorities, etc.
- Compare the current skills demand with the current supply of VET, including the identification of skills gaps, qualification needs and barriers to the demand and supply of training

2.4 Scope of the Research

The scope of BUILD UP Skills Malta project focuses on a specific target group: on-site workers, tradesmen and installers of EE and RES systems within the building sector. The European Commission has identified the need for qualified workers at an operational level, who possess the ability to install and maintain all EE and RES systems in buildings of all types and ages.

2.5 Research Method

The data for this research project was collected and analysed using both quantitative and qualitative methodologies, in order to ensure the presentation of suitable information. The adopted approach consisted of:

Desk research

This took place throughout the course of the project and examined the characteristics of the built environment sector, national policies and strategies, skills needs and gaps, building and energy sector statistics, existing training provisions and previously identified barriers in relation to meeting the EU 2020 energy targets.

One to one interviews

A total of 20 one to one interviews were held with stakeholders from the public and private sectors. While six of the interviews were conducted with representatives of the local VET providers, the remaining fourteen were conducted with individuals from the private firms and public institutions. All entities interviewed had a direct link to the construction, RES, building EE or VET industry.

For the purpose of the one to one interviews two sets of questions were drafted with the intention of gathering both quantitative and qualitative data. The template in section 11.1 was used during the interviews with the public and private firms, while the one in section 11.2 was utilised during the interviews with the VET providers.

Survey

A ten question survey, included in the annex section 11.3, was drafted for all stakeholders alike and its use was purely for the collection of quantitative data. This was distributed as a hard copy at the GreenBUILD conference held by Malta Enterprise in October of 2012, where a total of 9 stakeholders completed the said document.

The questions used within the ten question survey were also made available online through the website Survey Monkey. A standard mail shot was drafted

which included details of the BUILD UP Skills Malta Project, the aims of the project and the link to the online version of the survey. This was distributed to:

- The EPB assessors
- Members of KTP – the chamber of architects
- Members of MGPEI – Malta Group of Professional Engineering Institutions
- Registered importers of roof insulation, double glazing, solar water heaters, PV systems and micro wind turbines
- Members of the Malta Chamber of Commerce, Enterprise and Industry

Eight of the ten questions utilised in the surveys were extracted from those used in the interview questions. The remaining two questions were also extracted from the same source, but amended to facilitate their completion online. The analysis of the data was considerably facilitated by ensuring the questions used were kept constant throughout the data collection exercise. Templates of the interview and survey questions have been included in the appendix of this report.

Mapping of the current VET provisions

Comprehensive mapping of the accredited and non-accredited VET provisions available in Malta was carried out through:

- One to one interviews with the representatives of the institutions
- Research from the online resources from the websites of the institutions
- Research from documentation provided by the institutions

Once the VET provisions related to EE and RES systems, for each institution, were listed, this was forwarded to the respective institutions together with a request for further data. The request included the need for the current student population for the identified training programmes and also the number of students who completed the same courses over the last five years.

Chapter Three
Characterisation of the Building Sector

3.1 Introduction

This chapter provides a condensed description of the building sector in Malta. This is illustrated in qualitative terms, namely by explaining Malta's rich architectural history and heritage, whilst providing information about the current scenario. The industry's contribution to the economy, the market shareholders, the main actors within the building supply chain, the market trends and potential forecasts are all used to ensure a better understanding of the current building sector in Malta.

3.2 Historical Context

Maltese architecture has a long and illustrious history, including several prehistoric temples dating back to 5000 BC. These are the oldest free standing structures in the world. Moreover, Malta also has numerous fine examples of Baroque architecture. The latter style has an interesting and distinct look when compared to the equivalent built on mainland Europe. The slight variation can be attributed to the influence of the church on architecture and the deep rooted religious beliefs of all the inhabitants of the Island.

The years between the 16th and 18th centuries saw the construction of some of the most important and beautiful buildings in Malta, most of which were built in the area of the Grand Harbour. This was the main hub for activities during the aforementioned period and it is where the Knights of St John decided to base themselves for 268 years. The capital city of Malta was built precisely alongside the Grand Harbour and was named Valletta in honour of the Grandmaster who approved and commenced its construction.

Although major construction projects are dotted throughout Malta's decorated history, the construction related industries witnessed a great explosion of activity pre and post the two world wars. The British first sought to construct defensive structures pre-world war one and two, and later in the aftermath of the Second World War a considerable amount of construction took place to rebuild all the damaged structures.

Although stone, being a natural resource, was widely used in small projects, reinforced concrete become very popular in the 1930's when the British started to strengthen Malta's defensive structures.

The 1950's and 60's saw further development in the local concrete industry, and attempts were also made to educate the local workforce in concrete and its use (Bianchi, 2009). This period also saw the introduction of the hollow concrete block on the local market and the experimentation in the use of reinforced concrete for canopies, cantilevers, shading devices, etc. (Gatt, 2012)

After the enactment of the Education Act in 1944, the government built a total of 22 schools, and therefore allowed for further experimentation in the use of concrete on a large scale by local architects and engineers.

3.3 The Building Sector's Contribution to Malta's Economy

Direct Contribution:

The direct contribution of the Construction Industry to the Maltese economy is illustrated in a section of the original table extracted from the document "Regional Gross Domestic Product: 2007-2011":

Table 1A. Contribution of Regional GVA to Total Economy GVA (B1.g)

By industry and by region (NUTS III)

							%
			2007	2008	2009	2010	2011
3 Construction (F)	MT	MALTA	4.92	4.72	4.55	4.23	4.03

Table 1: Contribution of Regional GVA to Total Economy GVA (Government of Malta, National Statistics Office, 2012, p. 2)

Within the above table, the construction industry is classified as NACE code F, which is the Statistical Classification of Economic Activities in the European Community. This refers to the construction of buildings, civil engineering, and specialised construction activities. It must be pointed out that the professional services related to the industry fall under NACE code M_N.

Since the contribution by the professional sector to the Gross Value Added (GVA) is not divided by the numerous professions which form this sector, NACE Code F is to be considered to examine the direct contribution to the economy. It is clear that between the years 2008 and 2011 the industry has seen a reduction in the contribution to the local GVA. In 2008 this value stood at 4.72%, while in 2011 this value has decreased to 4.03% of the contribution to the countries GVA to the total economy. In monetary terms, this translates to an approximate decrease from €245 million in 2008 to €219 in 2011, in value added to the economy. (Government of Malta, National Statistics Office, 2012)

In a report published by the Central Bank of Malta, it was stated that the slowdown in economic activity within the construction activity may be attributed to the oversupply within parts of the sector. Interestingly enough however, the report goes on to state that "house prices proved rather resilient…registering a small rise during 2011" (Central Bank of Malta, 2011). The report also forecasts marginal growth in 2012, suggesting that the industry may in fact be recovering gradually from the drop in economic activity experienced.

3.4 The Value Chain

The construction industry is composed of numerous groups of stakeholders, who all contribute in different ways to the relevant activities. The diagram below illustrates the main groups of these stakeholders, which broadly can be divided into two groups. The first group consists of the policy makers and local authorities, which set the rules and regulations for the industry to abide by. These rules are then followed by the second group of stakeholders who include the developers, the architects and engineers and the contractors. This group consists of all stakeholders who offer professional and commercial services.

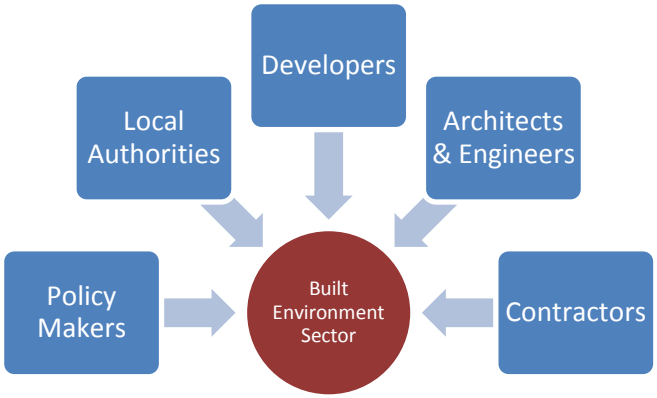


Figure 1: The Main Actors That Contribute to the Construction Industry

The value chain of the construction industry is a complex web of commercial activity that contributes to the local economy. For the purpose of this report, the author has chosen to simplify the aforementioned web of activities. This has been depicted below by four major sub divisions and the core of the industries activities has been purposely marked in red. The focus of the BUILD UP Skills Malta project focuses on construction products/materials and their correct installation, which should have contributed to increased energy efficient construction. All the activities that are in any way related to the site preparation and construction of both new builds and retrofitting of existing buildings are considered as being the core of the project. Suppliers of materials which lead to the construction of EE buildings have also been specifically included. These stakeholders provided considerable volumes of relevant information about the local industry and therefore formed an integral part of the pool of the stakeholders interviewed in this report.

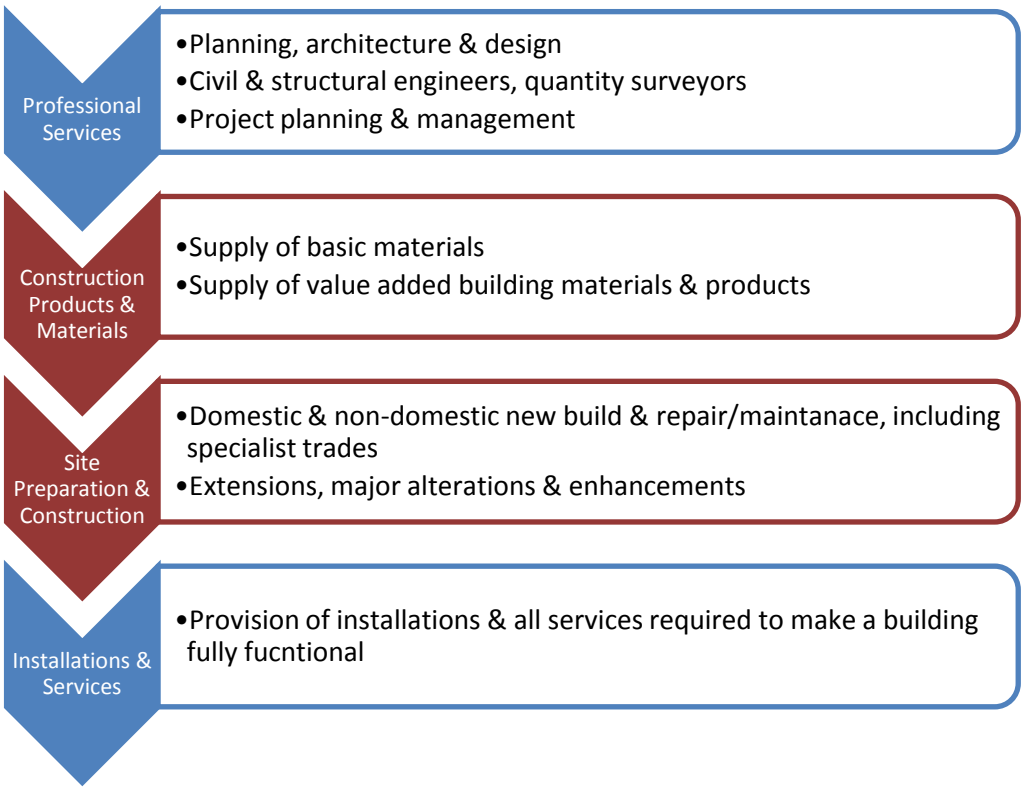


Figure 2: The Construction Industry Value Chain – Consisting of Circa 7,100 Commercial Organisations and 11,099 Employees

The above illustration depicts the construction industry value chain, which consists of approximately 7,100 organisations (Government of Malta, National Statistics Ofiice, 2012) and 11,099 employees[1] (Government of Malta, National Statistics Office, Labour Market and Education Statistics Unit, 2013) has been divided into four parts, namely: Professional Services, Construction Products and Materials, Site Preparation and Construction, and Installations and Services. This value chain summarises and encapsulates all the major activities and process that take place within the industry. The target group for the BUILD UP Skills Malta project is approximately 4,885 tradesmen which fall under NACE code category F 43, namely Specialised Construction Activities. (Government of Malta, National Statistics Office, 2013)

1 This translates to an average of 1.56 employees per organisation, which due to the type and limited nature of available data cannot be explained.

3.5 Main Factors of Change Affecting the Sector

Malta's accession to the European Union brought with it a peak in economic activity within the construction industry and like all industries undergoes cyclic fluctuations. The peaks experienced post accession to the EU, have been followed by an overall slowdown in production over the last few years. Numerous reasons have been proposed to have caused this slowdown in economic activity, two of the most acceptable are the oversupply of high density dwellings and the hesitation to invest by consumers due to uncertainties in the economy.

Since its establishment in 2001, the Malta Environment and Planning Authority (MEPA)[2], has evolved and commenced the long road towards promoting the need for energy efficient buildings and green construction practices. The most progress has been made in the case of large developments, which are automatically referred to the BRO for vetting of the energy efficiency of the proposal in question. Suggestions are made to the architect responsible for the project, which must be carried out before the project can be reviewed by the relevant planning board at MEPA. This additional step within the process to obtain a planning permit is yet to become mandatory for small developments. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)

Further change was brought about with the introduction of the document by the Building Regulations Office entitled "Technical Guidance Part F"; by means of this document all stakeholders within the industry were provided with a guide which tackled all aspects of construction in an attempt to ensure buildings become more efficient. The legislation pertaining to this document is elaborated upon further in section 4.2.1of this report.

The Energy Performance Certification (EPC) system soon followed after the introduction of the mentioned technical guidance document and enabled stakeholders to quantify the performance of buildings with respect to energy conservation. The introduction of this publication and system respectively generated change within the industry due to increase awareness of the issue of energy efficiency. The aim of the certification system was to classify buildings according to their overall inbuilt characteristics with respect to performance in terms of energy conservation. Although this aim should eventually bring about a considerable change in direction for the industry, this is yet to be fully accepted

2 The Malta Environment and Planning Authority (MEPA), is the public agency which is responsible for, amongst others, the processing of development applications and the issuing of development permits.

and embraced by the stakeholders and developers involved. The legislation pertaining to this system is elaborated upon further in section 4.2.1.

The capital grant schemes introduced by the government continued to entice investors to invest in green technologies and energy efficient materials and products. A number of different schemes were introduced over the years to increase the uptake and investment in PV systems, solar water heaters, micro wind turbines, insulation and double glazing; to name a few. **These schemes were followed by the introduction of fixed feed in tariffs for all the green energy generated, which provided a further financial incentive for all investors.**

The aforementioned publications, systems and incentives were all brought together by a marketing campaign designed and implemented by the BRO, to create a change in the direction of the industry.

The advantage of green construction within the context of Malta must be considered with the knowledge that the price of energy:

- Has increased drastically over the last decade
- Paid by consumers does not reflect the true cost because a government subsidy is currently in place
- Increases according to consumption, therefore discouraging waste

A reduction in the consumption of all buildings coupled with the generation of energy from renewable sources has therefore become critical for the industry and all homeowners alike. Increased awareness about the need to reduce energy consumption has been aided by the implementation of projects using EU funds, particularly ERDF. Although these represent a small portion of the overall construction activity, they have helped to start raising awareness about this important issue.

3.6 Market Trends and Forecasts

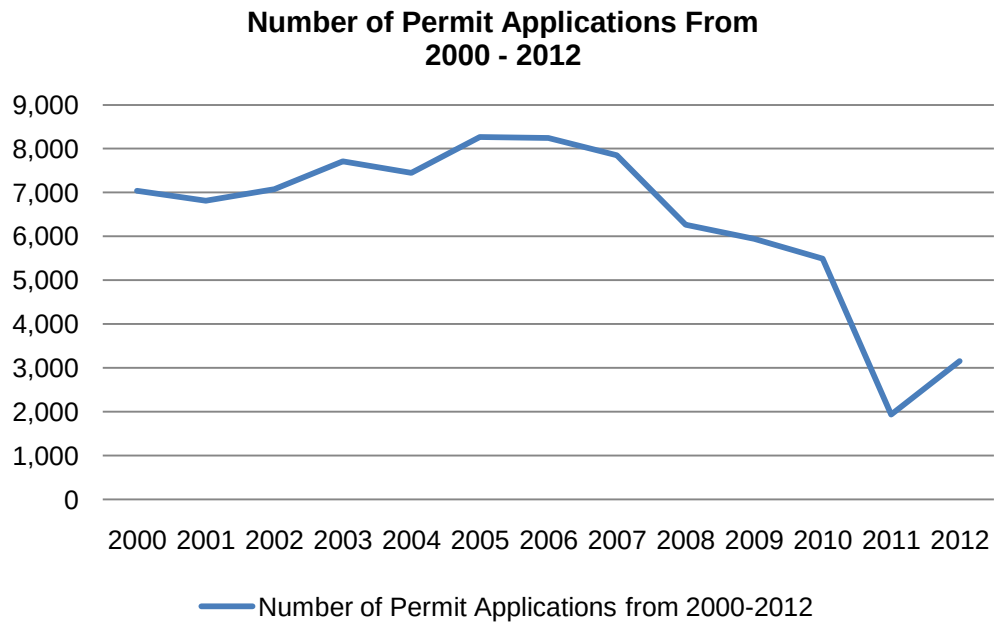
Political

The general election will take place on the 9th of March 2013 and the budget presented to parliament by the outgoing government included, amongst other things, new capital grants for RES and EE products/materials and a new feed in tariff structure. (Government of Malta, Ministry of Finance, the Economy and Investment, 2012)

The two main political parties have both shown their support and fully endorse green construction. The extent, to which these will be implemented once a new government is formed, is unknown.

Economic

As illustrated by the graph below, the activity within construction industry has been affected by the economic situation. The overdevelopment between 2000 and 2007 is the milestone most commonly used when attempting to better understand today's situation. This is easily understood when one compares the 8,269 building permit applications filed in 2005 to the 1,939 filed in 2011. (Malta Environment and Planning Authority , 2013) Refer to section 5.4 for further details about the fluctuations in the number of MEPA applications over the years.



Graph 1: The Variation of the Number of Building Permit Applications from 2000-2012 (Malta Environment and Planning Authority , 2013)

The sharp fall in the number of permit applications could be due to the recession or the restructuring of MEPA's application system. The latter saw a marked increase in the cost of an application, which has resulted in less speculators applying for permits.

The industry's contribution to the economy, as previously explained has seen a reduction. However it is reassuring to note that in some specific areas growth has been noted when compared to the 2007 figures. The civil engineering sector which is labeled as number 42 within category F of the NACE code classifications has actually experienced a steady growth over the years.

Although there is a great deal of investment in property, the high number of vacant properties is a concern to the country, particularly in light of the limited available land, which has been discussed in the section 5.2 of this report. Highly regulated construction boundaries limit the possibility of further urbanisation, in an attempt to increase redevelopment. This has also been coupled with incentives to encourage the reuse and renovation of currently vacant buildings within urban conservation areas.

Environmental

Malta faces considerable repercussions if the carbon emissions targets set by the EU are not met and therefore the government is doing everything in its power to increase green energy generation. Malta is almost entirely reliant on oil for its production of both electricity and water. Numerous attempts to increase efficiency at the local power plants have been coupled with the construction of an extension of the existing plant and also an interconnector cable with Sicily. The aim of the latter project is to purchase energy and invest in RES projects in other EU member states. Once both projects are fully functional, Malta will be able to close the power plant in Marsa, which is outdated and inefficient.

Malta's reliance on fossil fuels to provide clean water is due to the limited reserves of ground water. The country therefore depends on energy intensive reverse osmosis plants to supply the country with water.

Increased capital grants and incentives are expected to continue to be offered by the new government once elected, to further increase the uptake and investment of EE and RES by both the residential as well as the commercial sectors. One should also assume that additional public projects would be launched, some possibly in the form of PPP's (Public Private Partnerships). If this solution is adopted, the PPP's would create new jobs and economic activity within the industry, while generating considerable amounts of green energy.

3.7 Migrant Workers and the informal Economy

The total population of Malta and Gozo currently stands at 416,055 individuals, 4.8% or 20,086 of which are non-Maltese Nationals. This represents a 65.8% increase over the figure in 2005, which stood at 12,112 individuals. 52.9% of the mentioned non-Maltese nationals are males and approximately one quarter of these males are between 25 to 34 years of age. This is to be noted in the context of the local construction sites, which like their counterparts across the EU are making use of more non-national workers. A large percentage of the mentioned young non-Maltese males are low skilled tradesmen with relatively limited employment opportunities. These individuals are often employed in the construction industry's lowest hierarchical tiers of employment. Due to their limited capabilities they often end up working in project focused informal employment, with local companies paying these individuals the lowest legally possible tarrifs. **Nonetheless this portion of the population represents a valuable resource and is regularly asked to fill in when labour shortages arise**. (Government of Malta, Research and Methodology Unit, National Statistics Office, 2012)

Chapter Four
Malta's Policies and Strategies to Contribute to the EU Energy Targets in Buildings

4.1 Introduction

This chapter provides information about the policies, legislation and other strategies in Malta that are expected to contribute towards the achievement of the 2020 energy targets in buildings. This chapter outlines the currently approved policies, however due to the fact that the current legislature is about to end, the next term may bring about new policies, legislations and strategies. The main political parties agree about the importance of renewable energy sources and the need to increase energy efficiency across all sectors, particularly in the building sector. Based on the electoral manifesto of the two main political parties, the main policies for this sector are likely to remain unchanged except for a possible shift in direction.

As a result of being an EU member state, Malta is committed to the energy related targets for 2020 and 2050 since it forms part of the single European Energy Market. The main objectives of the energy policy must address a number of objectives shown in the image below.

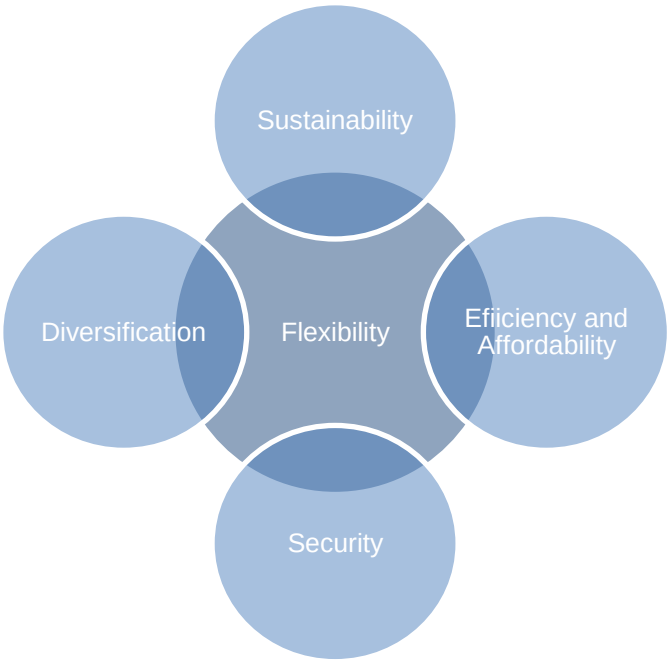


Figure 3: Thrusts of the Strategic Energy Framework" (Government of Malta, Ministry for Resources and Rural Affairs, 2012, p. 6)

4.2 National Energy Policies, National Action Plan for Renewable Energy and Strategies to meet the 2020 targets

The Maltese National target for the share of energy from renewable sources in gross final consumption of energy for the year 2020 is 10%. It must be noted that the share of energy from renewable sources in gross final consumption of energy in 2005 stood at 0% (Government of Malta, 2010). This meant that the promotion and creation of appropriate legislation and polices were critical, not only to achieve the target but also to increase awareness and create momentum towards achieving EU targets for renewable energy. The Government, Non-Governmental Organisations and social partners such as the Malta Chamber of Commerce, Enterprise and Industry took it upon themselves to attempt to increase the local awareness, through campaigns and schemes. Malta's National Renewable Energy Action Plan was drafted by the Ministry for Resources and Rural Affairs and outlined the targets for the share of renewable energy used from the year 2010 to the mile stone year of 2020. In accordance to the requirements of Directive 2009/28/EC this document must be updated every two years after the date of publication and BUILD Up Skills Malta have been informed that this is currently being drafted by the BRO.

Policy relating to renewable energy and its application in Malta commenced in 2006, when the first draft of the National Energy policy was issued for consultation. This document was written with three main objectives namely: -

- Security of supply
- Environmental protection
- The social dimension, affordability and competitiveness

(Government of Malta, Ministry for Resources and Rural Affairs, 2009)

The end of the consultation period coincided with the launching of the European Commission's Third Energy package, which included the revision of the Inland Electricity Market Directive. Malta's National Energy Policy could only be concluded at the end of 2008, once the negotiations at EU level had been concluded and Malta could therefore be fully aware of its commitments. . (Government of Malta, Ministry for Resources and Rural Affairs, 2012)

4.2.1 Energy Performance Building Directive and Technical Guidance Document

One of the most important documents for the local construction industry was the technical guidance by the Services Division within the Building Regulations office that forms part of the Ministry of Resources and Rural Affairs which was published in 2006. Over the last five years the Building Regulations office has been responsible for the drafting of the new building regulations for Malta and for the implementing of the Energy Performance Building Directive regulations.

The aforementioned technical guidance document entitled "Document F – Conservation of Fuel, energy and Natural Resources (Minimum Requirements on the Energy Performance of Building Regulations, 2006)" provided all stakeholders directly involved in the construction of buildings with a set of suggested guidelines to reduce energy consumption. In accordance to legislation (Government of Malta, 2006), these guidelines apply to all new buildings and existing buildings that undergo major renovation or alterations. The definition of major renovation or alteration is stated within the sourced legal notice. Document F, as it is commonly referred to, provided technical guidance related to the reduction in energy consumption for the Mediterranean climate. This includes information about the resistance to the passage of heat through a building, solar overheating, the control of heating and cooling systems, artificial lighting systems and the conservation of rain water. Tables containing data for U values of the materials most commonly used within the Maltese construction industry are included together with the methods to calculate the U value for a wall. (Government of Malta, Services Division, Building Regulations Office, 2006)

To ensure compliance with the Energy Performance of Building Directive, the Legal Notice 238 of 2006, entitled "Minimum Requirements on the Energy Performance of Building Regulations", came into force on the 1st of November 2006. (Government of Malta, 2006) Later in 2008 the Legal Notice 261 of 2008 superseded the previously mentioned legal notice, but retained the former technical guidance document. Once sufficient data and experience had been gathered, the new legislation transposed all of the directives clauses into National Law and the proposed plan was for the 2006 Minimum Requirements to be revised and updated by 2011. (Government of Malta, 2008)

4.2.2 Energy Performance Certificates

The second part of the Legal Notice 261 of 2008 deals with "Energy Performance Certificates" and provides details about all the scenarios where EPC's are legally required and the time frames in which to commission the certificates. The different types of buildings with numerous classifications of buildings that require such documentation are also outlined. The third part of the this legal notice outlines details about the "Inspection and Energy Performance Certification of lighting, water heating, space heating and space cooling installations in Buildings". The fourth part is entitled: "Administration of the EPC system for Energy Performance Certification of Buildings and, Mechanical and Electrical Services in Buildings". (Government of Malta, 2008)

The Energy Performance Certificate (EPC) system of certification was introduced, as stated above, by the Legal Notice 261 of 2008 due to The Energy Performance of Buildings Directive (2002/91/EC). The tasks implied by Article 7 of the EPBD were a major challenge for Malta both technically and also due to the required resources. The existing software had to be adapted to local requirements whilst the methodologies for carrying out the certification had to include both heating and cooling of residential and non-residential buildings. (Government of Malta, Services Division, Ministry for Resources and Rural Affairs, 2010)

The national calculation methodology for residential buildings in Malta is called the EPRDM (Energy Performance of Residential Dwellings in Malta). This calculation takes into account; the weather climatology, net energy required for space cooling and heating; water heating; lighting; ventilation and the also the deduction of energy savings from energy generating technologies that may be installed on the property. The outputs of the calculation for residential buildings are the annual values of delivered energy consumption (energy use), the primary energy consumption and the CO_2 emissions. These are presented as totals for the unit in question and also per square metre of the total usable floor areas. (Government of Malta, Services Division, Ministry for Resources and Rural Affairs, 2010)

A separate calculation methodology has been developed for non-residential buildings, called iSBEMmt, which is based on the UK's system called SBEM (Simplified Building Energy Model). The model and methodology were adapted for the local needs and makes use of local weather data, namely an activity database suitable for Malta (which defines the standardised assumptions of occupancy, lighting, cooling, ventilation, etc.), a construction database and data

collecting procedures suitable for Malta. (Government of Malta, Services Division, Ministry for Resources and Rural Affairs, 2010)

The actual EPC is the end product of the certification process and is valid for a ten-year period. This document provides the calculated energy use rating for existing (asset rating) and designed (design rating) for residential and non-residential buildings. Certificates can only be issued by qualified Energy Performance Assessors for Buildings (EPB Assessors), who must be architects or engineers who have graduated from the University of Malta or who are in possession of similar degrees. (Government of Malta, Services Division, Ministry for Resources and Rural Affairs, 2010)

The document also includes recommendations for improving the energy performance of the building in question which is actually the most beneficial section of the document for the owner. The EPB Assessor may also include an approximate cost estimate for implementing the identified measures and the eventual energy savings one would achieve, if implemented. (Government of Malta, Services Division, Ministry for Resources and Rural Affairs, 2010)

Although a considerable number of architects and engineers have shown interest in the system only 544 EPC's were registered between 2010 and the end of 2012 with the Building Regulations Office. This could be attributed to the lack of awareness about the system or because consumers fear that the asking price of property may be increased by the seller.

The Malta Environment and Planning Authority (MEPA) refer development applications of large developments to the BRO for consultation about energy efficiency before permits are issued. (Government of Malta, Services Division, Ministry for Resources and Rural Affairs, 2010)

4.2.3 National Energy Efficiency Action Plan

In October 2007 Malta submitted its National Energy Efficiency Action Plan (NEEAP) to the EU Commission. The scope of this action plan was savings in energy end use in line with Directive 2006/32/EC. In 2008 this document was updated to reflect the feedback received from the Commission, the assessment carried out by the energy efficiency watch, as well as national and international developments. The general objectives of the updated document were to identify cost-effective measures that would generate energy efficiency and to chart a plan whereby these measures are implemented in a structured holistic manner. The draft energy policy published in 2006 was used to develop this action plan,

together with the draft sustainable development strategy that was published in 2008. This action plan stated that the report will be continually updated over its nine-year life span and updates will be formally published on at least three occasions. An interesting point raised in the 2008 action plan was the lack of available data about energy usage in Malta. (Government of Malta, 2008)

The second National Energy Efficiency Action Plan was issued in 2011 and focuses on the National Energy Policy which was set to be published. The latest action plan reiterates Malta's targets set by the relevant EU Directives for Malta, namely:

- Energy End Use Efficiency: 9% by 2016;
- Renewable Energy Target: 10% of final energy consumption by 2020;
- Bio-fuel contribution in the fuel mix: 10% of final energy consumption of fuels by 2020;
- Reduction in greenhouse gas emissions under Effort Sharing Decision: +5% over 2005 levels by 2020.

This updated action plan also confirms that the interim target for energy end use efficiency of 3% was achieved in 2010. Confirmation of implementation of the majority of the measures proposed in the first National Energy Efficiency Action Plan was provided. Further areas of focus for Malta, which may prove to be profitable and which help Malta achieve the 2016 targets, were also identified.

4.2.4 Development Control: Policy and Design Guidance 2007

Acknowledging the importance that will be given to RES in the near future The Malta Environment and Planning Authority (MEPA) included a chapter about "Energy and Infrastructure" in their publication "Development Control – Policy and Design Guidance 2007". The aim of the document was to provide policy statements and performance standards to achieve sustainable, high quality developments. Chapter 13 provides architects, engineers and developers with guidance as to how one should correctly install RES systems and appropriately incorporate them into the urban fabric. (Malta Environment and Planning Authority , 2013)

4.2.5 National Strategy for Policy and Abatement Measures Relating to the Reduction of Greenhouse Gas Emissions

In 2008, the National Climate Committee was appointed by the Ministry for Resources and Rural Affairs (MRRA), with the purpose of drawing up a strategy that would enable Malta to adopt measures to address climate change and greenhouse gas emissions. This committee drafted a report in January 2009 entitled "National Strategy for Policy and Abatement Measures Relating to the Reduction of Greenhouse Gas Emissions". A consultation ensued and the report was reviewed and adopted by Parliament in September 2009. January 2009 also saw the presentation of the updated policy document entitled "Solid Waste Management Strategy for the Maltese Islands".

4.2.6 Feasibility Study for Increasing Renewable Energy Credentials

From 2008 till January 2009 the Malta Resources Authority (MRA) commissioned a study to examine the best way forward to ensure that Malta reaches the set renewable energy targets. This report, entitled "Feasibility Study for Increasing Renewable Energy Credentials" looked into the potential for solar and wind power as drivers for increasing the amount of renewable energy generated. The report also delved into local energy generation from renewable energy sources (RES); joint RES projects with other EU countries and some non-EU countries and also the potential of buying green certificates through statistical transfers. The financial model analysed and outlined within the report suggests that the most potentially financially attractive option for Malta to increase the generation of energy through RES would be the joint project option with another country. However, this feasibility study also states that if the priority for Malta is the generation of energy by means of RES, then an offshore wind farm maybe more feasible than solar technology.

"If the strategic benefits of generating renewable energy within Malta are considered a priority, offshore wind would be a more feasible option and contribute a higher proportion of renewable energy than solar."

(Mott MacDonald, 2009, pp. 6-12)

Table 6-1: Qualitative Comparison of Options

Option	Key risks	Key benefits
1. Offshore	Public opposition Environmental constraints Lack of investor interest	Security of supply Within Malta's control
2. PV	Low deployment rate High costs	Security of supply Within Malta's control
3. Statistical Transfer	Credit supply uncertainty Credit price uncertainty No energy security	Simplicity Unlimited
4. Importing green electricity	External to Malta Sicily grid congestion	Security of supply Access to lower cost electricity Directive compliance
5. Joint Projects	External to Malta No energy security Regulatory uncertainty Financial risks	Find optimal projects Low credit supply & price risks

Table 2: Qualitative Comparison of Options (Mott MacDonald, 2009, pp. 6-11)

Following the forwarded recommendations from the aforementioned report, the Government commissioned a subsequent study into the feasibility of three sites for wind farms. The study had to assess the environmental impact, the required data collection regarding the wind on site to better understand the energy generation potential and a grid stability study. The three identified sites were at Sikka Il-Bajda in Mellieha, Wied Rini in Rabat and at the Hal-Far Industrial Estate in Zurrieq.

The environmental impact assessment for the large-scale offshore wind farm at Sikka Il-Bajada was concluded towards the end of 2012 and submitted to MEPA. This document stated that further information was required about the avian activity in this area. Further research and monitoring was suggested to ensure a better understanding of the long-term effects of this 11km^2 project. Although the average wind speeds measured at Ahrax Point in Mellieha are at the lower limit of commercial viability, the site is projected to have a maximum installation capacity in the region of 72-95 MW. The other two smaller sites in the limits of Rabat and Zurrieq have projected maximum installation capacities of 10.2 MW and 4.25 MW respectively. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)

4.2.7 Policy Guidelines for Micro-Wind Turbines

In May 2010 the Malta Environment and Planning Authority (MEPA) published a set of permit guidelines for micro wind turbines up to a capacity of 20kW, entitled "Policy Guidelines for Micro-Wind Turbines". This document provides guidance about potential locations, requirements and conditions for the appropriate installation of turbines of this nature. However as was expected, the uptake of micro and medium wind turbines has been negligible due to a number of uncertainties including the high cost, the planning permission and the absence of advantageous feed-in tariff rates.

4.2.8 Malta's National Renewable Energy Action Plan

In July of the same year, Malta published and submitted "Malta's National Renewable Energy Action Plan" as required by Article 4(2) of Directive 2009/28/EC. The main objectives of which were:

- Security of supply
- Competitive pricing of high energy services
- Sustainability

(Government of Malta, 2010)

It is interesting to note the change in the objectives of this document when compared to the objectives set six years ago in the National Energy Policy. The 2012 document addresses the objectives in six policy areas:

- Energy efficiency
- Reducing reliance on imported fuels
- Stability in energy supply
- Reducing the emissions from the energy sector
- Delivering energy efficiently and effectively
- Ensuring that the energy sector can deliver

4.2.9 Budget Proposals 2012

In the 2013 Budget speech the Finance Minister, Dr. Tonio Fenech, presented a number of RES schemes for 2013. These included revised feed-in tariffs for PV systems which were to be guaranteed for 20 years; a proposal for a project for individuals who are not able to install PV systems at their residence to invest in a solar farm; the reintroduction of the solar water heater, double glazing and roof insulation grant schemes. Contrary to the norm in Malta's Parliament, the 2013 Budget was not approved. A new budget will be presented to Parliament for approval after March 9th elections. Whatever the outcome of the elections, major changes in budget proposals for RES schemes are not likely. (Government of Malta, Ministry of Finance, the Economy and Investment, 2012)

The proposed list of revised feed-in tariffs has been listed below:

Apart from this, the following feed-in tariffs will be introduced for PVs that are not helped by some form of financial grant on capital as follows:

- installations of less than 1MW on roofs : 18c/kWh for 20 years;
- installations of less than 1MW on the ground: 17c/kWh for 20 years;
- installations of more than 1MW on roofs: 17c/kWh for 20 years;
- Installations of more than 1MW on the ground: 16c/kWh for 20 years.

(Government of Malta, Ministry of Finance, the Economy and Investment, 2012)

Proposals related to the above mentioned feed in tariffs were realised through the publication of LN 71 of 2013 and are explained in sections 4.3.3 and 4.3.6.

4.2.10 Malta's National Energy Policy

The 2006 draft Energy Policy was updated to reflect the 2008 energy package including Malta's target to have a 10% share of renewable energy by 2020 and a 10% share of renewable energy in the transport sector. A consultation process to revise the energy policy was later launched in April 2009, the result of which was later subject to a Strategic Environment Assessment. The published document entitled, "A Proposal for an Energy Policy for Malta" was drafted by the Ministry of Resources and Rural Affairs in April of the same year. Six policy areas were identified, namely: energy efficiency, reducing reliance on imported fuels, stability in energy supply, reducing the emissions from the energy sector, delivering energy efficiency and effectively and ensuring that the energy sector can deliver. (Government of Malta, Ministry for Resources and Rural Affairs, 2009)

"The National Energy Policy for the Maltese Islands" was published by the Ministry for Resources and Rural Affairs in December 2012. In light of the European targets and the updated milestones EU member states must reach, this document not only focuses on the relatively short-term goals of 2020, but also looks towards the requirements for Malta for the EU's 2050 targets. Decarbonisation and the reduction of importance given to fossil fuels, while ensuring cost effectiveness and economic growth are at the centre of this document.

The 2012 National Energy Policy states that it is:

"…coherent with other national policies and strategies. These include:

- National strategy for policy and abatement measures relating to the reduction of greenhouse gas emissions;
- Operational Programme 1 – Investing in competitiveness for a better quality of life 2007-2013;
- National budgets;
- Vision 2015 for the Maltese Islands;
- Draft Structure plan (spatial policy) draft version for consultation;
- National Environmental Policy;
- Policy guidelines on micro-wind turbines;
- National Action Plan for Green Public Procurement;

- Climate change strategy and adaptation strategies;
- National Energy Efficiency Action Plan: June 2011;
- National Renewable Energy Action Plan: July 2010;
- Green economy document, draft version for consultation;
- A Solid Waste Management Strategy for the Maltese Islands, First Update, December 2010"

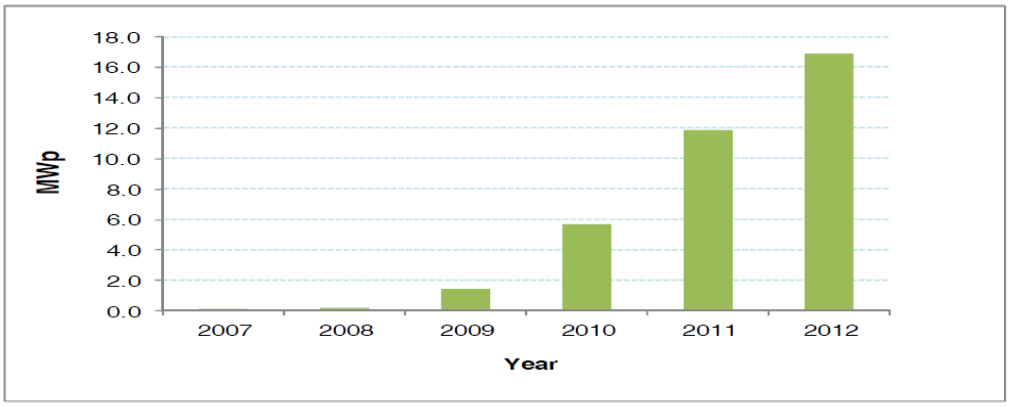
(Government of Malta, Ministry for Resources and Rural Affairs, 2012)

The publication of this document came at a delicate time for Malta because on the 1st of January 2013, the EU Emissions Trading Scheme (ETS) commenced. Since the local energy operator, Enemalta Corporation, will need to purchase allowances to cover the CO2 emissions, this will result in a change in the cost of energy. An exhaustive list of recommendations for all sectors of the economy was included in this Policy document, with projected timeline deadlines to contribute towards the achievement of Malta targets. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)

4.3 Schemes to Increase Investment in RES and EE

4.3.1 Photovoltaic systems and Micro Wind Turbines

Over the last half a decade, policies have been issued to further attract investment in micro level renewable energy sources, with particular attention given to PV and MWT systems. The policies outline three sectors, namely: residential, public and commercial and industrial.



Graph 2: Uptake of PV Systems Registered With the Malta Resources Authority from 2007 and May 2012 (Government of Malta, Ministry for Resources and Rural Affairs, 2012, p. 94)

4.3.2 Residential Sector: Photovoltaic Systems and Micro Wind Turbines

Capital grants schemes for PV systems and MWT were initially presented and commenced in 2006 and were in place until February 2009. The grant scheme for PV systems provided investors with a grant of 20% on the purchase price of the installation, conditioned by a minimum of 1 kWp and a maximum of 3.7 kWp. This grant was subject to a maximum of € 1,164.69 with an additional grant of € 582.34 for every additional installed kilowatt peak. (Government of Malta, 2006) In the case of MWT's the scheme provided investors with a grant of 25% of the total eligible cost up to a maximum of €232.94**.** (Government of Malta, 2006)

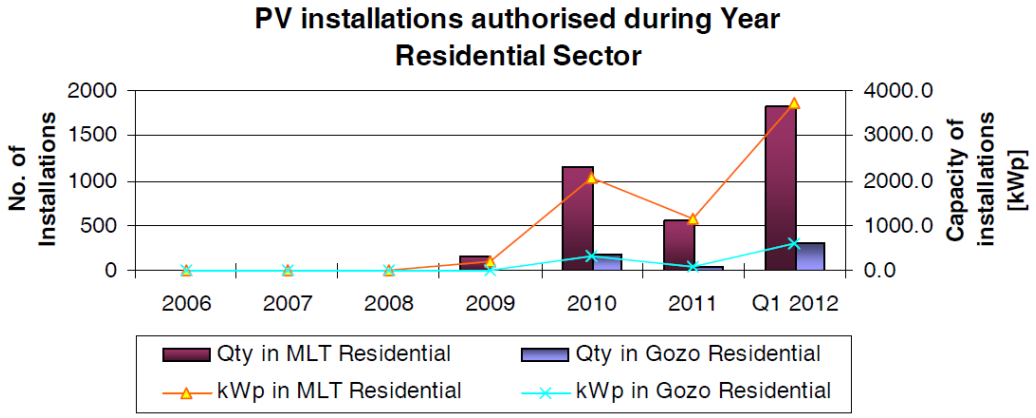
Year	Qty in MLT Residential	Qty in Gozo Residential	kWp in MLT Residential	kWp in Gozo Residential
2006	8	2	13.9	2.0
2007	5	0	8.0	0.0
2008	3	1	6.5	2.1
2009	149	6	197.3	6.8
2010	1141	175	2070.0	327.0
2011	550	32	1152.2	79.4
Q1 2012	1826	303	3737.8	588.4

Table 3: The Uptake of Photovoltaic Systems in the Maltese Residential Sector (Government of Malta, Malta Resources Authority, 2012, p. 1)

The grant for PV systems was revised in 2009, which provided investors with a grant of 50% on the purchase price of the installation, subject to a maximum of €3,000. (Government of Malta, 2009) This was once again changed in 2010, when two calls for PV systems were launched. The first call provided investors with an EU funded grant of 50% of the eligible costs up to a maximum of €3,000. (Government of Malta, 2010, p. 1489) The number of households that could benefit from the grant was also capped at 416households. This first call commenced in February of 2010 and was terminated in April of the same year by the Legal Notice 619 of 2010. The second call relating to grant schemes for PV systems was regulated by the notice published in the Government Gazette on the 22nd of July 2010. This EU funded grant, like the first call, also provided investors with a 50% grant of the total eligible cost, capped at a maximum of €3,000.

In 2011 a scheme was introduced that was co-funded by the national funds as well as ERDF funds. The scheme was regulated by Notice 617, and was later amended by the Notice 895 both of which were published in the Government Gazette in 2011. This grant provided investors with a 50% grant on all the eligible costs capped at a maximum of €3,000.

No data was available about MWT installations.



Graph 3: The Uptake of Photovoltaic Systems in the Maltese Residential Sector (Government of Malta, Malta Resources Authority, 2012, p. 3)

4.3.3 Residential Sector: Net metering and Feed-in Tariffs

A net metering system was in place when the first schemes for PV and MWT's were in place, but this mechanism is no longer in place for investors. This provided the residential sector with a spill off tariff of €0.069/kWh (Government of Malta, 2004), if any excess energy was exported to the grid, above that consumed by the residence. Early investors who started using the net metering system were given the option to continue using the net metering system or to switch to the feed-in tariff system introduced by the Government in July 2010 for PV systems. It must be noted that energy generated from MWT also makes use of the same regulations. (Government of Malta, 2010)

The Feed-in Tariff regulations, presented in 2010, establish that Enemalta Corporation will pay investors €0.25 for every kWh (unit) of electricity generated by PV systems in the residential sector and exported to the grid. This tariff applies to the Maltese market, while a separate feed-in tariff for Gozo of €0.28 for every kWh (unit) of energy generated was set. These feed-in tariff rates for the residential sector were guaranteed for 8 years. A limitation was included in the agreement which stated that exports over 4,800kWh would be paid for by a

feed-in tariff of €0.11 kWh, which represents the marginal cost and is announced yearly to reflect the marginal costs in that particular years by ENEMALTA/ARMS. The feed-in tariffs are paid for as deductions in energy consumed from the grid by the investor. If energy generated exceeds that consumed, the excess credit is carried forward as a credit note. (Government of Malta, 2010)

The most significant change in the updated 2013 feed-in tariff regulations was the introduced distinction between roof and ground mounted PV systems. The Legal Notice 71 of 2013 states that variable rates are available to applications approved in the first six months of 2013. The systems can be installed on any type of premises, however the investor must not have benefited from a grant for the initial capital investment. (Government of Malta, 2013) The following table outlines the various feed-in tariffs outlined:

Installation Type	Roof Mounted System		Ground Mounted System	
Capacity	Less than 1000kWp (per kWh)	1000kWp or more (per kWh)	Less than 1000kWp (per kWh)	1000kWp or more (per kWh)
Feed-in Tariff Rate	€0.18	€0.17	€0.17	€0.16
Guaranteed Period (years)	20	20	20	20

Table 4: Feed in Tariffs 2013 (Government of Malta, 2013)

4.3.4 Public Sector: Photovoltaic Systems and Micro Wind Turbines

Increased promotion has taken place over the last half decade for the installation of RES in public buildings. Between the years 2006-2009, 130 kWp of photovoltaic systems were installed on public buildings. (Government of Malta, Ministry for Resources and Rural Affairs, 2010)

In September 2012 following a competitive tendering process, the Government awarded a tender to a private entity to install 67,000m^2 of PV systems. These PV systems will be installed on a number of publicly owned properties, where the roof space has been leased for 25 years. The arrangement states that the firm is responsible for purchasing, installing, operating and maintaining the PV systems and must sell the electricity generated to the local operator Enemalta Corporation. The installed capacity is approximately equal to 4.5MWp and the

project will cost €20 million. The government has stated that this project is the first in a two-phase plan. The second phase will commence once the required lessons have been learnt from the first phase. In addition to these two phases, similar projects are also being considered at the University of Malta and MCAST. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)

4.3.5 Commercial and Industrial Sector: Photovoltaic Systems and Micro Wind Turbines

A co-financed scheme was launched with national and European Regional Development Funds between the years 2007-2013. This was formally launched in 2009 and its aim was to provide both the commercial and the industrial sectors with assistance to implement and install RES systems. A total of €10 million of funds was made available to investors, with the mechanism providing 50% of the initial investment, with a maximum capping of €100,000. The investment provided had to result in reducing the use of energy from fossil fuels by either more efficient use of energy or through the investment in renewable energy sources. The applicants had to prove that the installation could be completed within 24 months from the issue of funds and the project had to cost more than €25,000, but less than €200,000. All applicants had to prove that one of the two aims would be reached and applicants were ranked once the call for further applications closed. (Government of Malta, 2008) The top-ranked applicants were subsequently awarded the funding.

Year	Total installed MLT (All sectors)	Total Installed Gozo (All sectors)	Total kWp Installed (All sectors)
2006	17	3	**42.0**
2007	15	1	**53.4**
2008	12	6	**130.9**
2009	161	31	**1168.8**
2010	1162	232	**3917.8**
2011	575	103	**3674.0**
Q1 2012	1844	311	**4424.4**

Table 5: The Uptake of Photovoltaic Systems in All the Sectors in Malta (Government of Malta, Malta Resources Authority, 2012, p. 1)

The first call for applicants, early in 2009, saw the installation a photovoltaic capacity of 1.3 MWp, while the second call at the end of the same year saw an approved capacity of 2.1 MWp. (SOURCE: Malta Proposed National

Renewable Action Plan Report - 2010). The results of the third call are yet to be published.

While RES systems were amongst the most popular, the ERDF scheme was also used by the commercial and industrial sectors to obtain funding for the following:

- Building management systems
- Replacement of light fittings
- Intelligent lighting control and demand-controlled dimmable ballasts
- Room energy management systems
- Energy sub-metering systems and energy management software
- Installation of solar film and/or shading devices
- Improvements to insulation, fenestration and infiltration
- Installation of heat recovery systems
- Inverter motor speed control
- Demand-controlled ventilation
- Combined heat and power
- Natural ventilation projects, free cooling schemes, etc.

4.3.6 Commercial and Industrial Sector: Feed-in Tariffs

The majority of the photo voltaic and micro wind turbine systems installed within these sectors make use of the feed-in tariff system, however off the grid systems have also been installed. The feed-in tariff for commercial and industrial sector provides investors with €0.20 for every kWh (Unit) generated and this rate is guaranteed for 7 years. (Government of Malta, 2010) The feed-in tariff for this sector is capped at a maximum of 160,000 kWh and any energy generated over and above this figure will be paid for at a rate of €0.11 kWh. This latter feed-in tariff rate represents the marginal cost and is announced yearly to reflect marginal costs in that particular year by Enemalta Corporation. (Government of Malta, 2010)

The updated 2013 feed-in tariff regulations stated for the commercial sector, the tariff paid for electricity generated from PV's in the years 2010, 2011 and 2012, remained unchanged. This meant that the €0.20 per kWh tariff for a guaranteed seven years was still available to investors. (Government of Malta, 2013)

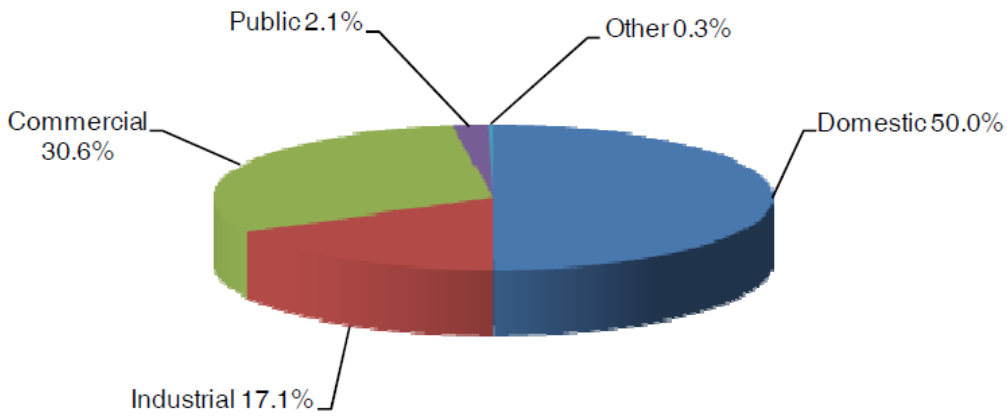
The update in the regulations also stated that applications in the commercial sector approved during the first six months of 2013 would benefit from a feed-in tariff of €0.17 per kWh. This tariff was guaranteed for a period of seven years and capped at an annual threshold calculated kWp multiplied by 1600kWh. Furthermore, investors are unable to benefit from grants in excess of 50% of the initial capital investment on the system to be eligible for this updated scheme. (Government of Malta, 2013)

These regulations also included the budget proposals which introduce the distinction between roof and ground mounted PV Systems. These have been explained in the preceding section 4.3.3. (Government of Malta, 2013)

As in the case for the residential sector, the feed-in tariffs are paid as deductions in energy consumed from the grid. If energy generated exceeds that consumed, then the excess credit is carried forward as a credit note for the investor.

4.3.7 Remarks: Photovoltaic Systems and Micro Wind Turbines

The various schemes over the years have resulted in a 16MW system of photovoltaic systems on the island, which have been registered with the Malta Resources Authority by May 2012 and which when either completed or fully functional could produce circa 25 GWh/annum. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)



Graph 4: Uptake of PV Installations (Government of Malta, Ministry for Resources and Rural Affairs, 2012, p. 94)

4.3.8 Solar Water Heaters

Due to Malta's location, SWH's are efficient and have a potential of absorbing 1650kWh/year of energy. (Buhagiar & Yousif, 2005). The relatively high efficiency and low cost of installation of the system has led to a high uptake amongst the local population.

4.3.9 Residential Sector: Solar Water Heaters

SWH's are by far the most widely used renewable energy application in Malta. Many grant schemes have been issued over the years to encourage the investment in this technology. The first scheme came into effect in 2005 and provided 15.25% of the total eligible costs up to a maximum grant of €116.48. (Government of Malta, 2005) This was subsequently doubled in 2006 to €232.94 (Government of Malta, 2006) and lasted until the 15th of February 2009, with an average of 1700 water heaters being installed each year. (Government of Malta, Ministry for Resources and Rural Affairs, 2012) The grant scheme was further increased in 2009 and provided 66% of the capital cost of the product, with a maximum capping of €460. (Government of Malta, 2009). This particular initiative yielded approximately 3,500 water heaters per year. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)

In 2010, the government re-issued the grant with a total budget of €4.2 million allocated for solar water heaters; this scheme was co-financed by the Government and the European Research Development Fund and was to be used over a three year period. (Government of Malta, 2010) This scheme grants investors with 40% of the eligible costs, up to a maximum of €560, however the scheme included clause of restricted eligibility clauses, which resulted in reduced sales. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)

Following a reduction in the sales in 2010 of Solar Water Heaters, the year 2011 saw the launch of two schemes. The first scheme was co-financed by the European Research and Development Fund (85%) and national funds (15%) and entitled individuals who met the social assistance criteria with a 40% grant of the eligible costs, with a maximum capping of €560. (Government of Malta, 2011) The second scheme was entirely funded by national funds and was not restricted by any social criteria. This second grant scheme entitled investors to 40% of the eligible cost of the water heater system with a capped maximum of €400. (Government of Malta, 2011) The 2010 scheme that was scheduled to close on the 31st of December 2010 was extended to the 4th of April 2011 by

means of the Government Notice 305 of 2011. The 25th of April of the same year saw the re-introduction of two identical schemes to those that were previously open to the public. The first grant that was part funded by the EU was re-issued by means of the Government Notice 146 of 2012 and included social criteria. The second, fully funded by national funds was re-issued by the Government Notice 145 of 2012 and once again did not include social criteria for eligibility.

A separate initiative encourages the investment and installation of solar water heaters in new builds by waiving the €163 Enemalta connection fee for new electricity supply connections. This commenced in the year 2009 and is still in place. This grant is received as a deduction in the bill received by the investor and is only eligible if the request is made three months after the application for the new electrical supply is made. (Enemalta Corporation, 2009)

According to the latest data received, by the end of 2010, 15,119 solar water heaters had been installed, with a calculated solar heat capture of 28GWh. This figure includes both those installations subsidised by grants as well as those that were not subsidised. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)

4.3.10 Commercial and Industrial Sector: Solar Water Heaters

The national and ERDF co-financed grant scheme previously mentioned in the subsection entitled "Commercial and Industrial Sector – Photovoltaic (PV) and Micro Wind Turbines (MWT)" refers to the scheme administered by Malta Enterprise. This grant scheme was formally launched in 2009 and encouraged the commercial and industrial sectors to invest in either energy saving measures or alternative energy sources. Since this sector was able to choose one or the other, some business owners decided to invest in solar water heaters for their establishments. (Malta Enterprise, 2010)

This scheme provided investors with a 50% grant for all eligible costs capped at a maximum at €100,000. The grant stipulated that the maximum cost of the installation could not exceed €200,000 and had to be greater than €25,000. (Malta Enterprise, 2010)

4.3.11 Co-Generation

The Malta Resources Authority issued a feasibility study report entitled "Analysis of Potential for Co-Generation on the Maltese Islands" in June 2009. This document studied the possibilities of using a power station to simultaneously generate both electricity and useful heat in the residential, commercial, industrial, education and health care sectors. The co-generation directive 2004/8/EC was transposed into Maltese legislation through the Legal Notice Number 2 of 2007 (and was amended by the Legal Notice no. 196 of 2008). This feasibility study was an obligation the Malta Resources Authority had to adhere to and must be reproduced every four years. The purpose of the report was to explore the possibilities of investing in co-generation in a number of sectors in Malta. This study also presents an analysis of the energy sector and electricity market of Malta, to ensure better understanding of the feasibility of such a co-generation project. Although the report indicated that in certain cases co-generation could provide benefits, it outlined the fact that co-generation is in fact more of an energy efficiency measure rather than a renewable energy source.

4.3.12 Building Insulation

Grant schemes for the insulation of the roofs in the domestic sector commenced in 2006 and the initial scheme provided investors with a 25% grant on the purchase price of the insulation, capped at a maximum of €232.94. (Government of Malta, 2006)

This scheme was later terminated in February 2009 in accordance to the Government Notice 81 of 2009. The same government notice brought with it the commencement of the 2009 scheme which provided investors with a grant of 33% of the eligible costs up to a maximum of €300. This scheme was open to a maximum of 1,000 families. (Government of Malta, 2009)

In April 2012 a scheme was introduced to further encourage the better use of energy. This national funded scheme sought to encourage the use and installation of both roof insulation as well as double-glazed apertures. The grant scheme provided investors with 15.25% of the total eligible costs, up to a maximum grant of €1,000. (Government of Malta, 2012)

The commercial and industrial sector were also encouraged in 2009 to invest in insulation by means of the ERDF grant scheme which provided grants for both

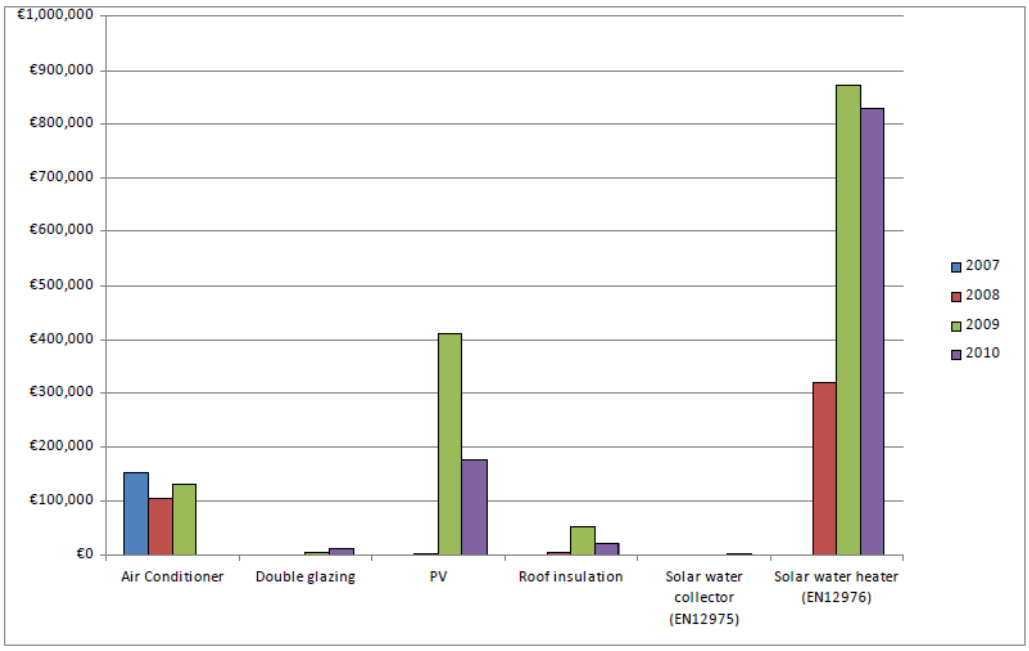
alternative energy sources as well as energy saving measures. This scheme provided investors with a 50% grant for all eligible costs capped at a maximum at €100,000. The grant stipulated that the maximum cost of the installation could not exceed €200,000 and had to be greater than €25,000. (Malta Enterprise, 2010)

4.3.13 Double Glazing Apertures

The first grant scheme for double glazed apertures in the domestic sector was launched in 2009 and provided investors with a grant of 33% of the eligible costs up to a maximum of €300. This scheme was open to a maximum of 1,000 households. (Government of Malta, 2009)

As previously stated, the 2012 National funded grant provided investors in the domestic sector with a 15.25% of the total eligible costs up to €1,000. (Government of Malta, 2012)

The commercial and industrial sector were also encouraged in 2009 to invest in double glazing by means of the ERDF grant scheme which provided grants for both alternative energy sources as well as energy saving measures. This scheme provided investors with a 50% grant for all eligible costs capped at a maximum at €100,000. The grant stipulated that the maximum cost of the installation could not exceed €200,000 and had to be greater than €25,000. (Malta Enterprise, 2010)



Graph 5: Government Grants on Installations, Fixtures and Renewable Energy Systems (Government of Malta, Services Division, Ministry for Resources and Rural Affairs, 2010, p. 8)

The following table outlines all the Government grants issued:

Description Scheme	Year Grant Issued	No of Grants	No of Payments	kWp Potential
2006 PV	2006	/	51	641.31
2006 Roof Insulation	2006	/	179	/
2006 SWH	2006	/	2538	/
2009 PV	2009	176	154	231.13
2009 Double Glazing	2009	70	51	/
2009 Roof Insulation	2009	170	152	/
2009 Double Glazing	2010	46	34	/
2009 Roof Insulation	2010	43	36	/
2009 SWH	2009		2	/
2009 SWH	2009	2546	2329	/
2009 SWH	2010	749	635	/
2010 PV Call 2	2010	2260	1579	3985.84
2010 PV Call 2	2011	89	80	156.53
2010 PV National			43	62.20
2010 SWHC	2010	21	20	/
2010 SWH	2010	323	295	/
2010 SWHC	2011	17	17	/
2010 SWH	2011	214	200	/
2011 PV ERDF	2011	3299	2927	6,739.12
2011 PV ERDF	2012	99	71	256.21
2011 SWHC ERDF	2011	2	2	/
2011 SWH ERDF	2011	27	24	/
2011 SWH ERDF	2012	12	8	/
2011 SWHC National	2011	74	63	/
2011 SWH National	2011	1354	1205	/
2011 SWHC National	2012	47	35	/
2011 SWH National	2012	637	483	/
2012 Double Glazing	2012	130	30	/
2012 Roof Insulation	2012	221	85	/
2012 PV	2012	99	71	256.21

Table 6: Government Grants Issued (Government of Malta, Malta Resources Authority, 2012) (Government of Malta, Ministry for Resources and Rural Affairs 2012)

4.4 National Policies and Strategies – in the Field of Vocational Education and Training (VET)

4.4.1 Further and Higher Education Strategy 2020

On the 3rd of April 2009, the National Commission for Higher Education presented its first strategy document, entitled "Further and Higher Education Strategy 2020". The document was drafted with the ambition of being a "reference and guide for both further policy development and actions for consideration by the education authorities." (Sciberras, Borg, Miller, & Tabone, 2009)

Twelve strategic priority areas were established as being of paramount importance to Malta. These dealt with topics ranging from the need to increase student populations, to the need to increase quality of the education on offer. Targets were also set for projected participation rates in further education[3] at 85% for the year 2015 and in higher education[4] at 35% for the year 2020. These must be compared with 60 % and 22% respectively for further and higher education participation rates in 2008. The need to increase the overall number of foreign paying students and also the number of local students within the strategically important sector of science and technology was emphasised. (Sciberras, Borg, Miller, & Tabone, 2009)

This strategy document also presents a case for the financial outlay of over €1 billion over a period of ten years which would lead to a considerable investment in local human capital. The presented projections showed the potential to educate and train over 100,000 individuals of all ages and raise €1.5 million annually by attracting 500 foreign fee-paying students each year. (Sciberras, Borg, Miller, & Tabone, 2009)

[3] Further education in Malta includes all formal education of persons above the compulsory school age, leading to qualifications classified at NQF levels 1 to 51. This includes all post-secondary public and private colleges and institutes which provide general and vocational education. (Sciberras, Borg, Miller, & Tabone, 2009)

[4] Higher education includes all formal education, training and research for persons above compulsory school age, leading to qualifications classified at NQF levels 6-8. (Sciberras, Borg, Miller, & Tabone, 2009)

4.4.2 A Quality Assurance Framework for Further and Higher Education

The launch of NCHE's document entitled "A Quality Assurance Framework for Further and Higher Education in Malta" on the 11th of January 2008 saw the start of a consultation process with all relevant stakeholders in Malta, including the Malta Chamber of Commerce, Enterprise and Industry. Following the launch of the aforementioned document, a seminar was held to present recommendations by NCHE about quality assurance and licensing for further and higher education institutions in Malta. Stakeholders from the entire sector were invited to attend and were subsequently requested to present their reactions to the report. Following the seminar, NCHE further clarified all the presented reactions and in March of the same year published a consultation report. The aims and principles of the proposed framework were based on the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) (European Association for Quality Assurance in Higher Education, 2005) and consisted of four main elements:

- Adequate internal quality assurance systems
- External quality audits
- Accreditation and recognition decisions based on the results of external audits
- Licensing systems linked to accreditation

(National Commission for Higher Education, 2007)

4.4.3 IVET and CVET

Initial Vocational Education and Training (IVET) is a full time training programme which youths can opt to follow after secondary school. This training should equip each individual with the skills and competences required to enter the labour market.

Continuing Vocational Education and Training (CVET) is training provided after the initial training received as youths and is defined by CEDEFOP as:

> *Short-term targeted training typically provided following initial education or training, and aimed at supplementing, improving or updating knowledge, skills and/or competences acquired during previous training. (European Centre for the Development of Vocational Training (CEDEFOP), 2004)*

Chapter Five
Statistics on the Building and Energy Sector

5.1 Introduction

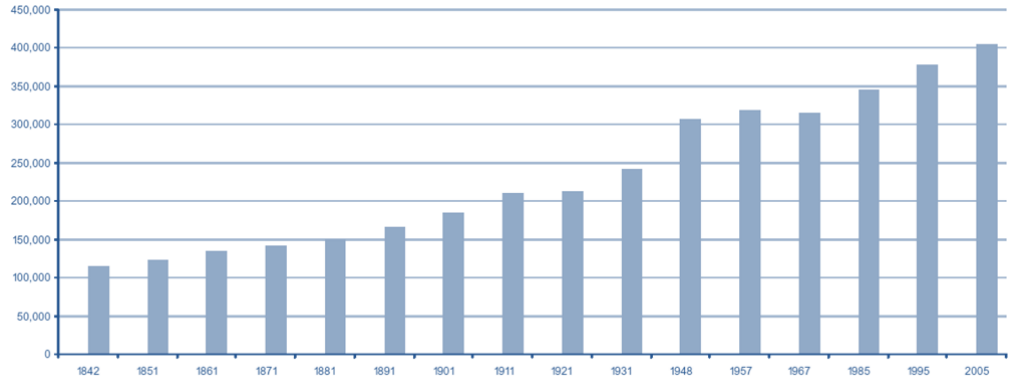
This chapter presents the current situation within the Maltese building and energy sector. Data is provided on the:

- Current building stock and the different types of buildings
- Occupied and vacant dwellings
- Low energy buildings
- Practicing companies and their employees within the industry
- Renewable energy sources in buildings

The most recent data available to the author is the 2005 Census of Population and Housing Report. The 2011 Census report is yet to be officially published and is planned to be made public at the end of the first quarter of 2013. However most of the data used has been cross referenced with the Preliminary Report of the 2011 census which was published in July 2012.

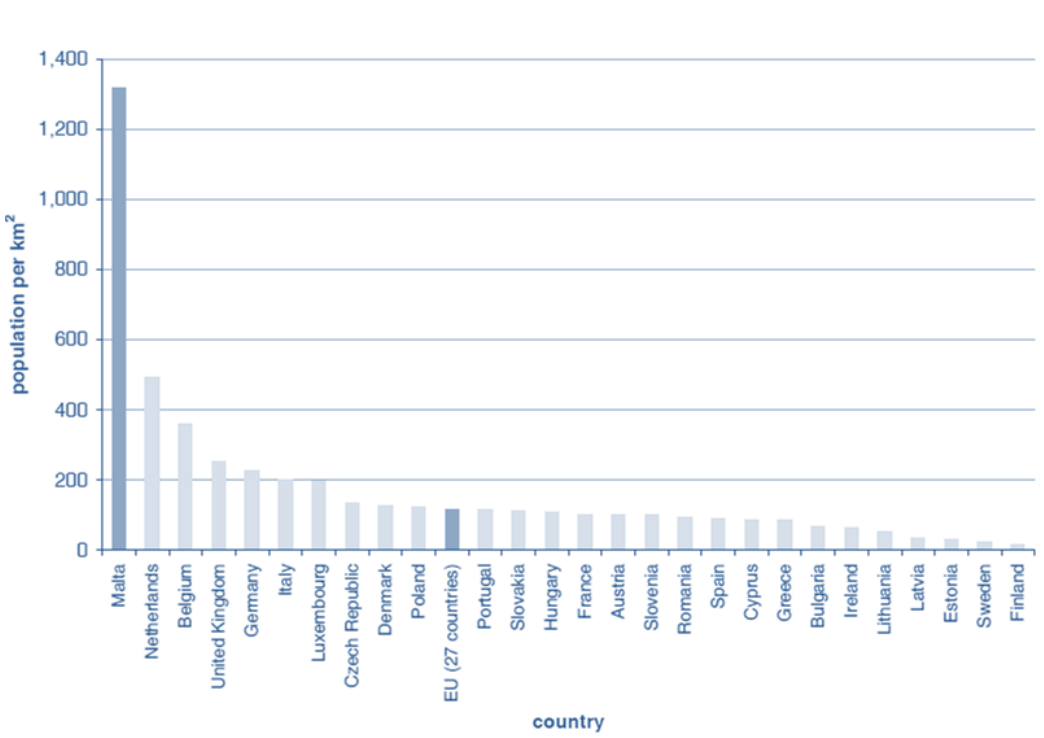
5.2 Building Stock

According to the document “Census of Population and Housing 2005, Volume 2 Dwellings” by the National Statistics Office published in 2007, Malta had a total of 192,314 dwellings. This must be understood within the context that Malta’s total population in 2005 stood at 404,962 individuals, which translates to a ratio of 2.1 individuals per dwellings. (Government of Malta, Research and Methodology Unit, National Statistics Office, 2007)



Graph 6: Population: 1842-2005 (Government of Malta, Research and Methodology Unit, National Statistics Office, 2007, p. xxiv)

It must also be appreciated that Malta has the highest population density amongst all the EU member states, which currently stands at 1,320.2 inhabitants per km^2. This is over two and a half times the population density of Holland, which is the second most densely populated country in the EU. (Government of Malta, Research and Methodology Unit, National Statistics Office, 2012, p. 22)



Graph 7: Population by Country (Government of Malta, Research and Methodology Unit, National Statistics Office, 2012, p. xx)

As will be explained in the next subsection, Malta has experienced a construction boom over the last four decades. This however has come at a cost as it has resulted in a steep increase in vacant properties.

	No. of Dwellings 1995	No. of Dwellings 2005	% Increase Over 1995
Occupied	119,479	139,178	+ 16.5%
Vacant	35,723	53,136	+ 48.7%
Total	155,202	192,314	+ 23.9%

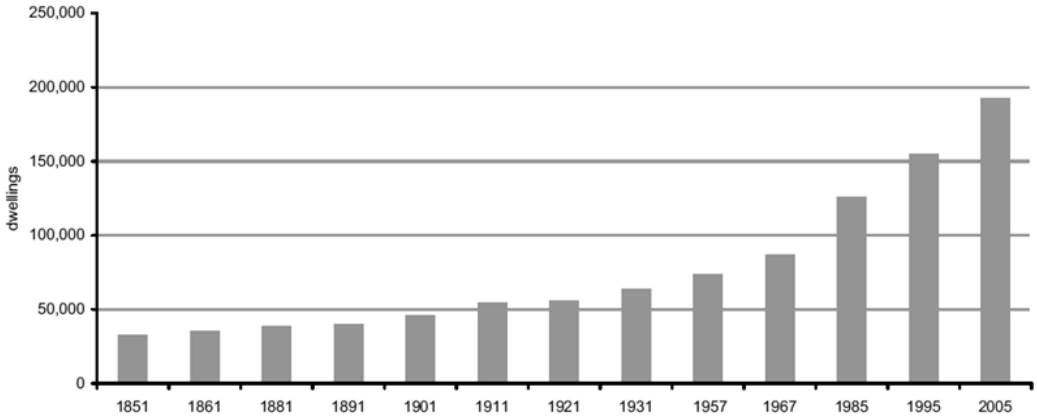
Table 7: Comparison between the Number of Occupied and Vacant Dwellings between 1995 and 2005 (Government of Malta, Research and Methodology Unit, National Statistics Office, 2007, p. 3)

The table above that includes data extracted from the "Census of Population and Housing Report 2005 Volume 2 Dwellings" clearly indicates the 48.7% increase, amounting to 17,413 vacant dwellings. This means that 46.9% of all dwellings built in the decade from 1995 to 2005 were theoretically not required to house the increase of inhabitants of the country. Obviously these dwellings are most likely either second homes, dormant investments or used as rentable holiday dwellings which are therefore only occupied on a seasonal basis. (Government of Malta, Research and Methodology Unit, National Statistics Office, 2007)

The highest concentration of construction for most of the building types took place between 1971 and 1990. This peak in the construction industry was dominated by quantity and not quality of the dwellings. To ensure maximum profits could be generated from projects, developments were built with single leaf masonry or block work walls, non-insulated floor and roof slabs and single glazed non-insulated aluminium apertures. **This has led to a considerable number of dwellings requiring retrofitting in an attempt to minimise energy consumption.**

5.3 Rate of New Construction and Renovation

The rate of new construction in Malta saw a sharp increase in the 1970's and 1980's. The local building stock increased by 5.8 times from 1851 to 2005 and more recently 2.2 times from 1967 (87,049 dwellings) to 2005 (192,314). This therefore equates to an increase of 105,265 dwellings to the building stock in just 38 years. A marked change in the type of developments was noted, especially with the increase in popularity of flats and penthouses from 1970 till present day. (Government of Malta, Research and Methodology Unit, National Statistics Office, 2007)



Graph 8: Building Stock: 1851-2005 (Government of Malta, Research and Methodology Unit, National Statistics Office, 2007)

The next table overleaf shows data extracted from the second volume of the Census on Population and Housing 2005. Numerous interesting trends that point to social and economic change can be identified whilst studying the table in question. The increase in apartments and penthouses is possibly the most obvious. The post war baby boom meant that all these individuals would require homes once they had left their parents dwelling. This, over the years resulted in a change in the landscapes of all Maltese towns and villages. Small town houses and fully detached villas were converted to apartment blocks.

The 1970's saw the increase in construction of all building types, most of which reached their peaks in the 1980's. This extraordinary rate of construction subsided after the turn of the century and the new millennium saw a reduction in the construction rate across all building types.

District and period of construction	Total	Terraced house	Semi-detached house	Fully-detached house	Ground-floor tenement having its own airspace	Maisonette	Flat/Penthouse	Farmhouse	Suite of rooms forming part of a housing unit	Other
MALTA	**139,178**	**54,714**	**6,105**	**3,534**	**9,266**	**30,894**	**32,569**	**1,261**	**447**	**388**
Malta	**128,459**	**48,147**	**5,269**	**3,128**	**8,271**	**30,378**	**31,423**	**1,050**	**440**	**353**
Gozo and Comino	**10,719**	**6,567**	**836**	**406**	**995**	**516**	**1,146**	**211**	**7**	**35**
Total	**139,178**	**54,714**	**6,105**	**3,534**	**9,266**	**30,894**	**32,569**	**1,261**	**447**	**388**
1918 or earlier	16,955	9,515	691	381	1,915	2,615	779	718	268	73
1919-1945	13,962	6,898	228	148	1,489	3,628	1,302	174	68	27
1946-1955	10,182	3,851	119	93	977	2,565	2,446	74	42	15
1956-1960	5,885	1,826	140	92	541	1,602	1,607	41	17	19
1961-1965	6,079	1,910	258	268	475	1,616	1,494	35	7	16
1966-1970	8,631	2,621	515	465	515	1,906	2,534	43	12	20
1971-1980	22,478	8,771	1,153	755	1,042	3,953	6,666	73	15	50
1981-1990	26,629	12,622	1,686	757	1,346	4,952	5,145	46	8	67
1991-1995	13,998	4,439	763	319	584	3,469	4,341	25	8	50
1996-2000	9,635	1,682	391	183	279	3,241	3,799	19	2	39
2001-2005	4,744	579	161	73	103	1,347	2,456	13	-	12

Table 8: Occupied Dwellings by Type and Period of Construction (Government of Malta, Research and Methodology Unit, National Statistics Office, 2007, p. 38)

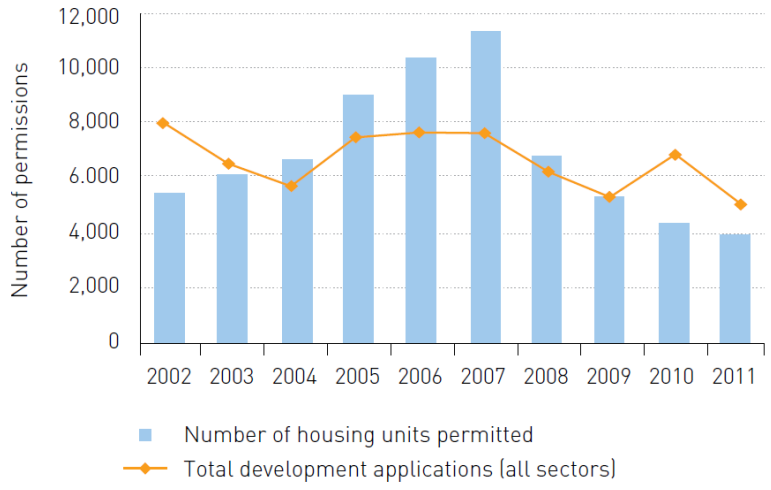
The rate of construction and overall renovation can easily be understood when viewed in the context of the fluctuation in permit applications at the local environment and planning authority. This table which has been extracted from the document “Short Term Construction Indicators Q3/2012” by the National Statistics office shows the changes in the permit applications for all building types. With the exception of maisonettes, all building types have experienced a decline in buildings permit applications when compared to the industry peaks of 2007. This further emphasises the fact that the industry's productivity has experienced a decline.

Variable	2007	2008	2009	2010	2011		2012			% change
	Q3				Q3	Q4	Q1	Q2	Q3	Q_t / Q_{t-1}
Residential buildings	**125.3**	**84.0**	**54.5**	**49.3**	**41.7**	**39.3**	**35.3**	**31.6**	**29.5**	**-6.6**
One-dwelling residential buildings	64.3	44.0	43.8	41.8	44.0	43.9	39.5	36.9	34.8	-5.7
of which:										
Maisonettes	60.9	34.0	36.9	29.7	39.6	35.4	27.1	21.5	23.1	7.6
Terraced houses	62.2	44.3	67.1	56.6	50.4	72.7	63.1	60.5	48.6	-19.7
Others	100.3	118.7	67.6	90.4	77.3	94.6	62.4	81.7	27.6	-66.2
Two and more dwelling residential buildings	139.1	92.1	57.3	50.7	40.8	38.2	34.2	30.7	28.7	-6.7
of which:										
Apartments	139.1	92.1	57.3	50.7	40.8	38.2	34.2	30.7	28.7	-6.7

* The calculation of growth rates for the indices tables may slightly differ from the growth rates published due to rounding

Table 9: Seasonally Adjusted Index for Residential Units for Which Permits Have Been Granted, Excluding Residences for Communities (2005 = 100)* (Government of Malta, National Statistics Office, 2012, p. 4)

This also is confirmed by the graph below from the document “The Environment Report Indicators 2010-2011”, depicting the total number of approved permits over a number of years. The rise in the number of permit approvals can be noted from 2005 to 2007 and was followed by a steep decline from 2008. Interestingly this report states that 82% of all dwelling units given planning permission were in fact apartments, which confirms this important change in the industry. (Malta Environment & Planning Authority, 2012, p. 12)



Graph 9: Number of Housing Permits Granted From 2002-2011 (Malta Environment & Planning Authority, 2012, p. 12)

5.4 Energy Efficient Buildings and Dwellings

Energy efficient buildings and dwellings only became a topic of discussion amongst professionals, the local authorities and developers post accession into the EU in 2004. This was further amplified with the introduction of legislation namely the EPC system and the publication the Technical Guidance Document F. Due to our Mediterranean climate, the local population has always tried to keep their houses cool in the hot summer months and warm in the mild winters. The increase in construction over the years led to a change in culture, with less emphasis being put on the quality of the building envelope which is the only physical barrier against the elements. Uncontrollable rises in the cost of electricity, due to the rise in the cost of crude oil, has led to all sectors becoming more concerned with energy efficiency to keep costs to a minimum.

Number of Permit Applications vs. Number of Energy Performance Certificates Issued			
Year	No. of Permit Applications	No. of EPC	
		Assessments	Designed
2006	8,242	n/a	n/a
2007	7,847	n/a	n/a
2008	6,264	n/a	n/a
2009	5,948	n/a	n/a
2010	5,493	1	0
2011	1,934	41	265
2012	3,153	124	113

Table 10: Comparison Between The Number of Building Permit Applications and The Number of Issued EPC's (Government of Malta, Ministry For Resources And Rural Affairs, Building Regulations Office, 2012) (Malta Environment and Planning Authority , 2013)

The table above consists of data from the Building Regulations Office, which forms part of the Ministry of Resource and Rural Affairs. Assessment EPC's are those carried out on existing buildings, while designed EPC's are ones performed on proposals. The table compares the number of building permit applications and the number of EPC's issued over the last three years. Concurrent to the introduction of this legislation the BRO organised specialised courses for EPB assessors, with 165 EPB assessors being trained in 13 course programs. The BRO only accepts EPCs from registered EPB assessors who

received the appropriate training. Article 14, Sub Article 1 of the Legal Notice 376 of 2012 states;

"An owner or his agent shall obtain an EPC in the form prescribed by these regulations when a building is constructed, sold or rented."

(Government of Malta, 2012)

Data for previous years has also been provided in the table above, as it is presumed that in most cases construction will take over one year. During the process of construction, sale or renting of the property numerous stakeholders including but limited to the architect, engineer, estate agent and eventually a notary are in most cases involved. It would be assumed that the mentioned individuals are aware of the legal requirements for the need to issue an EPC.

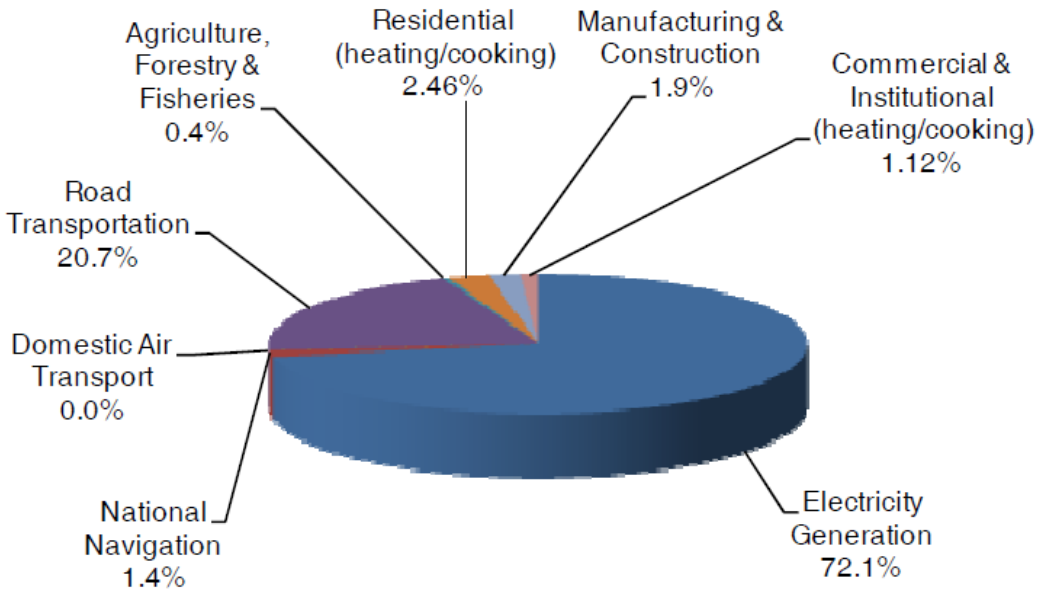
Although no official reason has been published as to why such a low number of EPC's have been registered, a few possible reasons include:

- General lack of public awareness, particularly with the various stakeholders involved
- Concern about the potential for increased costs
- Inadequate resources within the regulatory agency to enforce the mandatory use of the system

5.5 Energy Consumption

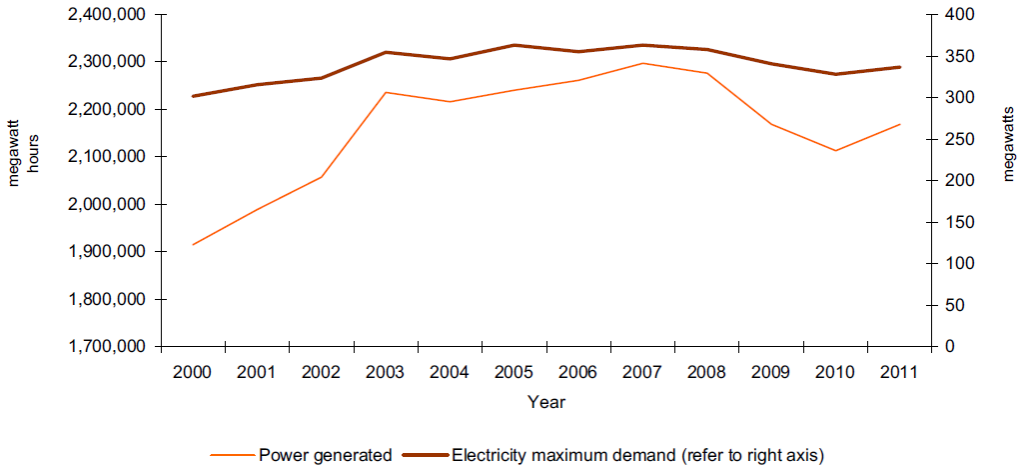
All of Malta's energy requirements are imported since the country possesses no reserves of fossil fuels or the space to construct a nuclear power plant. Understandably this leaves the country vulnerable to potential supply disruptions and severe price fluctuations. Malta's 2012 National Energy Policy states that the country must continue to strive to diversify the energy sources that it is making use of, as well as improve the security of supply. (Government of Malta, Ministry for Resources and Rural Affairs, 2012) This would also relieve the dependence on the local power stations, which experience the highest demands during the months of July and August. (Government of Malta, National Statistics Office, Environment and Resources Unit, 2012)

Enemalta Corporation, the local public provider of electricity, purchases the required fossil fuels directly from the suppliers. Fossil fuels consumed by power stations account for approximately 72% of the local consumption for Malta. Understandably this leads to extreme susceptibility should the local supply ever be disrupted. Future policies must include strategic action plans for further diversification, possibly into natural gas to complement the heavy fuel oil and light distillates currently being used at the local power stations. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)



Graph 10: Primary Energy Imports Consumed in the Inland Market in 2011 by percentage (Government of Malta, Ministry for Resources and Rural Affairs, 2012, p. 44)

Previous sections of this report have explained that Malta has experienced both a steady increase in the population as well as in the rate of construction. It is therefore acceptable to presume that the same rate of growth was experienced in a number of other sectors in Malta. This brought about increased energy demands, which have been illustrated by the graph below. This graph was published in the document “Energy Consumption in Malta: 2000-2011” by the NSO and compares the power generated with the maximum electricity demand over an eleven year period. It is interesting to note that following the peaks in 2007 and 2008, a decrease for demand and therefore generation was experienced during 2009 and 2010.



Graph 11: Electricity Generation in Malta: 2000-2011 (Government of Malta, National Statistics Office, Environment and Resources Unit, 2012, p. 3)

The identified drop in demand and resultant production was potentially the consequence of the increase in the cost of energy. Policy change resulted in a greater portion of the cost being passed on to the consumer because as things stood the approach was no longer sustainable. The consumer therefore saw a reduction in the subsidy provided by the government, which was hoped, would encourage more efficient use of energy in buildings and the installation of RES.

The uptake of all RES that have made use of government incentives and capital grants have been tabulated below, together with the energy generated by each system. This data was provided by the MRA.

Technology	Number of Installations	Energy (kWh)
Solar PV	4,862	10,825.43
Wind	0	0
Solar Water Heater	7,603	n/a

Table 11: Total Uptake of RES Systems through Government Incentives and Energy Generated (Government of Malta, Malta Resources Authority, 2012)

5.6 The Building Sector – Organisations and Workforce

The local Building Sector consists of approximately 7,100 organisations (Government of Malta, National Statistics Office, Business Registers Unit, 2012) and 11,099 employees. (Government of Malta, National Statistics Office, Labour Market and Education Statistics Unit, 2013) The target group which fall within the scope of this project and report are approximately 4,885 workers. This value represents the workers that fall under the NACE Code Category F number 43, "Specialised Construction Activities". (Government of Malta, National Statistics Office, 2013)

The sector is largely reliant on a large volume of micro (0 – 9 employees) firms which represent 97.5% of the market. On the other size of the spectrum, the large (250+ employees) firms represent less than 1% of the market. This is very evident from the table below, which has been plotted from data taken from the document "Business Demographics: 2006-2011" published by the National Statistics Office in April 2012.

No. of Employees Per Firm	2006	2007	2008	2009	2010	2011
0-9	6099	6455	6721	6868	6891	6939
10-49	139	143	146	153	153	152
50-249	19	23	24	22	20	20
250+	5	4	4	5	4	4

Table 12: Number of Firms by Size within the Construction Industry (Government of Malta, National Statistics Office, Business Registers Unit, 2012)

The data illustrates the size of companies within the construction industry over a six year period. Although a very small number of large firms are practising within the market, it is interesting to note that they do not employ the majority of the employees. This therefore leads one to conclude that the local market is driven by short term project based contracts for micro companies[5] or sole

[5] (European Commission, 2013)

Company Category	Employees	Turnover € (million) or Balance Sheet Total € (million)	
Medium – Sized	< 250	≤ 50	≤ 43
Small	< 50	≤ 10	≤ 10
Micro	< 10	≤ 2	≤ 2

practitioners which may be subcontracted by the larger firms, who may be more likely to win tenders for large projects. Training for micro companies during business hours is not always viable due to tighter schedules and lack of human resources. The majority of CVET is in fact provided as evening classes, in attempt to attract individuals from firms of all sizes. (Government of Malta, National Statistics Office, Business Registers Unit, 2012)

Table 12: Number of Firms by Size within the Construction Industry shows data for a specific range of NACE Code entries which are all directly related to the construction industry and specifically the construction of green buildings. The selected data covers the following NACE code entries, which have been added to provide the data above: 41 = Construction of buildings, 42 = Civil engineering, 43 = Specialised construction activities and 71 = Architectural and engineering activities, technical testing and analysis. (Government of Malta, National Statistics Office, Business Registers Unit, 2012)

It is the authors opinion that with the recent drive and emphasis on the construction of green buildings, it is believed that the flexibility of small firms may result in a change in their corporate direction towards related activities. Alternatively it is believed that labour entrants may choose to be more specialised and therefore become an on-demand resource to the large firms. Firms who offer services to construct or renovate green buildings, should be successful in the long run with the large amount of retrofitting needed within the local market. Due to our high population density it is thought that redevelopment, particularly into more energy efficient buildings will become the norm. This should translate into increased attendance for formal training provisions, both IVET as well as CVET.

Chapter Six
Existing Vocational and Educational Training Provisions

6.1 Introduction

The Maltese education system, with the exception of the most recent changes, has been broadly based on that used in Great Britain. This can be attributed to the fact that Malta was a British colony until 1964. Post accession to the European Union, Malta saw some drastic changes both in the content being taught to students at all levels and also to the system of attainment of the qualifications and the respective accreditation bodies.

Education for the most part has always been provided free of charge to the public in Malta. In light of this, a number of private education institutions have set up in Malta, which provide a variety of courses to students. The local public institutions are still the leaders for the provision of VET in Malta, particularly in the field of construction and green skills. The main stakeholders and the courses they offer to the public are explained at length in this chapter.

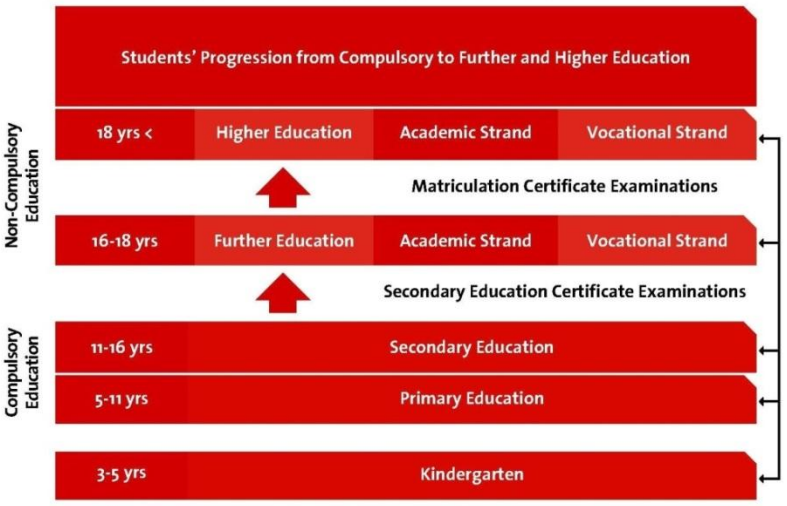


Figure 4: Student Progression from Compulsory to Further and Higher Education (National Commission for Further and Higher Education, 2013)

6.2 National System for VET of Tradesman and Other On-Site Workers in Buildings

6.2.1 Malta's National Education System

Children in Malta start school relatively early when compared to their counterparts throughout the majority of Europe. Although compulsory education commences at the age of five, most parents opt to start sending their children to pre-primary as early as three. This is sometimes also referred to as nursery and is offered to the public free of charge by the government. Post pre-primary school, children commence primary education, which consists of a six-year programme and is divided administratively into two cycles of three years each. Once students have completed this first stage in their education, they move onto secondary school. This is a further five years of education and is the last stage of compulsory education in Malta. (Government of Malta, Ministry of Education and Employment, 2012)

Once students have sat for their Secondary Education Certificate (SEC) at the end of secondary school, they then have the choice to either further their education or to commence work. If the former is selected post-secondary education can be either the general education route or alternatively the vocational track. The two -year general post-secondary education leads students to the Matriculation Certificate examinations, which in themselves are the entry point to the University of Malta and MCAST. Although most students opt to follow a full time two -year course, no restrictions are in place regarding when one is able to sit for these exams. Entry requirements to all public and private post-secondary education institutions require a minimum of six passes at grade 1 to 5 (a grade 1 is equivalent to an A and a grade 5 is equivalent to a D/E) of the Secondary Education Certificate, which are equivalent to a Level three of the Malta Qualifications Framework. (Government of Malta, Ministry of Education and Employment, 2012)

The other route open to students at the age of sixteen is to commence a vocational course at one of a number of institutions that provide a variety of courses to the public. These courses range in duration from two years to a number of years. Although a number of public and a handful of private institutions offer courses, only two public institutions offer courses related to construction and green skills. The Malta College of Arts, Science and

Technology (MCAST) and the Employment and Training Corporation (ETC) are the two biggest vocational training providers. MCAST can be referred to an umbrella institution as it houses all the state vocational institutions. (Government of Malta, Ministry of Education and Employment, 2012)

6.2.2 MCAST

MCAST consists of ten institutes and the Gozo Centre, of which the Institutes of Building and Construction, Electrical and Electronics and Mechanical Engineering, offer training in trades related to the green construction industry. Courses are offered at different levels ranging from Higher Education Certificate's to Undergraduate Certificate and also Undergraduate Diplomas. While some courses do not require any entry qualifications, others do and these correspond to the MQF level assigned to the training. At the time of writing the institutes offered a total of 20 courses relevant to this project. Part time courses are also offered by MCAST, which are predominantly targeted to the existing workforce, one of which is conducted in conjunction with the Ministry for Resources and Rural Affairs. (Government of Malta, Ministry of Education and Employment, 2012)

The entry requirements for the full time courses at MCAST vary, depending on the courses but these are always in terms of the number of passes in the Secondary Education Certificate. Once an individual has entered into the Vocational system at MCAST, mobility within the same area of study is made very easy for students.

6.2.3 ETC

ETC's role within the local educational landscape is to aid the unemployed portion of the population to find employment through the provision of training to increase their job prospects. Since the institution is predominantly a job centre, therefore the entry system is very different to other local educational systems. Local jobseekers are required to register at ETC, which means that the individual in question is ready and willing to take active steps to improve their employability. (Government of Malta. Employment Training Centre, 2013)

Registration at ETC refers to registration on the unemployment register. The register in Malta has three main parts. The first part is for individuals who have never worked or who have been made redundant. These individuals may be

entitled to unemployment benefits. Individuals who have resigned from their previous job, who have missing documents, who have been dismissed or who have been removed from the first part of the register are listed on part 2 of the register. The third part of the ETC register is of individuals who are currently employed but would like to be notified of other opportunities all the same. If one requires part time employment, such as students, these are enlisted on part 3B of the register. The registers 3C1 and 3C2 are for individuals who require a part time employment opportunities as their sole employment or would like a part time employment in addition to their full time job, respectively. (Government of Malta. Employment Training Centre, 2013)

Upon registration, in addition to job search seminars, the appointment of an employment advisor and the drafting of a personal action plan, individuals are also required to attend training programmes. Inevitably, such an initiative increases the chances of that individual getting employed. Refusal to attend training courses or other initiatives/requirements will result in individuals being struck off the register. (Government of Malta. Employment Training Centre, 2013)

ETC runs the training scheme entitled “I Can Employability Programme” and offers a number of different schemes. Short courses are offered in seven key areas, one of which is targeted at technical and trade courses. Traineeships, apprenticeships and training subsidies are also offered. Two levels of apprenticeships are made available to registered individuals. The first entitled the Technical Apprenticeship Scheme (TAS) enables registered individuals to learn a new trade or skill at tradesman level, which is at Level 4 of the MQF level descriptors. (Government of Malta. Employment Training Centre, 2013)

> *“This means that at the end of the apprenticeship, the apprentice will have the competence to supervise the routine work of others, taking responsibility for the evaluation and improvement of work”.*
>
> *(Government of Malta. Employment Training Centre, 2013)*

Four relevant areas for this apprentice scheme exist at the moment. The second apprentice scheme on offer is the Extended Skills Training Scheme (ESTS) that teaches a new trade or skill. Unlike the TAS scheme this is at a LEVL 3 of the MQF level descriptors. (Government of Malta. Employment Training Centre, 2013)

> *"This means that at the end of the apprenticeship you have the competence to take responsibility for the completion of tasks in work or study and adopt your own behaviour to the circumstances in solving problems.*
>
> *(Government of Malta. Employment Training Centre, 2013)*

Individuals who attend the courses provided by ETC are not restricted by any entry requirements and it must be pointed out that the current courses are not accredited or referenced to the National Qualifications Framework. Two courses on offer are however based on City and Guilds Courses and are accredited.

6.2.4 Directorate for Life Long Learning

Apart from MCAST and ETC, the directorate for Life Long Learning within the Ministry of Education and Employment offers evening courses for individuals to learn new skills. Six of the mentioned courses are related to the construction industry and provide some sort of green skills to the attending students. Unlike the other two institutions that have already been discussed, the Directorate does not limit individuals from attending the courses in question and therefore entry requirements have been removed completely. The purpose of these courses is to provide education after working hours to individuals who may require or wish to learn a new skill. It must be stated that these courses are not accredited and do not provide any sort of qualification. A certificate of attendance is presented to individuals who attend 80% of the lectures provided. However further studies at an institution, such as MCAST, are required for formal accreditation and certification to take place for the skill in question.

6.2.5 University of Malta

If youths opt not to take the vocation route and are in possession of the necessary entry requirements they are able to attend the University of Malta. Although the majority of the education provisions offered are on a full time

basis, part time courses in the field of green construction are offered by the Institute for Sustainable Energy. The aims of the institute are to "*assist in the development of national energy plans through studies in the use of new and renewable energy sources and methods of energy conservation."* The training provisions which fall within the scope of this project are intended for individuals interested in becoming installers of RES systems, namely PV and SWH systems.

8	Doctoral Degree			8
7	Master's Degree Postgraduate Diploma Postgraduate Certificate			7
6	Bachelor's Degree			6
5	Undergraduate Diploma Undergraduate Certificate Higher Educaion Certificate	VET Higher Diploma	vi	5
4	Matriculation Certificate Advanced Level Intermediate Level	VET Diploma	v	4
3	General Education Level 3 SEC Grade 1-5	VET Level 3	iv	3
2	General Education Level 2 SEC Grade 6-7 Secondary School Certificate and Profile (B)	VET Level 2	iii	2
1	General Education Level 1 Secondary School Certificate and Profile (A)	*VET Level 1	ii i	1

Table 13: The Malta Qualifications Framework for Lifelong learning (Government of Malta, Ministry of Education and Employment, 2012, p. 64)

6.3 Development and Accreditation of Vocational Qualifications

In 2005 the government published the legal notice 347 of 2005, which established the principle of level descriptors for nationally recognised qualifications and thus provided the foundation for Malta Qualifications Framework. Malta's National Qualifications Framework encapsulated formal, informal and non-formal learning into a credit system, entirely based on learning outcomes. This milestone in the development and accreditation of qualifications in Malta came to fruition after Malta's accession to the European Union.

6.3.1 Malta Qualifications Council

The Malta Qualifications Council was set up in December 2005 as required by the Legal Notice 347 of 2005. The objective of the council is primarily to coordinate the development of the National Qualifications Framework for Lifelong Learning and to supervise the training and certification leading to qualifications within the framework. On the 5th of September 2006, the European Commission adapted a proposal for a recommendation of the European Parliament and of the Council on the establishment of the EQF. In August of 2008, the office of the Mutual Recognition Coordinator and the Malta Qualifications Recognition Information Centre merged to form part of the MQC. (Government of Malta, Malta Qualifications Council , 2013)

The definition of levels of qualifications and the establishment of standards related to qualifications within the NQF also falls under the remit of the council. The MQF was amongst the first frameworks in the EU to be aligned with the EQF. The National Qualifications Framework encapsulates the compulsory, vocational and academic sectors into a single platform in an attempt to increase and facilitate opportunities for credit transfers and transparency of qualifications. Continuous communication and collaboration takes place between learners, companies, education providers and the MQC to increase the contribution towards the national effort for competitiveness**.** The NQF adheres to both the Bologna and the Copenhagen processes. Additionally the NQF is the local benchmark tool using the learning outcomes approach, which enables translations between qualifications, qualification systems and levels.

"Malta's NQF is based on the principle that levels of education and qualifications can be measured by what a person is capable of doing rather than by what an individual has been taught."

(Government of Malta, Malta Qualifications Council, 2007, p. 5)

After a thorough research exercise was carried out of the national frameworks in place in other countries, the MQC short-listed and eventually selected the European Qualifications Framework to use as a model for the National Framework. The result is an eight level framework benchmarked to the EQF, which also addresses the National Reform Programme. (Government of Malta, Malta Qualifications Council, 2013) The framework is compatible with the Framework of Qualifications of the European Higher Education Area (EHEA) or the Dublin Descriptors. (Government of Malta, Malta Qualifications Council, 2007) The Maltese NQF proposes a new Vocational Education and Training Framework with five levels of qualifications from VET Level One to a VET Higher Diploma that should enjoy the same parity of esteem as an undergraduate diploma or undergraduate certificate. It has been stated that informal and non-formal education and training will eventually form part of the NQF.

The following three tables outline and define the eight level descriptors used in the MQF and are aligned to the EQF. (Government of Malta, Ministry of Education and Employment, 2012, p. 109)

Learning Outcomes	Level 1	Level 2	Level 3
Knowledge and Understanding	Basic knowledge and understanding of textbooks and simple tasks while relating to the immediate environment;	Understands and uses good knowledge for tasks, procedures or a field of work or study;	Understands theoretical knowledge and information related to complex procedures in a field of work or study;
Applying Knowledge and Understanding	Follows instructions and completes repetitive simple tasks in familiar contexts and under a quality controlled system;	Follows instructions and completes a range of well-defined tasks;	Follows instructions and carries out complex tasks systematically and in unfamiliar and unpredictable contexts;
Communication Skills	Communicates basic information in familiar repetitive contexts;	Communicates basic Information in unfamiliar contexts;	Communicates complex information in unfamiliar and unpredictable contexts;
Judgmental Skills	Assesses and ensures that assigned tasks have been completed effectively;	Selects and uses information for specified tasks and be proactive;	Assesses, evaluates and interprets facts related to a field of work or study and applies basic problem solving techniques;
Learning Skills	Acquires and applies key competences to defined actions;	Acquires and applies key competences to a range of actions;	Acquires and applies key Competences as a basis for lifelong learning;
Autonomy and Responsibility	Takes some responsibility for completing simple tasks and exercise limited autonomy;	Takes responsibility and exercises autonomy in well-defined tasks under a quality controlled system;	Takes agreed responsibility for completing complex tasks, and interacts with the immediate environment and in defined actions at one's own initiative;

Table 14: Levels 1-3 of the Malta Qualifications Framework (Government of Malta, Ministry of Education and Employment, 2012, p. 109)

Learning Outcomes	Level 4	Level 5	Level 6
Knowledge and Understanding	Understands and analyses broad theoretical, practical and technical knowledge related to a field of work or study;	Understands advanced textbooks which may lead to further academic or vocational learning and, researches solutions to abstract problems;	Understands professional theoretical and practical knowledge in a specialised field of work or study;
Applying Knowledge and Understanding	Follows instructions and carries out defined theoretical, complex and technical tasks;	Demonstrates operational capacity and management skills using creativity;	Demonstrates innovative theoretical and practical responses to work or study contexts;
Communication Skills	Communicates theoretical and technical information in a work or learning context;	Interacts with others to convey abstract and concrete solutions to problems in a field of work or study;	Communicates ideas, problems and solutions to both specialist and non-specialist audiences using a range of techniques involving qualitative and quantitative information to sustain arguments;
Judgmental Skills	Interacts with and generates solutions to problems within the immediate environment of a given field of work or study;	Formulates practical and theoretical responses to abstract and concrete problems and makes judgements on social and ethical issues;	Makes professional judgements on social and ethical issues within the area of specialisation, masters problem solving skills, and evaluates the management of projects and people;
Learning Skills	Applies key competences to defined actions and to a technical or academic field of work or learning;	Evaluates own learning and can improve key competences for further learning, and promotes team training;	Assesses own learning and can specialize in one or more key competences for further learning;
Autonomy and Responsibility	Exercises autonomy and takes responsibility for defined qualitative and quantitative tasks of self and others by completing complex tasks in a broad context under quality assured mechanisms;	Is responsible for the effective and efficient management of projects and people within agreed timeframes;	Is responsible for the management of creative and innovative projects and the team's performance;

Table 15: Levels 4-6 of the Malta Qualifications Framework (Government of Malta, Ministry of Education and Employment, 2012, p. 109)

Learning Outcomes	Level 7	Level 8
Knowledge and Understanding	Has comprehensive specialised or multi-disciplinary theoretical and practical knowledge which forms the basis of original research, which may contribute to social and ethical issues;	Has theoretical and practical expertise in a specialised field of knowledge which may contribute to social and ethical issues in a national and international dimension;
Applying Knowledge and Understanding	Demonstrates mastery of knowledge and skills, adapts to the fast changing business environment and manages people and projects efficiently;	Demonstrates leadership and innovation in mastering research, work and study contexts;
Communication Skills	Communicates with specialist and non-specialist audiences clearly and unambiguously conclusions and knowledge which may be the outcome of original research, self-study or experience;	Communicates expertise to a wide audience including peers and the general public using different methods including national and international publications, and participates in specialist fora;
Judgmental Skills	Performs critical evaluations and analysis with incomplete or limited information to solve problems in new or unfamiliar contexts, and to produce original research;	Demonstrates expertise in critical evaluations and analysis with incomplete or limited information to solve problems in new or unfamiliar environments, and to produce original research;
Learning Skills	Makes assessments of personal continuous professional development, takes initiative to undertake self-directed study and may proceed to further specialisation;	Has a sustained commitment to generate new ideas and innovative projects related to technological, cultural and social development;
Autonomy and Responsibility	Is accountable and responsible for the original research within a personal social responsibility and/or business context, for one's operations and for adapting the management of people and projects reflecting the dynamic nature of the environment in which one operates;	Is responsible for the leadership of a number of specialised projects and an authority in a specialised field of work or study;

Table 16: Levels 7 and 8 of the Malta Qualifications Framework (Government of Malta, Ministry of Education and Employment, 2012, p. 109)

6.3.2 European Qualifications Framework

The European Qualifications Framework was agreed upon by European institutions in 2008 and is currently in the process of being implemented throughout the region. The European Commission has encouraged all countries within the region to carry out a referencing exercise to align and relate their national system with the EQF by 2012. The main focus of the EQF is to act as a translation device to make the national qualifications systems throughout Europe more readable. The direct consequence of which would be an increase in workers and learners' mobility therefore facilitating lifelong learning. (European Commission, 2013) It is important to point out that the EQF is unable to define new qualifications and by no means is it meant to replace national or sector qualifications frameworks. Its use must be viewed as a way of converting diversity from a disadvantage into strength and is therefore comparable to the European credit transfer system (ECTS) in higher education. (European Centre for the Development of Vocational Training (CEDEFOP), 2009) While the EQF is a referencing tool for comparison of qualifications, the ECTS is a standard for comparing the study attainment and performance of students within higher education across the EU. It is of interest to point out the existence of ECVET that is the European credit transfer system for vocational education and training which complements the ECTS for vocational training. The importance of ECVET is understood when viewed as the potential increase in mobility of construction workers that form part of a growing industry in the EU.

The EQF's intended primary users are individuals and companies who as a result of its creation will be in a better position to understand and compare qualifications levels of different countries and education and training systems. (European Commission, 2013) The framework consists of eight reference levels that describe the abilities of the individual learning. The level provides an indication of what this individual currently knows, what they understand and what they are able to carry out. This is therefore referred to as a learning outcome and is not based on curricular inputs. (European Centre for the Development of Vocational Training (CEDEFOP), 2009) The levels in question range from the basic (Level 1) to the most advanced (level 8), and apply to all types of education, training and qualifications. Assuming the system can eventually be integrated and implemented through Europe this will prevent unnecessarily testing of workers to gauge their skill levels. (European Commission, 2013) Validation of non-formal and informal learning is also promoted through this framework.

6.3.3 National Commission for Further and Higher Education

The National Commission for Further and Higher Education (NCFHE) incorporates the Malta Qualifications Council (MQC), the Malta Qualifications Recognition Information Centre and the Office of the Mutual Recognition Coordinator. The NCHE forms part of the Ministry of Education, Employment and the Family and is an integral part of this government body as it provides strategic and operational support for reform in further and higher education to all educational institutions in Malta. (Government of Malta, Malta Qualifications Council, 2013) The commission consults and provides advice to the Government through the Minister who then consults with the commission about potential proposed changes in legislation. It was established by virtue of the Education Act (ACT No. XIII of 2006) on the 4th of August 2006 and subsequently a permanent Commission was appointed on the 6th of September 2006. (Government of Malta, National Commission for Higher Education, 2013) The mission statement of the NCHE is: "to promote more and better further and higher education to empower all students with knowledge and skills for their future". (Government of Malta, National Commission for Higher Education, 2013) The commission supports institutions in an attempt to meet the challenges set by the NCHE Vision 2020 through:

- Reform of education, training and labour market systems
- The setting up of structures and mechanisms to quality assure all qualifications
- A system of accreditation and licensing of all F&HE institutions and programmes
- Research and strategic policies aimed at making learning more attractive, ensuring fair and open access to all students willing to further their studies
- The promotion of student and staff mobility
- Active participation in the Bologna and Copenhagen Processes positioning Malta as a centre of excellence in vocational training and in further and higher education.

(Government of Malta, Malta Qualifications Council, 2013)

The Commission is composed of no fewer than seven and not more than nine members who are nominated by the Minister for Education and later appointed by the Prime Minister, for a period of three years. (Government of Malta, National Commission for Higher Education, 2013)The individuals appointed are professionals who have a comprehensive grasp of the further and higher education landscape within the context of the general socio-economic development in Malta. Five commission officers form the Secretariat, all experts in policy areas related to education. The current work by the secretariat is summarised by the following table. (Government of Malta, National Commission for Higher Education, 2013)

Capacity Areas	Key Function
Strategy Development	Consultation, research and recommendations to improve systems, structures and policies for a more responsive and inclusive further and higher education sector
Student Related Policies	Access to education policies, student support schemes, scholarships, mobility, and consultation with student representative bodies
Funding Policies	Budgetary analysis of state recurrent and capital expenditure for teaching provision, research and student support
Quality Assurance	Policies related to quality standards and quality assurance agency standards
Governance Structures	Reviews of policy regarding regulated governing structures in state institutions and support to governing structures regarding policy developments
International Affairs	Budgetary analysis of state recurrent and capital expenditure on provision, research and student support
Statistics and Benchmarks	Data collection, analysis, and publication to benchmark the performance and outcomes of Malta's further and higher education sector.

Table 17: The Capacity Areas and Key Functions of the Secretariat within the National Commission for Further and Higher Education (Government of Malta, National Commission for Higher Education, 2013)

Brief history of the NCFHE:

Year	History
2004	A working group was appointed by the then Minister for Education to evaluate the state funding for higher education in Malta. The resulting report entitled "State Higher Education Funding", commonly referred to as the Chalmers report was published in November of the same year. In addition to a number of recommendations related to the strategic developments of the Maltese education system, emphasis was pointed out on the need for a body to be responsible for the strategic oversight of Malta's post-secondary and tertiary education institutions.
2005	A white paper by the same Minister was published in response to the report in October of 2005 with a proposal for a National Commission for Higher Education.
2006	The first interim Commission was appointed on the 3rd of February by the Minister of Education. On the 7th of April, this interim Commission published recommendations on the terms of reference for a Permanent Commission that would act as an advisory and consultative body. On the 4th of August the proposals made by the interim Commission were incorporated into the Amendments to the Education Act (ACT No. XIII of 2006), which followed with the appointment of the permanent Commission on the 6th of September.
2007	The organisational setup and the commencement of the assignment of the Commission commenced during the first year of operation by the newly appointed CEO and five officers who formed the Secretariat. The new appointees were exceptionally busy during the Commissions first year of existence. The tasks carried out during the first year included: • Research on the regulatory framework • Consultations with stakeholders within the sector • Research on existing governance and quality assurance systems and their suitability for Malta

	• A platform for dialogue for all local stakeholders • The provision of the recommendations for a new licensing and quality assurance framework • Statistical analysis of the sector
2008	The NCHE launched its recommendations on Licensing and Quality Assurance in January; this was followed by a comprehensive consultation process and included a conference for all state and independent institutions. March saw the eventual publication of the whole process through a consultation report. September saw the organisation of the conference entitled "Skills for the Future" which brought over 200 stakeholders from the sector together to discuss current and future skill gaps and proposals to attract students to bridge the gaps identified. The first NCHE Survey was published in October with data from all further and higher education providers about all that was offered at the time. The official website was launched in November and acted as a valuable communication channel by providing a great deal of information to the public about the findings and activities of the Commission.
2009	The outcome of the conference "Skills for the Future" were presented in a report of the same name in February. The conference the previous year was aimed at addressing skill mismatches which exists in the economy as well as those that could emerge following the growth in the targets sectors. The final report carried out a skill gap analysis of major sectors in Malta and coupled this with a strategy to bridge the identified gaps. On the 3rd of April 2009, the National Commission for Higher Education presented its first strategy document, entitled "Further and Higher Education Strategy 2020". The document was drafted with the ambition of being a "reference and guide for both further policy development and actions for consideration by the education authorities." (Source: Further and Higher Education Strategy 2020 – Recommendations of the National Commission for Higher Education – Malta – April 2009) Twelve strategic priority areas were established as being of paramount importance to Malta. These dealt with topics ranging from the need to

	increase the student population, to the need to increase the quality of the education on offer. The document "What do you want to be?" was published in November by the Commission with the intention of acting as a go to guide for students uncertain of their next move on the education ladder. A comprehensive, yet easily understood explanation of all the options open to students was presented.
2010	The second edition of the NCHE Further and Higher Education Statistics report was published for the year 2009. The data was collected from a combination of international sources, however the primary source for the local data was the Annual Further and Higher Education Survey conducted by the Commission.
2011	The third edition of the NCHE Further and Higher Education Statistics report was published for the year 2010. The data was collected from a combination of international sources, however the primary source for the local data was the Annual Further and Higher Education Survey conducted by the Commission.
2012	A process which took approximately two and a half years reached its culmination with the publishing of the document entitled "Social and Economic Conditions of Student Life in Malta - National Report Malta - EUROSTUDENT IV (2008 – 2011)". The aim of this research exercise was to gain an insight into the social and economic conditions of student life in Malta. NCFHE's participation within this EUROSTUDENT project started in 2008, however the whole research project commenced in 2000 and included the participation of 11 countries. A second call for research was opened and Malta was accepted together with an additional four countries to research the social and economic conditions of students.

Table 18: Brief History of the NCFHE (Government of Malta, National Commission for Higher Education, 2013)

6.4 Supply of Vocational Education and Training in Malta

Whilst the VET scene in Malta has developed to offer an exhausted range of training provisions, the attendance of workers is relatively limited, mainly due to the culture of informal on-site training. Although this has started to change due to quality assurance, the continual updating of knowledge by the workforce is far from the required levels. An analysis of the available VET providers related to green skills and the energy efficiency of buildings, shows that the market is dominated by the public institutions, namely MCAST, ETC and University of Malta. Unlike other sectors, including accounts, management and IT, the sector relating to green skills within the construction industry is yet to take off and attract attention.

6.4.1 MCAST

MCAST is by far the dominant force in the provision of VET for all sectors in Malta, particularly that of construction. This public educational institution was formed as a trade school, with emphasis placed on hands on experience coupled with theory. Over the years the range and type of courses have changed and developed to offer undergraduate degrees in some areas. Today MCAST is composed of ten institutes in Malta and the Gozo centre. (Malta College of Arts, Science & Technology, 2012)

The courses offered provide training provisions at all MQF levels, starting from basic skills to more complex training provisions. This study has identified a total of 20 courses have been identified as full or part time courses that directly provide green skills to the construction industry. The MQF ranking of these courses ranges from the Introductory Certificates that are a Level 1 to Level 6 which are the Bachelors of Science with Honours degrees.

Institution	Course	Number of Students	
MCAST	**Institute of Building and Construction Engineering**	**2012/2013**	**2007-2012**
	MCAST Diploma in Heating, Ventilation and Air Conditioning - LEVEL 3	16	78
	MCAST Diploma in Plumbing - LEVEL 3	2	9
	MCAST Diploma in Trowel Trades (Plastering and Tile Laying or Painting and Decorating) - LEVEL 3	0	5
	MCAST - BTEC Diploma in Construction	12	52
	MCAST Diploma in Heating, Ventilation and Air Conditioning - LEVEL 4	24	25
	MCAST Diploma in Plumbing - LEVEL 4	0	0
	MCAST - BTEC Extended Diploma in Construction and the Built Environment (Building Services Engineering)	10	14
	MCAST - BTEC Extended Diploma in Construction and the Built Environment (Civil Engineering)	28	6
	MCAST - BTEC Extended Diploma in Construction and the Built Environment	61	138
	MCAST - BTEC Higher National Diploma in Construction and the Built Environment (Building Services Engineering)	11	7
	MCAST - BTEC Higher National Diploma in Construction and the Built Environment (Civil Engineering)	7	5
	MCAST - BTEC Higher National Diploma in Construction and the	37	58

	Built Environment		
	Bachelor of Science (Honours) in Construction Engineering	11	15

Table 19: Supply of VET in Malta: MCAST: Institute Of Building and Construction Engineering

Institution	Course	Number of Students	
MCAST	**Institute of Electrical and Electronics Engineering**	**2012/2013**	**2007-2012**
	MCAST Diploma in Green Energy Technologies	12	26
	BSc (Hons.) in Power Generation & Renewables	0	12
	Single Phase Installation	13	52
	Three Phase Installation	21	0

Table 20: Supply of VET In Malta: MCAST: Institute of Electrical and Electronics Engineering

Institution	Course	Number of Students	
MCAST	**Institute of Mechanical Engineering**	**2012/2013**	**2007-2012**
	MCAST-BTEC Extended Diploma in Operations and Maintenance Engineering	53	231
	MCAST-BTEC Higher National Diploma in Operations Engineering	27	123
	Bachelor of Engineering (Honours) in Mechanical Engineering (Plant)	26	0

Table 21: Supply of VET in Malta: MCAST: Institute of Mechanical Engineering

6.4.2 ETC

Amongst the many services it offers, individuals who are searching for employment are also offered educational courses by ETC, enabling them to learn a new skill or increase their knowledge in a particular area. Courses are offered in nine core areas, three of which areas are related to the construction industry. A total of 12 courses have been identified as offering green skills and would therefore contribute to the energy targets of the country. Unlike other education providers who have fixed commencement dates, ETC tenders all its educational courses to third parties through the use of public procurement procedures. This process is both time consuming and also creates an element of uncertainty, as fixed dates are not always possible since issues can arise when no tender submissions are made or appeals against awarded tenders are lodged.

Institution	Course	Number of Students			
ETC	**Employability Programme Training Courses**	**2012/2013**		**2007-2012**	
	Technical Courses				
	Refrigeration and Air Conditioning	pm 7	am 19	pm 121	am 153
	Trade Courses				
	Steel Fixing	0		55	
	Shutter Formwork	0		42	
	Foundation Course for License "A"	0		26	
	Electrical Domestic Installation (License A)	0		213	
	Electrical Industrial Installation (License B)	0		0	
	Tile Laying (Wall and Floor Tiles)	pm 11	am 0	pm 11	am 150
	Stone Mason and Bricklaying	3		43	
	Plastering including Graffiato	8		126	
	Basic Plumbing	12		239	
	Electrician's Mate (Basic)	17		200	
	Other				
	Maintenance and Repair of Wells	0		0	

Table 22: Supply of VET In Malta: ETC

As stated in section 6.2.3, ETC also offers job seekers two apprenticeship schemes in nine crafts, namely the Extended Skills Training Scheme (ESTS) and the Technical Apprenticeship Scheme (TAS). Tabulated below are the number of individuals who have completed the said apprenticeships.

Apprenticeship Scheme	Sector	Number of Students	
		2012/2013	2007-2012
ESTS			
	Plumbing	1	8
	Stone Mason	1	3
	Plastering	0	0
	Tile Laying	0	4
TAS			
	Building Services Engineering Technician	3	6
	Construction Technician (Civil Engineering)	8	0
	Construction Technician (Design)	29	81
	Construction Technician (Land Surveyor)	1	13
	Construction Technician (Quantity Surveyor)	13	24

Table 23: Supply of VET In Malta: ETC: Apprenticeship Schemes

6.4.3 Directorate for Lifelong Learning

The Directorate for Life Long Learning forms part of the Ministry of Education and Employment. These evening courses are specifically aimed at individuals who may want to attend a course in a new field after working hours. Ten course types are on offer to the public, one of which is specifically entitled “Vocational Education and Training”. This section offers 72 courses about a vast range of subjects, six of which provide green skills. As per section 6.2.4 no entry requirements are in place and the fees charged to students are highly subsidised, and in some cases the courses are free.

Institution	Course	Number of Students	
D. L. L. L.	**Vocational Education & Training Centre**	**2012/2013**	**2007-2012**
	Stone Carving	0	10
	Woodwork	6	15
	Metal Works	7	16
	Stainless Steel Fabrication	6	/
	Metal Craft & Design	19	0
	Metal Pipe Bending & Fitting Techniques	4	/

Table 24: Supply of VET in Malta: D. L. L. L.: Vocational Education & Training Centre

6.4.4 University of Malta - Institute for Sustainable Energy

The Institute for Sustainable Energy, which forms part of the University of Malta, offers three courses which fall within the scope of this project. These courses are intended for individuals interested in becoming installers of RES systems, namely PV and SWH systems.

Institution	Course	Number of Students	
UoM	**Institute for Sustainable Energy**	**2012/2013**	**2007-2012**
	ISE 2101: Photovoltaic Systems Installations – Single Phase	1	9
	ISE 2102: Solar Heating Systems Installations	0	18
	ISE 2101: Photovoltaic Systems Installations – Single Phase and Three Phase	11	27

Table 25: Supply of VET in Malta: UoM: Institute for Sustainable Energy

6.5 Relevant Initiatives at National/Regional Level Supported by the EU

6.5.1 European Social Fund

The European Social Fund is the most significant programme at a National level in Malta supported by the EU. The ESF programme 2007 - 2013 focuses on employment, education and training. The aim is to provide assistance to ensure the country keeps up with the changes taking place in the global economy over the last half decade by improving human resources skills. The encouragement of workers to invest in lifelong learning was also identified as being critical to improve access to the labour market. The increase in opportunities for women and training in the field of information and communication technologies was also given importance. The management and coordination of this operational programme is the responsibility of the Planning and Priorities Co-Ordination Division within the Office of the Prime Minister. (European Commission, 2013)

In light of the fact that Malta has fewer university students than other EU countries, students who do not take the general tertiary route must none the less be encouraged to further their education. The areas of science, engineering and ICT have been ear marked as being vital to both the economy and the modernisation of the country as a whole. (European Commission, 2013) The priorities of the Maltese Operational Programme for ESF funding are:

Priority 1: Improving education and skills

- The need for the labour force to upgrade the knowledge and skill levels and the need to view an increase in the participation rates across all levels and subjects.
- Student participation in the ear marked sectors of science, technology and ICT in higher education must also experience an increase due to their influence on the local economy.
- The relevance and quality of the education and training on offer in Malta must improve.

Priority 2: Investing in employability and adaptability of the workforce

- Agility in companies to ensure that the firm as well as the employees are able to adapt to the needs of the economy and upgrade their skills when and if necessary
- The overall increase in participation rates, particularly in lifelong learning

Priority 3: Promoting an equal and inclusive labour market

- The increase in promotion of quality and stable employment for the long term un-employed and also aiding women enter the workforce
- The provision of assistance to the disadvantaged groups within the population and ensuring their required skill sets are kept up to date

Priority 4: Strengthening of institutional and administrative capacity

- The increase in institutional capacity and efficiency of the public administrations, local government, social partners and civil society, with the aim of developing effective partnerships in a wide range of policy areas.

Priority Axis	Community Funding (€)	National Counterpart (€)	Total Funding (€)
Improving education and skills	31 790 000	5 610 000	37 400 000
Investing in the employability and adaptability of the workforce	26 345 750	4 649 250	30 995 000
Promoting an equal and inclusive labour market	31 365 000	5 535 000	36 900 000
Strengthening of institutional and administrative capacity	18 194 250	3 210 750	21 405 000
Technical assistance	4 305 000	759 705	5 064 705
Total	**112 000 000**	**19 764 705**	**131 764 705**

Table 26: Financial Plan (2007-2013) (European Commission, 2013)

Chapter Seven
Skill Gaps Between the Current Situation and the Needs For 2020

7.1 Labour Force Evolution

In 2012, the total labour force within the construction industry stood at approximately 11,000-12,000 individuals. Although discrepancies among different sources have been identified, for the precise value of workers within this sector, the data submitted to EUROSTAT will be utilised for the purpose of this report. Therefore the total number of workers within the construction industry as a whole amounts to 11,099 individuals. (Government of Malta, National Statistics Office, Labour Market and Education Statistics Unit, 2013)

The labour force of the construction industry which accounts for 6.5% of Malta's total workforce has experienced a decline recently. The decline in the rate of construction and the industry's contribution to the GDP has been explained in previous sections of this report. This has therefore led to a decrease in the number of individuals employed over the years. (Government of Malta, National Statistics Office, Labour Market and Education Statistics Unit, 2013)

7.1.1 Building Regulations

Malta currently has an EPC system in place, which in itself could lead to a possible increase in the labour force with regards to green jobs if used and enforced appropriately. Increased awareness and enforcement of the legal obligation to use this certification system could have a pronounced effect on Malta reaching its energy targets. Possible changes in building regulations, with mandatory use of energy efficiency systems or higher mandatory minimum U values for the design and eventual construction of buildings would need to be introduced. **This could lead to increased economic activity due to the forced retrofitting of buildings during construction, sale or when rented, the by-product of which would be increased labour needs.**

The success and the endorsement of this EPC system is dependent upon the demand of customers for energy efficient buildings. This means that the end

user of the actual construction process, the buyer, must understand the advantages of an energy efficient building. **Estate agents and notaries, who have direct contact with buyers, need to become more knowledgeable about the benefits of the various systems on the market and basic vernacular techniques which could reduce energy consumption.**

Architects and engineers should further encourage green construction practices to their clients at design stage, irrespective of possible increases in the cost to build or renovate. The developers themselves also need to better understand the potential cost benefit model that could be implemented and resultant increased profit margins. With increased awareness, properties with a good EPC rating will be more sought after hence fetching higher prices and or resulting in quicker sale.

If the correct and targeted awareness about the real advantages of EE and RES can take place, it is likely that the retrofitting of a considerable number of buildings would need to take place. Further investment by the Government may be required to continue encouraging investment by the domestic and commercial sectors. The potential ripple effect throughout the value chain would lead itself to the need for increased workers within the scope of the project target group.

7.1.2 IVET and CVET

The potential increase in demand for retrofitting of buildings would result in the need to provide further Initial Vocational Education and Training (IVET) and Continuing Vocational Education and Training (CVET) training provisions. Such training provisions would adequately equip the new comers to the industry and to up skill the existing workforce respectively. Although the IVET provisions may require a peak in supply that could subside due to saturation of the market, the provision of continuous CVET is essential for re-skilling and the continuous updating of skills.

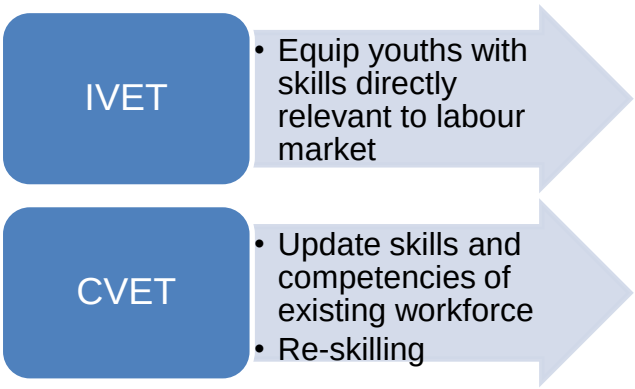
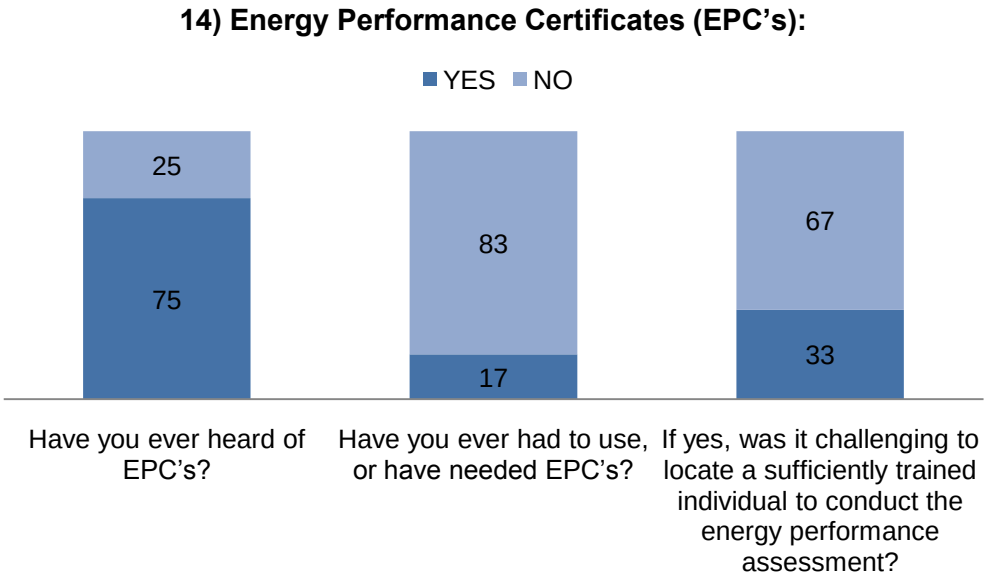


Figure 5: IVET and CVET

7.1.3 Building Regulations – Response From Stakeholders

The stakeholders interviewed concluded that they are in fact aware of the EPC system. However the same individuals are yet to make use of this system and are therefore potentially unaware of its possible benefits.



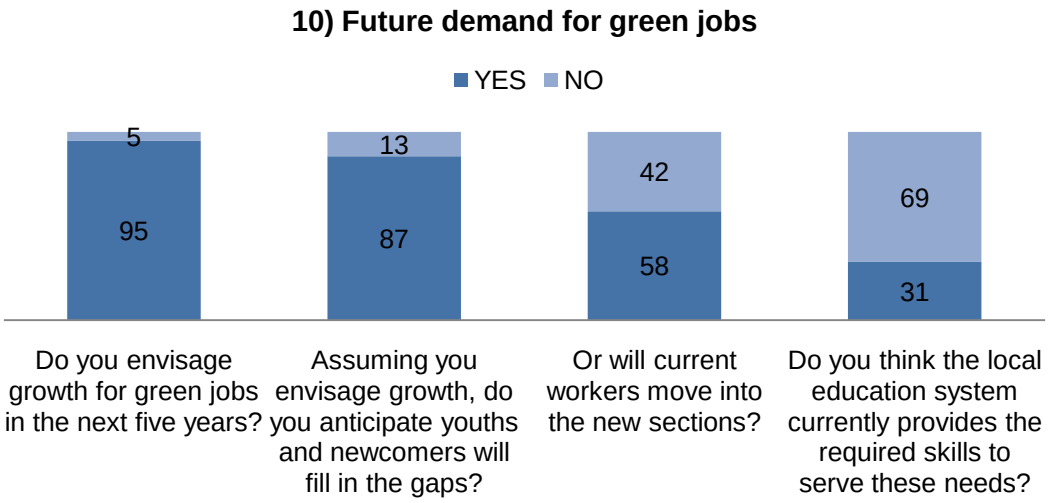
Graph 12: Question 14: Energy Performance Certificates. Response from stakeholders

Although the BRO has issued the list of certified EPC assessors, the majority of interviewed stakeholders are still unaware of where to locate it. The stakeholders are therefore potentially not aware that only EPC assessors can carry out an energy audit and provide a client with an EPC. From the results obtained through the interviews, it is thought that part of the industry maybe under the false impression that warranted architects or engineers may also produce EPC's.

It is also worth mentioning the fact that EPC have been transcribed into local legislation as per section 4.2.2. The construction, sale or the rental of any property should be accompanied by an EPC. The fact that 83% of the stakeholders interviewed are yet to make use of this system could point towards the lack of information and enforcement of the system. One would assume that it would be in their best interest to familiarize themselves with the system. In doing so, they would be able to quantify the savings that their respective products and systems offer the clients, which could be carried out in conjunction with a cost benefit analysis.

7.1.4 Emergence of New Occupations – Response From Stakeholders

Previous chapters within this report have provided data about the current decline in employment and rate of construction within the industry. Although EE materials and RES systems have been on the market for the last decade, limited investment has taken place. This can be attributed to the lack in understanding of the cost benefit of their installation and due to the unsubsidised cost not being sufficiently cheap to warrant the investment. Peaks in investment have however taken place when government capital grant schemes are issued.



Graph 13: Question 10: Future Demand for Green Jobs. Response from stakeholders

According to the stakeholders, although the construction industry on the whole has relatively dampened hopes for the near future, the green construction industry is very optimistic of what lies ahead. **A staggering 95% of those interviewed forecast that in their line of work and the industry as a whole, growth is to be expected in the next five years.** This is positive news for the industry as this increase in investment and growth in the market is required for Malta to reach its targets in seven years.

The stakeholders interviewed also felt that it would be the newcomers, namely those attending and eventually completing IVET, who would take the lead and fill the occupational gaps within the industry. The general consensus pointed at a lack of confidence in the competence levels of the current workforce. An increase in the number and quality of courses on offer seems to be the most obvious solution to this problem. This is especially the case, since less than one third of the respondents felt that the current provisions addressed the current skill shortages. If training provisions are not updated and further courses provided in the near future, then Malta will have an insufficient and ill-equipped work force to conduct the retrofitting needed to achieve the EU targets. Training provisions would need to take the form of both IVET as well as CVET as it is paramount that knowledge and skills are continuously updated.

7.2 Policy in Relation to Green Skills and Jobs

7.2.1 Definition of Green Skills and Jobs

The construction of green, eco and low energy buildings is a process which involves numerous professions and tradesmen. Although the terms are used throughout the EU, there is no uniformity and formal definition for the terms green skills and green jobs. The opening chapter of this report provided a number of available definitions which could be used and implemented for the local industry.

A definition for green jobs has however been provided in the document "Green Jobs from a Small State Perspective. Case studies from Malta", which classifies these jobs as:

> *"… jobs within industries that aims to minimise environmental impact through a range of environmental policies to a more restrictive definition that comprises jobs within the green sectors of the economy."*
>
> (Briguglio, Brown , & Aquilina, 2011)

This definition is provided in the second chapter of the publication edited by Saviour Rizzo entitled "Green Jobs from a Small State Perspective. Case studies from Malta". The chapter continues to state that **the discrepancies between definitions can lead to discrepancies in the reported contribution of green jobs to the economy.** The effect of which is the severe under estimation of its actual impact to the GDP and employment figures, for a sector which is unquestionably going to continue to grow due to increased demand that lies ahead for the country.

The report "Employment in the Environmental Goods and Services Industry in Malta" published by ETC in December of 2007 provides a definition for the environmental goods and services industry:

> *"The environmental goods and services industry consists of activities which produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air, and soil as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services which reduce environmental risk and minimise pollution and resource use."*
>
> (Government of Malta, Employment Training Centre, 2007)

This definition is one which encapsulates a wider range of activities and jobs, which are not relevant to this project. ETC has provided data regarding the local green industry and states that the national labour force employed within this industry stood at 3% in 2007 and that this translated to a 2% contribution to the GDP for that year. The major contributors to the industry as a whole include pollution management and water supply, both of which contribute considerably, but which however, do not fall within the scope of this project.

7.2.2 Policy

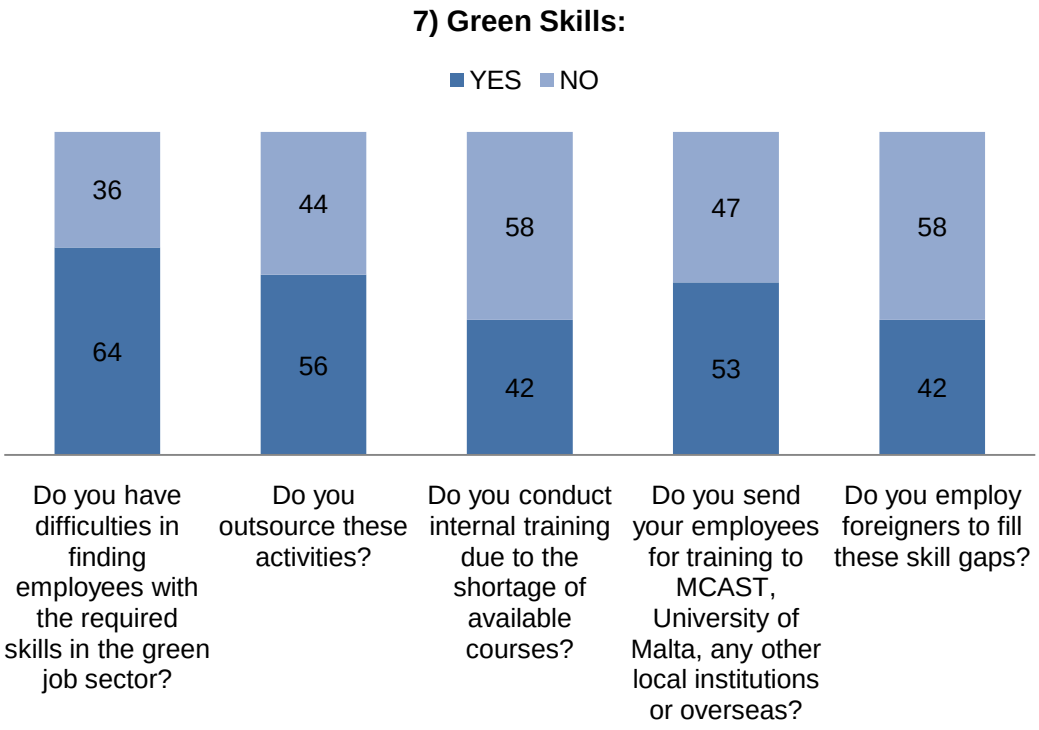
The sixth policy area as set out in the National Energy Policy published in 2012 by the Ministry of Resources and Rural Affairs is “Ensuring that the energy sector can deliver”. For a sector to deliver and therefore meet the required targets, a regulatory framework, relevant research and development initiatives and the appropriate education provisions must be established. These are the foundations of the success of any sector and this is no different for the green construction industry. (Government of Malta, Ministry for Resources and Rural Affairs, 2012)

It is with regret to note that the policy which addresses the further creation and support for green jobs is yet to be published. This would need to include the required regulatory procedures and education provisions to ensure that the training of green skills is made available both for initial and continued education. It is likely that this policy gap will be duly addressed in the coming months.

7.3 Skill Requirements in the Building Sector

New emerging skills that may not have been present within the sector two decades ago have become essential for Malta to reach its 2020 energy targets. Although the current provisions would need to continue being provided, new training provisions are required to increase the energy efficiency of the buildings constructed.

7.3.1 Skill Needs – Response From Stakeholders



Graph 14: Question 7: Green Skills. Response from stakeholders

To fully understand the current availability of green skills within the construction workforce, the interviewed stakeholders were asked whether the process of recruiting individuals with such skills was challenging or not. Two thirds of all the stakeholders interviewed stated that in their experience they have encountered difficulties when attempting to employ individuals with the necessary competences. Whilst it may be problematic to employ individuals to form part of the in-house team it is interesting to note that only half of those interviewed actually outsource these activities related to green skills.

Outsourcing or the conducting of training would be the obvious solution to skill gaps within a workforce. However formal training for specific green skills, either

internally within the firm or at an educational institution is only implemented as a solution by approximately 50% of the stakeholders interviewed. In both cases it seems only half of the respondent's actually resort to formal training. These findings either mean that the industry has reservations about training employees, either due to the risk associated with potential increased job mobility or due to the financial implications. Whichever the reason, this finding is not only a negative fact about the mind-set of the industry, but a substantial obstacle that would need to be overcome for the energy targets to be met.

The employment of foreigners appears to be a popular practice, with just less than half of the respondents having resorted to this practice to fill skill gaps. This is interesting as it compliments the findings in section 3.7, which outlines the high percentage of non-nationals employed within the industry. The ease of employment of foreigners increased through the establishment of the Schengen Area in Malta in 2007. This was later coupled with multiple projects to increase overseas work experience within the EU, which should have increased trans-border immigration of skilled tradesmen.

Most companies have stated that informal uncertified training has taken place within their respective workforce; however the consequence of this on the quality and competence levels of the employees is unknown.

7.4 Specific Skills and Knowledge Requirements and Gaps

To fully understand the needs of the industry and identify skill gaps, stakeholders were asked to gauge the level of training that had taken place amongst their workforce. The extracted data, namely the inverse of the figure provided during the interview, represents the percentage of the workforce that had not been formally trained. This data indicated which parts of the workforce, from the represented trades, needed up-skilling and which required upgrading of knowledge and competences.

It is important to note that a portion of the workforce who may have not received VET training may not require the up skilling or updating of their competences which are being discussed within this report. This portion of each company may consist of support or administrative staff and also a percentage of professionals, who may not require such training or have studied at a tertiary education level respectively. It has therefore been assumed that such individuals fall within the bracket of the workforce which have been trained and therefore do not require further VET provisions of the nature being discussed.

The skill gaps identified during the data collection for this report were comparable to those presented in the report “Ex-ante evaluation of the initiative on the building workforce training and qualification in the field of energy efficiency and renewable energy within the Intelligent Energy Europe Programme.” **Although the report by ECORYS was published two years before, the needs of the local industry appear to have remained unchanged. This leads one to the conclusion that these skill gaps are yet to be dealt with by means of the adequate training provisions.**

The formation of occupational profiles for the entire target group being considered within this project was not possible with the available data and resources. The formation of occupational profiles for the whole construction industry, including the outlined target group for this report, is essential for all identified skill gaps to be addressed appropriately. This emphasises the need for Malta to have a Sector Skills Unit (Government of Malta, 2012) that would:

- Produce the required occupational profiles;
- Ensure the consistency and relevance of occupational standards;
- Reduce skills gaps and skills shortage;
- Improve the skills and productivity of their sector’s workforce;
- Improve learning supply;
- Ensure the recognition and certification of skills and competences

Notwithstanding the limitations in data and resources, five proposals are drafted for occupational profiles that are based on the main skills gaps that have been identified. The five proposals drafted for occupational profiles have been based on the three essential pillars namely: knowledge, skills and competences. (Government of Malta, Malta Qualifications Council, 2009)

7.4.1 Proposed Occupational Profile #1

Installers of Renewable Energy Solutions and other Technical Systems

The first proposed occupational profile deals with the provision of skilled workers who are knowledgeable and capable of installing, maintaining and upgrading various RES systems as well as other technical building systems. Understandably, different systems may be utilised more frequently and therefore require more trained workers to fill the current skill gaps.

Proposed Occupational Profile #1 Installers of All Renewable Energy Solutions and other Technical Systems	

Knowledge	• Possess good knowledge about the operation of:
	  • PV systems
	  • SWH systems
	  • Biomass boiler and stove
	  • Cogeneration systems
	  • District heating and cooling systems
	  • Heat pumps
	  • Technical building systems (building management, intelligent lighting, heat recovery systems, etc.)

Skills	• Ability to perform the installation of:
	  • PV systems
	  • SWH systems
	  • Biomass boiler and stove
	  • Cogeneration systems
	  • District heating and cooling systems
	  • Heat pumps
	  • Technical building systems (building management, intelligent lighting, heat recovery systems, etc.)
	• Ability to perform the maintenance of:
	  • PV systems
	  • SWH systems
	  • Biomass boiler and stove
	  • Cogeneration systems
	  • District heating and cooling systems
	  • Heat pumps
	  • Technical building systems (building management, intelligent lighting, heat recovery systems, etc.)

Competences	• Applies knowledge and skills to inspect systems and judge if upgrades are required for:
	  • PV systems
	  • SWH systems
	  • Biomass boiler and stove
	  • Cogeneration systems
	  • District heating and cooling systems
	  • Heat pumps
	  • Technical building systems (building management, intelligent lighting, heat recovery systems, etc.)

Learning Outcomes	• Understands technical information about RES and other technical building systems • Follows instructions and carries out the installation, maintenance and upgrading of RES and other technical building systems (building management, intelligent lighting, heat recovery systems, etc.)

Table 27: Proposed Occupational Profile #1: Installers of Renewable Energy Solutions and other Technical Systems

7.4.2 Proposed Occupational Profile #2

Building Inspectors & Auditors for EE & RES

The second proposed occupational profile deals with the provision of skilled building inspectors and auditors who are knowledgeable about various RES and technical building systems. They must also possess knowledge about building thermal characteristics and the cost benefits of RES and EE systems. These workers must be competent in calculating the energy performance, the life cycle analysis and the energy consumption of a building. These individuals would be expected to draft comprehensive assessment reports about their findings.

Proposed Occupational Profile #2 Building Inspectors & Auditors for EE & RES	

Knowledge	• Possess good knowledge about the operation of technical building and RES systems, including:
	  ◦ PV systems
	  ◦ SWH systems
	  ◦ Biomass Boiler and stove
	  ◦ Cogeneration systems
	  ◦ District heating and cooling systems
	  ◦ Heat pumps
	• Possess good knowledge about active and passive EE measures
	• Knowledge and understanding of the cost benefits associated with the installation of RES systems and EE measures
	• Possess good knowledge about building thermal characteristics, including:
	  ◦ Thermal Capacity
	  ◦ Insulation
	  ◦ Passive heating and cooling
	  ◦ Thermal bridging
	  ◦ Design, positioning and orientation of buildings and apertures
	  ◦ Indoor climatic conditions
	  ◦ Natural lighting and shading

Skills	• Demonstrates ability to calculate the energy performance of buildings in accordance to minimum requirements, taking into account the active and passive EE measures and RES systems • Ability to calculate the cost benefit analysis of both RES and EE systems and measures respectively, on various building types

	• Demonstrates ability to inspect and judge effectiveness of installed technical building and RES systems, including:
	  ◦ PV systems
	  ◦ SWH systems
	  ◦ Biomass Boiler and stove
	  ◦ Cogeneration systems
	  ◦ District heating and cooling systems
	  ◦ Heat pump
	• Ability to calculate the annual energy consumption of a building
	• Ability to perform the lifecycle analysis of a building
	• Ability to inspect and assess the building thermal characteristics, including:
	  ◦ Thermal Capacity
	  ◦ Insulation
	  ◦ Passive heating and cooling
	  ◦ Thermal bridging
	  ◦ Design, positioning and orientation of buildings and apertures
	  ◦ Indoor climatic conditions
	  ◦ Natural lighting and shading

Competences	• Applies knowledge and skills to recommend most cost effective measures to improve the energy performance of a building • Applies knowledge and skills to perform the assessment of energy saving and future consumption forecasting of a building • Applies knowledge and skills to produce comprehensive reports from site inspections about the installed technical building and RES systems
Learning Outcomes	• Understands technical information about RES and EE measures • These workers must be competent to calculate the energy performance, the life cycle analysis and the energy consumption of a building. These individuals would be expected to draft comprehensive assessment reports about their findings, with suggestions for improvement and recommend more efficient systems

Table 28: Proposed Occupational Profile #2: Building Inspectors & Auditors for EE & RES

7.4.3 Proposed Occupational Profile #3

HVAC Technicians

The third proposed occupational profile deals with the provision of skilled HVAC technicians who are knowledgeable and capable of installing, maintaining and upgrading various types of heating, ventilation and A/C systems. Understandably different systems may be utilised more frequently and therefore require more trained workers to fill the current market gap.

Proposed Occupational Profile #3 HVAC Technicians	

Knowledge	• Possess good knowledge about the operation of HVAC systems
	• Possess good knowledge about:
	  • Mechanical and forced ventilation
	  • Natural ventilation
	  • Humidity control measures
	  • Heat recovery ventilation
	  • Energy recovery ventilation
	  • Air filtration and cleaning
	  • Air handling units
	  • Under floor heating and air distribution systems

Skills	• Ability to perform the installation of HVAC systems • Ability to perform the maintenance of HVAC systems
Competences	• Applies knowledge and skills to inspect HVAC systems and judge if upgrades are required depending on its effectiveness and efficiency • Applies knowledge and skills to recommend most cost appropriate HVAC system
Learning Outcomes	• Understands the operation of various HVAC systems and is able to understand technical information about these systems • Follows instructions and carries out the installation, maintenance and upgrading HVAC • Applies their knowledge to suggest the optimum systems to be used

Table 29: Proposed Occupational Profile #3: HVAC Technicians

7.4.4 Proposed Occupational Profile #4

Installers of Energy Efficient Materials & Building Envelope Systems (Curtain Walls, Cladding and Façade Systems)

The fourth proposed occupational profile deals with the provision of skilled installers who are knowledgeable and capable of installing and maintaining energy efficient materials for internal and external use. The proposal also identifies a number of building envelope systems that installers would need to be knowledgeable about and capable of installing and maintaining, namely: cladding systems, façade systems, curtain walls and ventilated facades.

Proposed Occupational Profile #4 Installers of Energy Efficient Materials & Building Envelope Systems (Curtain Walls, Cladding and Façade Systems)	

Knowledge	• Possess good knowledge about:
	  • Air tightness and draught control measures
	  • Vapour and moisture barrier control measures
	  • Water proofing and drainage systems
	  • Need for protection from erosion
	  • Fixing and assembly systems
	  • Cladding systems
	  • Façade systems
	  • Curtain walls
	  • Ventilated facades
	  • EE building materials and construction techniques
	• Possess good knowledge about building thermal characteristics, including:
	  • Thermal Capacity
	  • Heat flow through walls, floor and roof slabs
	  • Insulation
	  • Passive heating and cooling
	  • Thermal bridging

Skills	• Demonstrates ability to:
	  • Install cladding and facades systems, curtain walls and ventilated facades
	  • Install EE materials and construction techniques
	  • Install window and door frames
	  • Ensure thermal insulation of frames
	  • Ensure adequate water drainage is provided
	  • Ensure air tightness and draught control measures are adequate
	• Ability to inspect and assess the window and door frames

	• Ability to inspect and assess the building thermal characteristics, including:
	  • Thermal Capacity
	  • Insulation
	  • Passive heating and cooling
	  • Thermal bridging
	  • Design, positioning and orientation of buildings and apertures
	  • Indoor climatic conditions
	  • Natural lighting and shading

Competences	• Applies knowledge and skills to correctly install EE materials and building envelope systems which provide the required level of thermal insulation, moisture barrier and protection from the elements whilst forming the essential building envelope
Learning Outcomes	• Understands technical information about EE materials and various building envelope systems • Follows instructions and carries out the installation and maintenance of EE materials and building envelope systems

Table 30: Proposed Occupational Profile #4: Installers of Energy Efficient Materials & Building Envelope Systems (Curtain Walls, Cladding and Façade Systems)

7.4.5 Proposed Occupational Profile #5

Installers of Insulated Glazing and Aperture Systems

The fifth proposed occupational profile deals with the provision of skilled installers who are knowledgeable about and capable of installing and maintaining insulated glazing and aperture systems. The qualified installers are to be knowledgeable about the need for air tightness, moisture and vapour control, thermal insulation, the heat flow through the aperture and the various types of insulating systems for apertures.

Proposed Occupational Profile #5 Installers of Insulated Glazing and Aperture Systems	

Knowledge	• Possess good knowledge about:
	  • Single, double and triple glazed window systems
	  • Thermal insulation of window and door frames
	  • Correct installation of window and door frames
	  • Air tightness and draught control measures
	  • Vapour and moisture control measures
	  • Correct water drainage systems
	  • Heat flow through apertures
	  • Vacuum and argon insulated glazing systems

Skills	• Demonstrates ability to:
	  • Install window and door frames
	  • Ensure thermal insulation of frames
	  • Ensure adequate water drainage is provided
	  • Ensure air tightness and draught control measures are adequate
	• Ability to inspect and assess the window and door frames

Competences	• Applies knowledge and skills to correctly install aperture systems which are well fitting, thermally insulated, air and moisture tight and form a uniform part of the building envelope
Learning Outcomes	• Understands technical information about insulated glazing and aperture systems • Follows instructions about air tightness, moisture and vapour control and thermal insulation while carrying out the installation and maintenance of glazing and aperture systems

Table 31: Proposed Occupational Profile #5: Installers of Insulated Glazing and Aperture Systems

7.4.6 Needs and Current Provisions

Chapter six of this report has clearly outlined all the VET provisions that are currently on offer within the local industry. Some of the knowledge and skills that are required currently form part of the provisions offered.

Although modifications may be required to these provisions, the report seeks to outline the new provisions that are required for the workforce to be well equipped and capable of reaching the set targets. MCAST is currently in the process of evaluating some of the courses it offers through two different ESF projects. This involves the review and design of syllabi with the required support, teaching material with relevant pedagogical skills, course accreditation and staff training. Other courses available on the local market might also need to go through the same process.

7.5 Qualification Needs

An overview of the entire educational programmes that are available to individuals of all ages, particularly the various options available for both IVET and CVET courses related to training programmes related to green construction skills is outlined in Chapter six of this report. As clearly explained, some of the training provisions are yet to be aligned to the MQF and therefore do not have a designated MQF level to grade the level of the education on offer.

7.5.1 Alignment with the Malta Qualifications Framework

The five proposals in the previous subsection of this chapter would require alignment with the MQF if they are introduced by one of the education providers. Possible MQF level indications may be introduced through the National Qualifications Roadmap. The proposals may further be refined during the second pillar of the BUILD UP Skills project.

The local dominant provider of VET education in Malta, MCAST, has completed aligning all their training provisions to the MQF. This enables a better understanding of the courses and provides a clear distinction between the courses on offer. The alignment of courses to the MQF also facilitates the education paths and makes the progression to higher levels of education more clear. The Institute of Sustainable Energy that forms part of the University of Malta has also referenced all the courses and degrees that are offered.

ETC, the local public employment agency, which also provides considerable training to individuals seeking employment, is currently undergoing the process of referencing all its training provisions. It is envisaged that this lengthy process will be completed in the near future. This will enable job seekers and companies to have a better understanding of the trainees' competence level once they have completed training at this institution.

The Long Life Learning Directorate, which forms part of the Ministry of Education and Employment, has not provided information as to whether they intend referencing the courses they currently offer to the MQF. The aim of the Long Life Learning Directorate is after all to educate individuals, who may have not had the opportunity to continue their education as youths and to teach basic trades and skills that could be implemented. Unlike MCAST and the Institute of Sustainable Energy, the Directorate does not restrict entrance into courses and therefore no entry requirements are applicable. On completion of the course, students are provided with certification for attendance rather than certificates of achievement and are not expected to sit for examinations.

7.5.2 Courses on Offer and Impact on Recruitment Process

The overall feedback from stakeholders is that a wider array of courses should be on offer to the manual workforce. It is felt that courses which are longer in duration, but are taught in a formal manner and are certified and accredited, would be beneficial to the industry in the long run, although they understand that this would also have some drawbacks.

If courses of this nature are to be implemented throughout the system then companies foresee possible improvements in the recruitment process, whereby employees can be judged on a level playing field. **Assuming all workers are either trained or accredited for their experience and informal training, when individuals apply for jobs and submit their respective CV's or skill cards, companies will find it easier to compare their skills and competences at face value.**

Once the process of training or accrediting the manual labour workforce has been completed, assuming it is made compulsory, companies will be able to easily identify skill gaps or skill overlaps that exists within their own workforce. The mapping process of skills could greatly facilitate and assist the human resources section of any firm in the appropriate allocation of skills. This would also contribute towards the identification of critical areas that require training, the respective level, and also the urgency for training.

7.5.3 Skill Cards

Some EU member states have introduced the skill card system as an alternative to a license. This system provides the workforce with a card, similar to a driving license, which lists the competences of that individual. A single uniform system for skill cards would be ideal for the local industry and if aligned to the MQF would enable the workforce to list all their competences received from all institutions. The system would also need to cater for experienced individuals who may only require recognition of skills they already possess. This would enable the validation of both formal and informal training and therefore provide further quality assurance for all the work carried out.

7.5.4 The Impact of Qualification and Accreditation on the Tendering Process

Tendering procedures for EU member states have become more complex, numerous and stringent. Large tenders with a value over the set limit must be advertised throughout the EU to allow for fair competition by all contractors practicing in the profession. The particular conditions in most tenders take the form of restrictive tendering procedures to ensure the quality of the bids and the construction of the project. The restrictive tendering procedures take the form of a thorough list of items that bidders must present within their proposals. In some cases these include key employees required to form part of the team to conduct the work in question. Companies with a large number of uncertified informally trained workers will encounter difficulties in formally quantifying and listing competences held within their firms. **However the mandatory introduction of skills cards, aligned to the MQF, which document workers skills, would greatly facilitate the process of providing data related to competences held by a workforce for a company.**

The stakeholders also identified drawbacks, namely increased worker mobility and poaching by competing firms. Although this may be viewed as a drawback, these are potentially advantages for the employees and companies, however the market will ultimately determine the true benefits gained.

7.5.5 Warrants and Licenses

A number of the stakeholders interviewed were also of the opinion that as an alternative to skill cards, the issuing of licences or warrants for trades related to all the professions within the construction industry could be introduced. This would distinguish between workers who have been formally trained to carry out certain trades and those who have not. This would increase quality assurance and responsibility on construction sites. **One mechanism that could possibly be implemented could include the provision of a predetermined number of hours of compulsory CPD for the reissuing of license every year or within a determined reference period. This would ensure all workers are knowledgeable about the latest building materials and building systems.**

The use of warrants and licenses already exists within the local construction industry and may therefore be easier for workers to understand and eventually accept. Two local professions within the construction industry that make use of a warrant system are the architects and civil engineers and also the engineers. This warrant is presented upon proof of academic qualifications and a predetermined number of hours of experience in the field. An oral examination is the final stage for such professionals to receive their warrants. (Government of Malta, Ministry for Resources and Rural Affairs, Works and Services, 2013)

Builders and workmen are able to practice within the local industry without formal training or certification, however without the title of mason. To receive the title of mason, one must obtain a license. Only individuals who have completed the required training and passed the relevant examinations obtain this license.

Year	Number Of New Applicants
2008	98
2009	79
2010	44
2011	25
2012	24

Table 32: Number of new applicants for the Masons License from 2008-2012 (Government of Malta, Ministry for Resources and Rural Affairs, 2013)

The current number of individuals currently on the masons register is 920 and the number of new applicants over the last five years has decreased notably. This may have resulted due to the reduced popularity of masonry construction due to the increased cost and the increase of use of pre-cast concrete building elements. The number of applicants in 2012 is approximately one fourth of the number five years ago in 2008. (Government of Malta, Ministry for Resources and Rural Affairs, 2013)

7.6 Extent to Which Training Has Already Taken Place in the Building Sector

The provision of the IVET and CVET courses by the various education providers has contributed towards an increase in the percentage of the trained workforce. Information pertaining to the education institutions, the courses on offer, the current student population and the student population over the last five years has been provided in a previous chapter within this report.

As stated in previous chapters, an average of 160 students per year have been trained in IVET training schemes and a further 380 in CVET in the last five years. These values represent the output from all the education institutions listed in Chapter six. As previously stated, only a percentage of these workers have attended courses that are referenced to the MQF. The perception provided by the stakeholders has shed light on the percentage of trained workforce that exists in their particular trades.

7.6.1 Extent to Which Training Has Taken Place – Response From One to One Interviews

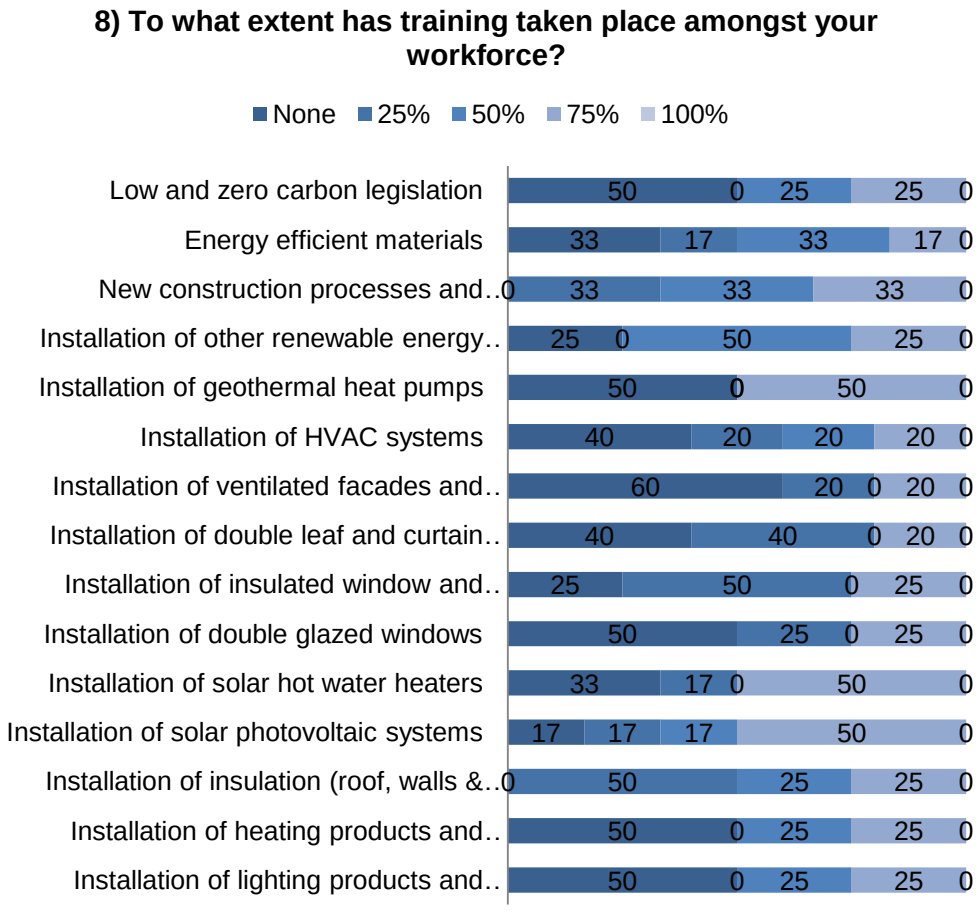
When questioned about the training that has taken place amongst their workforce those individuals interviewed were allowed to indicate the level of training for each area separately. Those individuals who completed the survey, both individually and online, were only asked to quantify the level of training for their workforce as a whole. This has led to the creation of two data sets, which will be analysed separately.

The data collected[6] from the one to one interviews is subdivided for all of the short listed trades shown above. Although the illustrated data is unrelated since the short listed areas form different parts of the field, some very interesting and notable trends have been identified. Firstly, the alarmingly high reply rate by stakeholders of the complete absence of formal training in a number of fields. This provides evidence that a considerable amount of onsite non-formal uncertified training must be taking place. On the opposite end of the scale, none of those interviewed stated that their workforce was entirely trained, presumably due to administrative and support staff.

6 The legend provided above the graph represents the options provided during the interviews, while the data in the graph is a representation of the percentages of the population who selected each option.

The three areas that have been identified by stakeholders as having been trained the most are: the installation of solar water heaters, solar PV systems and geothermal heat pumps. It is important to point out that in the case of the installation of geothermal heat pumps this applies for members of staff that have a tertiary level of education and not for the tradesmen.

The identified trades have been given significant importance locally due to the drive towards increasing Malta's RES output and training for such trades is offered at both MCAST and the University of Malta. **The government incentives and need to have qualified and certified installers has made a difference and led to the increased training within this sub sector of the industry.**



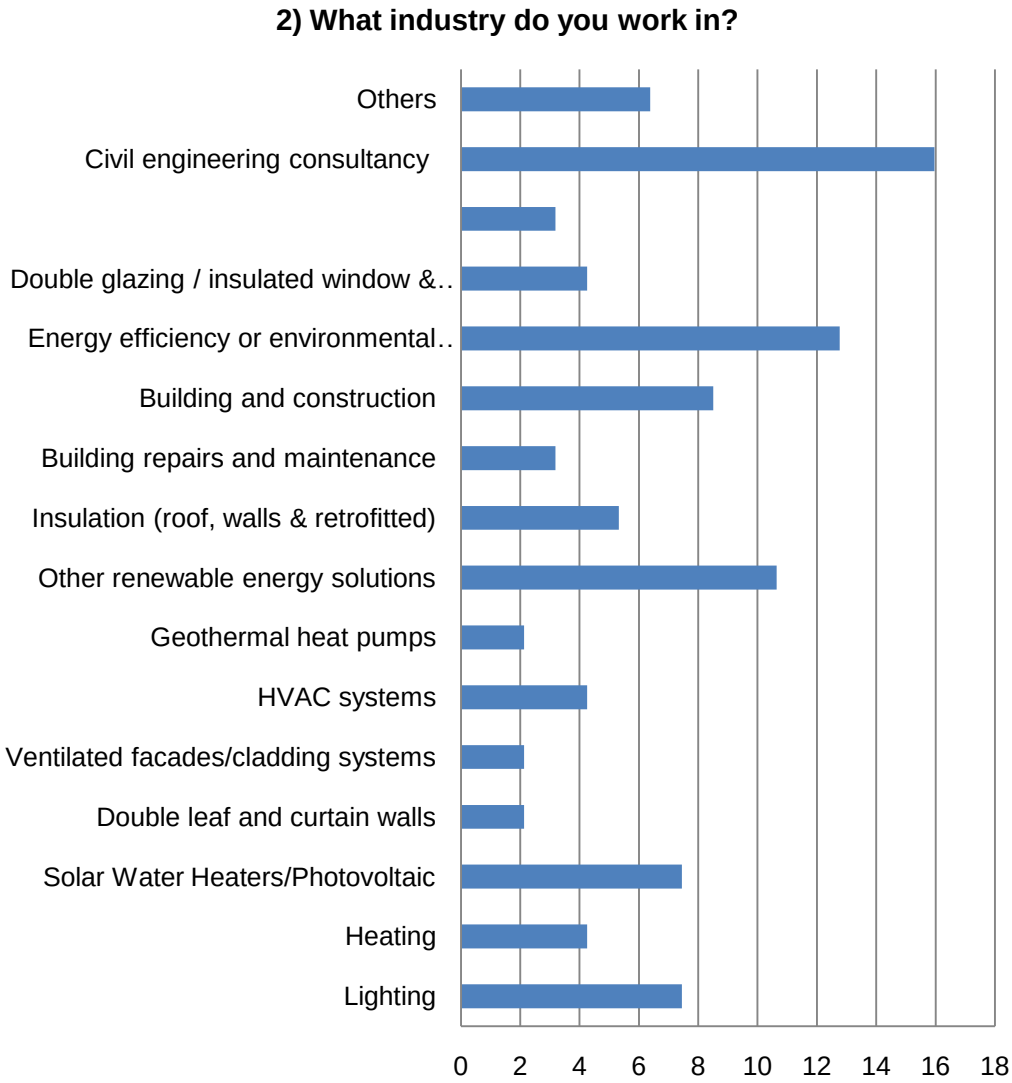
Graph 15: Question 8: To what extent has training taken place amongst your workforce? Response from one to one interviews

The graph shows some alarming data, namely that the majority of the other trades are being carried out by untrained workers. A staggering 70% of the trades listed above are being carried out by a workforce which is either not trained or has received very limited training. It must be emphasized that some of these trades may not require in-depth training to drastically improve the end product, namely the building envelope of buildings, which protects the building from the elements. Since the workforce is certainly skilled to carry out the work assigned, updating of knowledge may be the only type of training required.

7.6.2 Extent to Which Training Has Taken Place – Response From Surveys

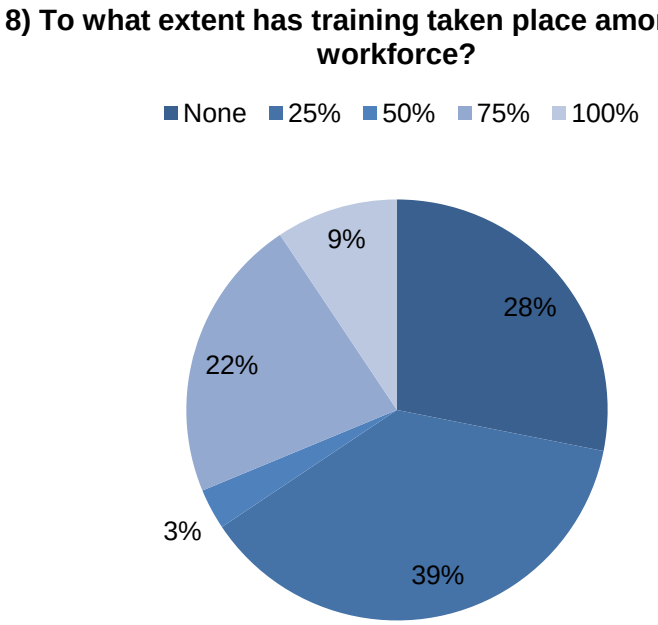
The data collected from the distributed surveys and the online surveys have produced different results. The most popular trades and professions represented in the data include:

- Civil engineering consultancy
- Energy efficiency or environmental consultancy
- Building and construction
- Solar water heaters/Photovoltaic
- Lighting
- Other renewable energy solutions



Graph 16: Question 2: What industry do you work in? Response from surveys

The following trades were the least popular: geothermal heat pumps, ventilated facades/cladding systems and double leaf and curtain walls. Understandably the type of stakeholders who provided data for this data source had an impact on the type of results. Contrary to a previous conclusion about installers of geothermal heat pumps, whilst some of the workforce may be trained in this field, this trade is yet to become common. Due to the limited number of installations of this nature, the number of individuals who work as installers of geothermal heat pumps are few in number.



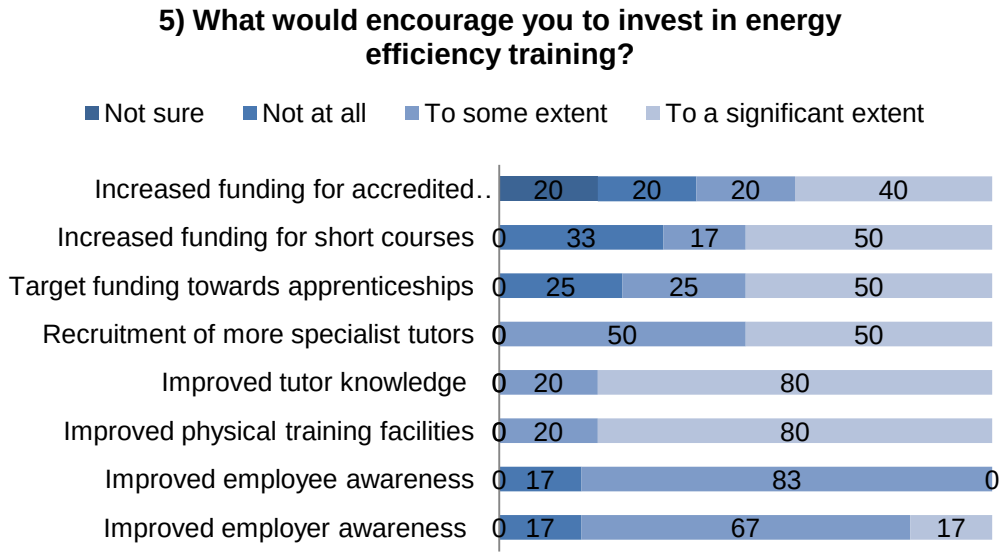
Graph 17: Question 8: To what extent has training taken place amongst your workforce? Response from surveys

Two thirds of those who completed the survey stated that a mere 25% or less of their workforce within their respective trade or profession received formal training. These findings are similar to those from the interview data source and this is a concern when one keeps in mind the impending energy targets to be met that require a trained and competent workforce.

Unlike the data received from the interviews, more than one third stated that their workforce was 75% or entirely trained. This can be accounted for by the civil engineering, energy efficiency and environmental constants and other renewable energy solution providers. These employ a large number of tertiary educated workers, and also subcontract activities that require less skills, knowledge and competences to third parties.

7.6.3 Prompts to Increase Investment in Energy Efficiency Training – Response From VET Providers

VET providers were questioned about what would increase the probability of a new course being introduced in the area of energy efficiency. The graph below illustrates the data collected, shows clearly that the two most influential changes are in fact improved tutor knowledge and improved physical training facilities. This emphasizes the imminent need for availability of train-the-trainer courses to recruit of more specialist tutors.



Graph 18: Question 5: What would encourage you to invest in energy efficiency training? Response from VET providers

These two factors are closely followed in order of importance, by increased funding for short courses and target funding for apprenticeships. The findings confirm a lack of awareness by both the companies as well as their employees about the current provisions of VET and their resulting benefits.

Two of the five factors mentioned are in fact related to tutors who are able to deliver training on the specialised fields of EE and RES. Train the trainer courses are therefore essential and the first step that the country would need to take to address VET provisions in these specialised fields. Without adequately trained and knowledgeable trainers, the learning outcomes, which are the foundation of every training qualification, the required new courses would not be able to be drafted.

Both improved training facilities and potential increases in funding for apprenticeships are related to the need for trainees to get the required hands on experience. Unlike tertiary education that is centred on theoretical education, VET is focused on both theoretical education and practical application. This may take place both on the premises at the VET provider or within the industry itself. Increased classroom facilities would go hand in hand with laboratories to ensure that the theory is taught in a suitable environment.

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7.7 Capacity in the Existing Workforce to Achieve the 2020 Energy Targets

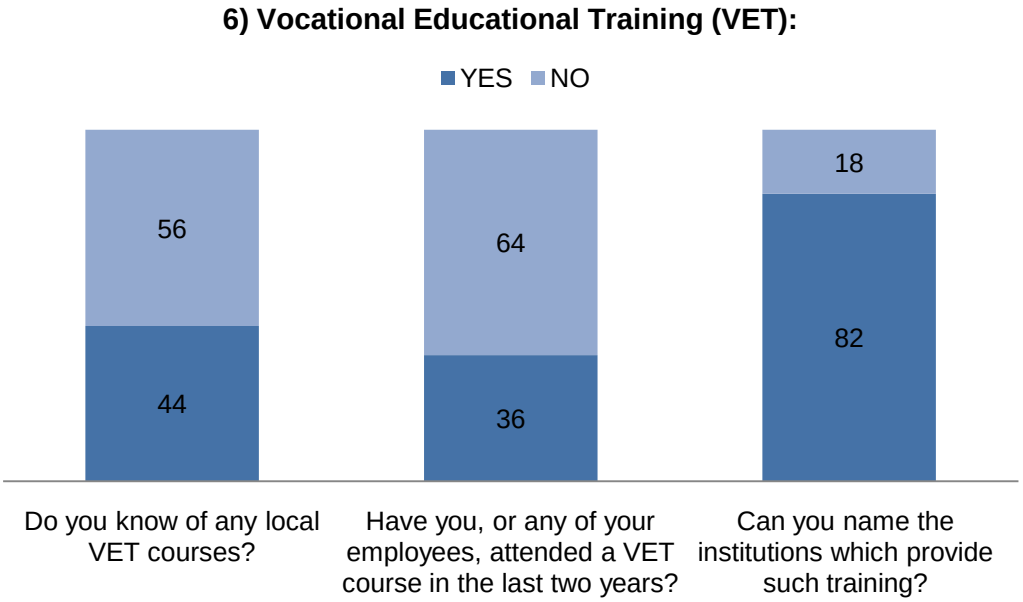
The existing workforce already possesses knowledge on and the ability to carry out their trades, however doubt has been cast as to their competence levels regarding green construction practices.

Updating of these skills and competences related to EE practices are the only way Malta is to reach its 2020 energy targets. However this may not be the case at the current attendance rates in CVET of approximately 300 individuals per year. As stated in previous chapters, the current workforce for the target group of this project stands at approximately 5,000 workers, which given the seven year period to the 2020 deadline equates to the need to up skill 700 individuals of the current workforce each year.

7.7.1 Awareness of VET – Response From Stakeholders

A remarkably low 44% of the stakeholders questioned were aware of the availability of VET courses. Within the interviews and surveys, the stakeholders were also questioned about their knowledge of CPD, which is discussed in the subsequent section of this chapter. Although the two have similar meanings and both refer to training, 60% of the stakeholders were aware of the latter. The question pertaining to CPD only formed part of the questions utilized in the interview data collection exercise, while the question pertaining to VET was included in both the interviews and the surveys distributed.

Neither of these terms, which describe forms of education, where abbreviated, but presented in full in the questions, with the intention of ensuring no misunderstandings took place. However it appears the stakeholders who answered the CPD and VET questions were unaware that the two actually have similar meanings.



Graph 19: Question 6: **Vocational Educational Training (VET):** Response from stakeholders

Although less than half of the respondents to this question knew of the existence of a VET course, the more alarmingly statistic is that only one third have attended, or know of an individual who has attended a course. **This proves the relatively low attendance ratio of CVET or IVET when compared to the total workforce within the industry. This further strengthens the argument that the local workforce is being trained informally on site.**

7.8 Monitoring Needs and Structural Measures

The National commission for Higher and Further Education must continue the positive work that has taken place over the last few years. In particular increased emphasis is required for:

- The reform of the training provisions for green jobs
- The creation of a system to accredit workers for their skills (LN 295 of 2012)
- The identification and addressing of the training needs related to the provision of eco construction training

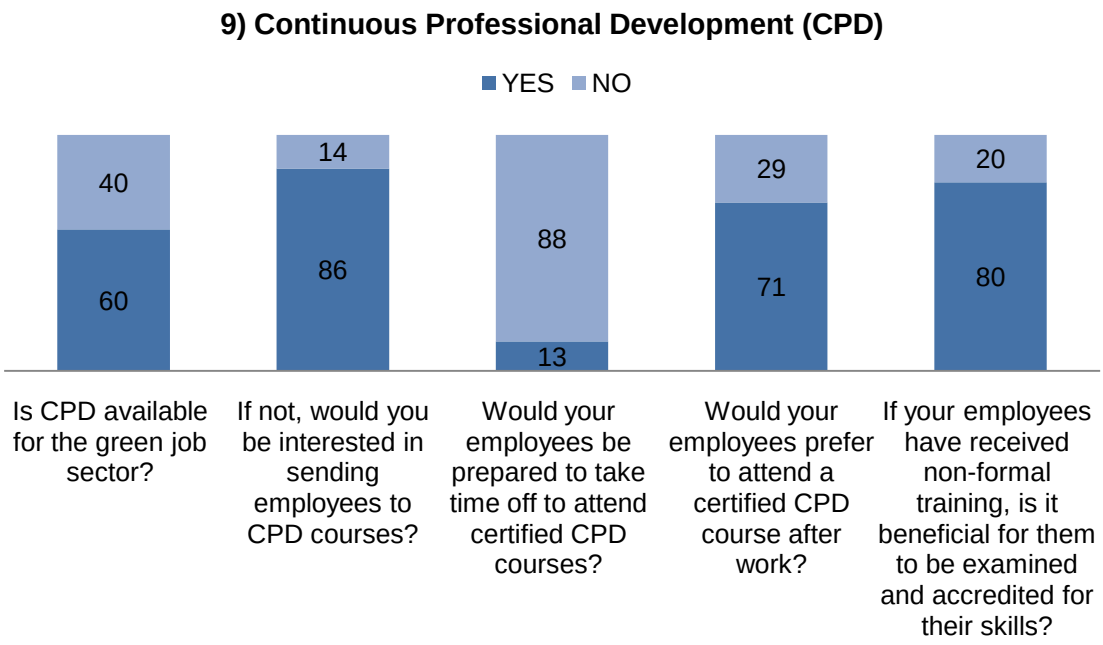
The need for the sectors skills committee to address the urgent need for occupational profiles for all industries, particularly those related to green jobs for the construction industry. These would significantly aid Malta to reach its 2020 energy targets by clarifying which areas require increased investment and training.

7.8.1 Awareness of Continuous Professional Development – Response From Stakeholders

Continuous professional development is a structured measure that needs to become a permanent feature of the construction industry, to regularly update the workforce. The local CPD culture amongst the higher qualified professionals is one which is inbuilt into some professions as licenses and is only awarded if individuals attend a minimum number of hours of accredited training per year. The content of the training provided is related to the profession, and in most cases deals with updates to products or systems and the latest findings within the field. **Although this is yet to become mandatory for architects and engineers, the Chambers that represent both of these professions do organise numerous information sessions, seminars and conferences on a yearly basis.**

On the contrary CPD in the form of CVET has not been available for as long, for the manual workforce. Trade schools have been existence on the island since the inauguration of the first trade school, the Polytechnic, in 1970 by the then Prime Minister. (Galea, 2003) The local trade schools have mainly focused on the provision of IVET, and it has only been in the last two decades that CVET has been provided for the workforce. This provides students with an academic

and practical background before they enter the workforce. More recently, such training is being offered as a recognised apprenticeship.



Graph 20: Question 9: Continuous Professional Development (CPD). Response from stakeholders

More than half of the industry does seem to be aware of the presence and provision of courses for the current workforce. This awareness is essential due to the need to update skills and competences of the current and future work force for Malta to meet its 2020 targets. The local forerunner in the provision of VET, MCAST, was widely identified and named by the stakeholders. This is encouraging as companies are aware of which institution they need to contact when they consider sending their employees to training.

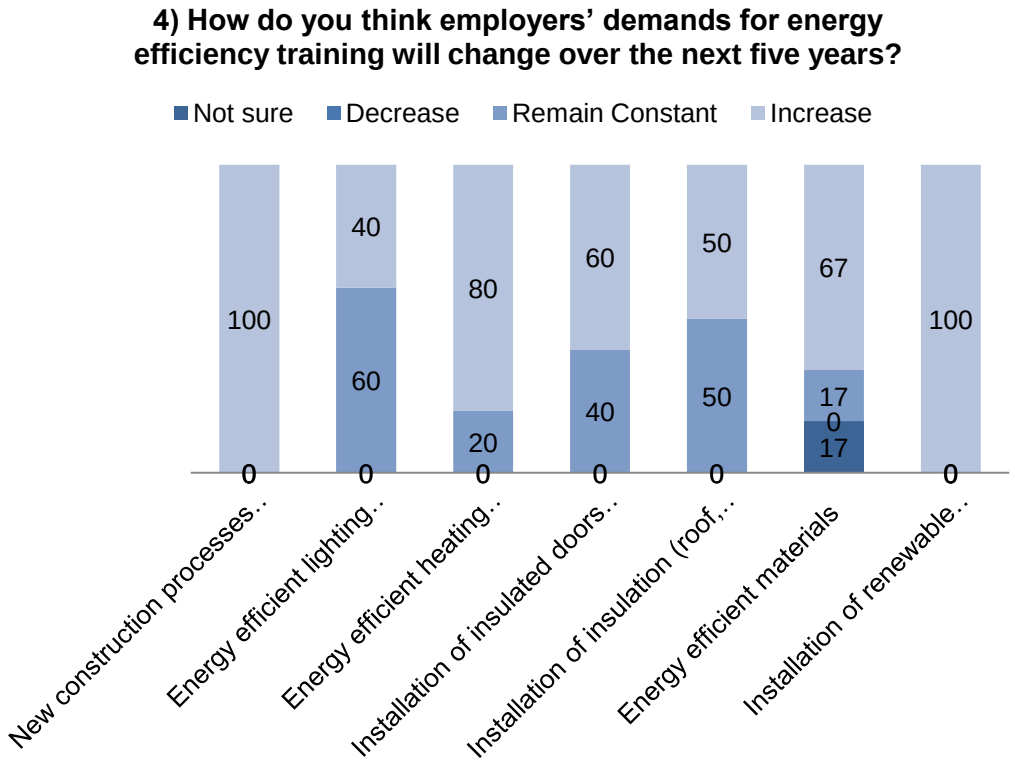
The results extracted from the interviews revealed the fact that the companies within the industry are extremely interested in increasing the competence and knowledge base of their workforce. However they are more than certain that the vast majority of employees would not be prepared to take time off work to attend training. It is thought that employees would rather attend training after their working day, which would make no difference to the training provisions and is therefore positive. Companies also suspect that employees feel that they should attend training during working hours and should still be paid for this time. Since private companies rely on productivity to survive, some companies are concerned about the sustainability of such initiatives. Some have also mentioned issues related to job mobility and fear that the newly trained individuals may either expect higher salaries or search for employment

elsewhere and therefore deplete the company of the newly acquired resource. The issue of increased job mobility, once an employee has acquired new skills and competences, is present in all industries. Employees should view this as a positive, as training provides them with skills that also benefit them individually by making them more employable.

One of the stakeholders interviewed felt very strongly about the fact that employees should be licensed or certified for their ability to carry out all trades to a predetermined competency level. This would facilitate the selection process when a company seeks to employ new workers and also instils responsibility for the work carried out.

7.8.2 Forecasted Change in Demand For Energy Efficiency Training By Companies – Response From VET Providers

The monitoring systems that must be implemented to keep track of the requirements of the industry must enable participation by stakeholders and VET providers from the industry. It must be noted that they are the ones with the most up to date information about each industry and are best positioned to forecast future needs.



Graph 21: Question 4: How do you think employers' demands for energy efficiency training will change over the next five years? Response from VET providers

During the one to one interviews the VET providers were asked about their thoughts for future training provisions demands. Exceptionally positive feedback was received about the potential increase in demand by companies for training. With the exception of the training for lighting systems and installation of insulation, all other trades are expected to require increased rates of training within the next five years.

The stakeholders are almost certain that there will be a great increase in the demand for training in the areas of RES, new construction processes and EE heating systems. Training in EE measures, including the installation of insulated walls, apertures and EE materials are also thought to be critical to for future requirements.

7.8.3 Remarks

This overly optimistic data is reassuring as it means that from the indications received by the VET providers, training for EE and RES are definitely going to become a much more integral part of the industry. Together with an increase in demand for EE in buildings, **Malta also requires:**

- appropriate occupational profiles
- increased enforcement of the EPC system
- stricter regulations regarding EE buildings, with incentives to encourage investment and appropriate enforcement of regulation
- increased trainer knowledge about the relevant topics of RES of EE
- accreditation of skills held by existing workforce
- mandatory training, with the introduction of CPD
- increased awareness about the available VET provisions on offer in Malta
- the introduction of the skill card system

Chapter Eight
Barriers

8.1 Introduction

The aim of the National Status Quo is to provide a clear understanding of the green construction industry, together with the skills gap analysis for the said local industry. The identification and initial analysis of potential barriers related to the qualification of the workforce is also an essential part of the project. This will be elaborated upon and tackled during the drafting of the National Qualifications Roadmap.

Data pertaining to the barriers that stakeholders anticipate may hinder the national achievement of the 2020 energy targets was collected from all the data collection methods utilised and outlined in the second chapter of this report. The most significant barriers outlined by the stakeholders include:

- Lack of coordination within the sector
- Lack of consumer and employer demand for energy efficient technologies
- Lack of employer demand for training in energy efficient technologies
- Lack of awareness regarding the 2020 energy targets
- Insufficient numbers of trained workers

The VET providers and stakeholders representing the companies within the industry were asked to rank a drafted list of barriers that Malta may face when attempting to achieve their 2020 targets. The question clearly stated that the scale was from 1 (least important) to 10 (critical). The stakeholders were asked to provide a rating for each of the barriers and initiatives that may encourage them to invest in EE training.

The sum of the provided figures was calculated and then divided by the maximum score possible, namely the multiplication of the number of respondents to that question by 10. The resultant figures from this computation were converted to percentages and then illustrated in the relevant graphs in sections 8.3, 8.4 and 8.5.

8.2 Policy and Strategy

As stated in chapter seven of this document, the policy documentation related to the provision of green skills and jobs is yet to be published. The provision of green skills and jobs is however mentioned as a policy area within the National Energy Policy document published in 2012. Understandably, the lack of such a policy is one of the possible reasons for the current uncoordinated state of the industry. Data received during the interviews and surveys indicates that there is a lack of communication between the business stakeholders and the responsible government bodies. This has resulted in the lack of confidence by consumers and therefore a reduction in the demand.

8.2.1 Strategy

The author, together with the stakeholders interviewed, is of the impression that the introduction of a single strategy for the way forward is required for this policy area. The required document must reflect the needs and thoughts of both the public and private stakeholders, thus ensuring the industry can move forward to reach the EU 2020 energy targets. The Government must give due importance when pertinent to the enforcement of the existing legislation.

The strategy must also provide:

- The foundation for the creation of the urgently needed occupational profiles for the entire construction industry
- Appropriate communication channels for the dissemination of all relevant information to all the stakeholders involved within the industry
- The introduction of CPD, which could be linked to the communication strategy to ensure continued updating of knowledge
- A long term plan for incentives to ensure continued investment by consumers for both the residential and commercial sectors
- Updated methods for the enforcement of the EPC system and mandatory minimum energy consumption values of all building types.

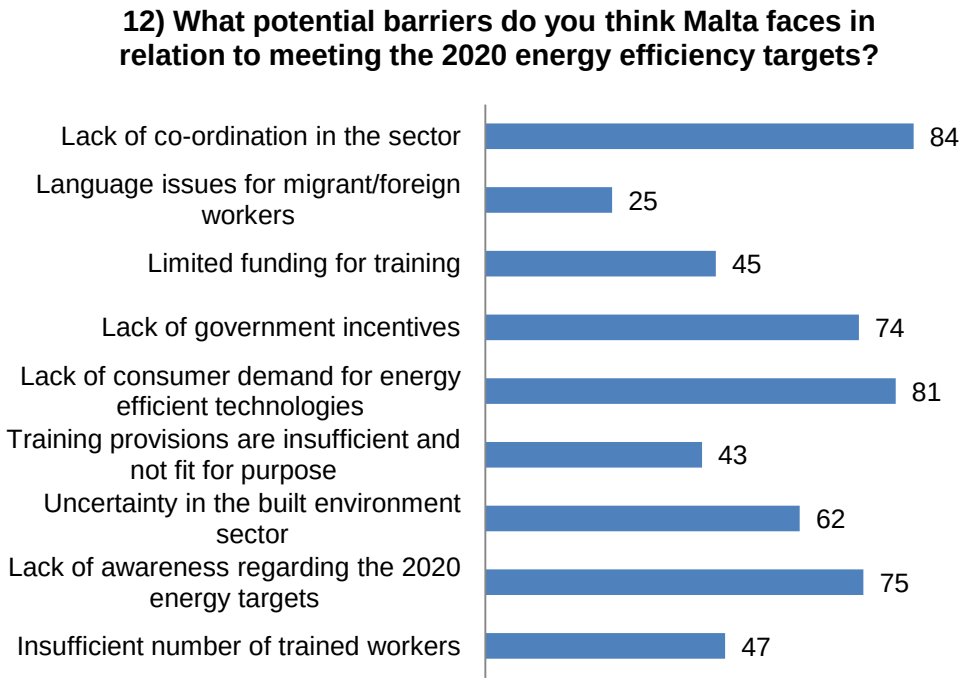
8.3 Barriers Malta Faces to Meet the 2020 Energy Targets

8.3.1 Response From Stakeholders

The two most influential barriers identified by the stakeholders are the lack of coordination within the sector[7] and the lack of consumer demand for energy efficient technologies. As stated both within this chapter and within the previous chapter of this report, the absence of the relevant policies and strategy for the green sector has proved to have a pronounced effect. Until this particular issue is addressed and the required policy transcribed into local legislation, a great deal of uncertainty will be felt by the stakeholders operating within the sector. The consequence of this is the further lack in confidence by consumers to invest in RES and EE, resulting in reduced interest by suppliers.

To solve the lack in consumer demand, a three-pronged approach is proposed, namely:

- Education to increase awareness
- Improved financial incentives
- Enforcement of legislation promoting energy efficient dwellings



Graph 22: Question 12: What potential barriers do you think Malta faces in relation to meeting the 2020 energy efficiency targets? Response from stakeholders

7 This barrier refers to the lack of coordination between the theoretical, educational, legal and practical fields. In particular the lack of synchronization between the educational field and the practices implemented in industry.

Education to increase awareness about EE, RES and our responsibility to meet the EU energy targets must continue to be disseminated to all age groups of society. The financial incentives offered since 2006 need to continue to develop to entice consumers to invest. Furthermore, the legislation in place for the mandatory use of EPC certificates must be enforced. Together with enforcement of the EPC systems, stricter minimum EE standards also need to be implemented. Interestingly enough four barriers identified as being of concern are:

- Lack of sector coordination and consumer demand
- Lack of awareness regarding the 2020 energy targets,
- Lack of government incentives,
- Uncertainty in the built environment sector

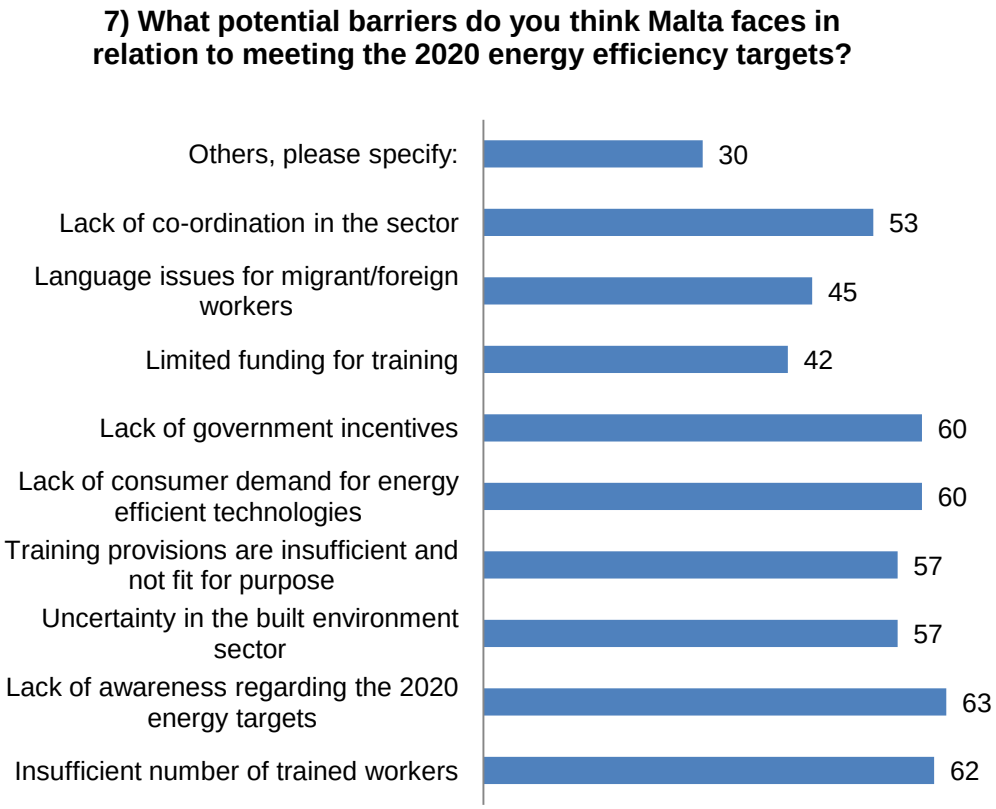
The barriers identified can therefore be overcome if the proposed approach is utilised. Assuming the government, within the coming months is in a position to continue striving to make these three elements part of their strategy, it is hoped that Malta will be in a better position to reach it targets.

8.3.2 Hesitancy to Invest

Whilst acknowledging that not all companies might understand the benefit of continuous training, some still feel that the cost may be prohibitive. This is particularly in cases where no financial support is provided. Challenges pertaining to the inability of employees to attend training during working hours are prevalent in micro and small companies due to the size of the workforce. As explained in section 5.6, micro companies who employ 1-9 individuals dominate Malta's construction industry this therefore results in a good portion of the industry being unable to attend training, particularly during business hours. This significant barrier can be overcome if training is encouraged through new financial incentives together with the current subsided training schemes. This would need to be enforced over an acceptable period of time, enabling staggered training to take place. In so doing, this would allow larger firms to plan ahead and ensure their workforce receives the required training.

8.3.3 Response From the VET Providers

As already stated companies identified: the lack of coordination within the sector and the lack of consumer demand for energy efficient technologies as the two primary barriers for Malta. These were followed by lack of awareness regarding the 2020 energy targets, lack of government incentives and uncertainty in the built environment sector as secondary barriers. On the contrary, the education providers had different thoughts regarding the potential barriers Malta may face to achieve the 2020 targets. Although two principal barriers can be identified, the importance given to the various barriers is relatively uniform and the range in the values in the graph is just over 30%, in contrast to a 59% range in the perception of the companies.



Graph 23: Question 7: What potential barriers do you think Malta faces in relation to meeting the 2020 energy efficiency targets? Response from VET providers

The two principal barriers identified are lack of awareness regarding the 2020 energy targets and an insufficient number of trained workers. Whilst the companies and the VET providers are in agreement with regards to the need to increase awareness, it is interesting to note that the latter group of stakeholders feel that the current industry does not have sufficient trained workers. So whilst

a small number of companies feel that their workforce is sufficiently trained, the vast majority are in agreement about the need and importance of formal training. Undoubtedly VET providers feel that potential up-skilling, upgrading of competences and increased formal training is required and would benefit the industry as a whole.

The VET providers and the companies are also in agreement about the lack of government incentives and lack of consumer demand for energy efficient technologies. Although the barriers in themselves are of concern, it is reassuring to hear that the two sets of stakeholders are in agreement, and their opinion must be taken into consideration during the drafting of future policies and strategies.

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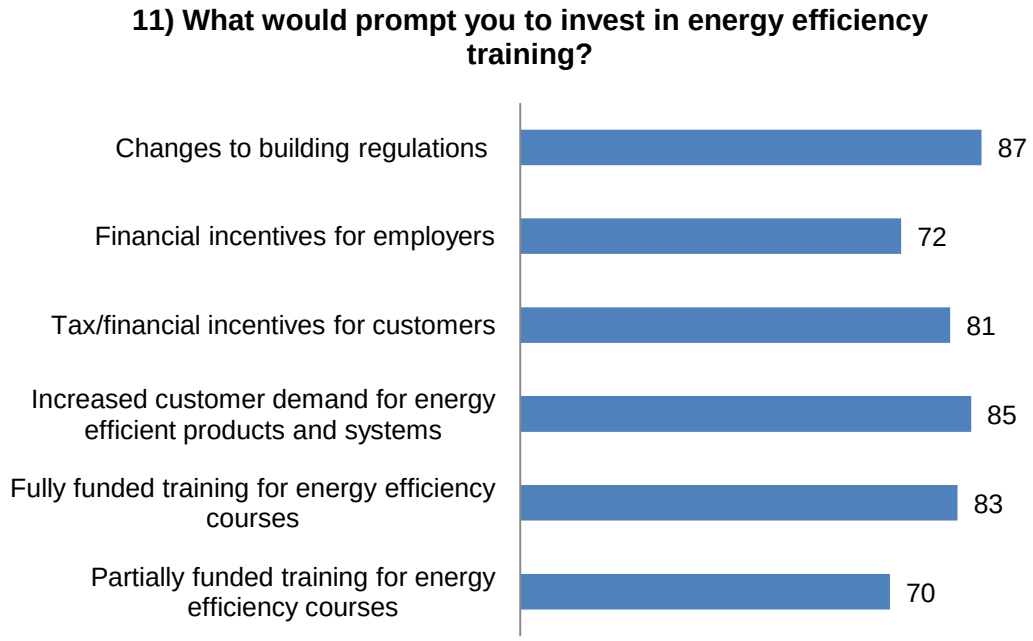
8.4 Prompts That Encourage Companies to Invest

The need to amend building regulations was once again emphasised by the companies interviewed. These individuals ranked this issue as being the one to most likely effect their decision when investing in training programmes for their workforce. As explained in previous chapters minimum guidelines for energy efficiency in dwellings have been published through a document published by the Building Regulations Office. This was complimented by a system to measure the effectiveness of these measures that forms part of the local legislation. Unfortunately enforcement of the EPC system is not yet being imposed, and stakeholders are therefore unlikely to invest if the demand for energy efficient construction systems is low or non-existent. Stakeholders feel that once enforcement is carried out and the minimum standards of energy consumption for dwellings are made mandatory, the demand is inevitably going to increase. This would unsurprisingly prompt them to invest in such training to meet the demand.



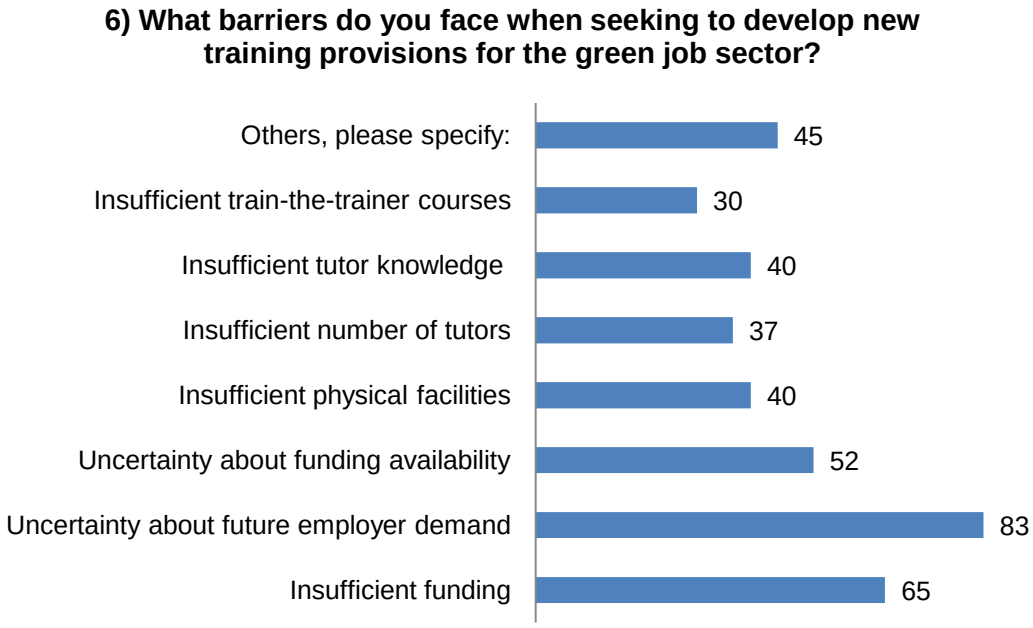
Graph 24: Question 11: What would prompt you to invest in energy efficiency training? Response from stakeholders

The stakeholders have also identified increased customer demand for energy efficient products, fully funded training for energy efficient courses and tax or financial incentives for customers as other prompts that would further encourage them to invest. Apart from aiding Malta to reach the EU targets, the need for increased customer demand also affects the amount of training

provided to the workforce. This is the classic chicken and egg problem, whereby the companies are reluctant to invest in training until the consumers demand green construction services. On the other hand the consumers may be reluctant to demand such services due to limited awareness and also their inability to fully gauge the cost benefits of investing in such technologies. This is why the stakeholders identified changes to building regulations as being the most influential change that will prompt the whole industry to invest in training.

8.5 Barriers Faced By VET Providers

Once again, the results of the VET providers contain an element of uniformity amongst the responses received, with the exception of one barrier. The stakeholders appear to be most concerned by the uncertainty about future employer demand. This is unquestionably connected to the apprehension the companies identified regarding both the lack of awareness and consumer demand, as has already been explained.



Graph 25: Question 6: What barriers do you face when seeking to develop new training provisions for the green job sector? Response from VET providers

During the process of developing new training provisions, VET institutions must conduct a forecasting exercise that attempts to identify both skill gaps and areas of possible growth and the relevant increase in the provision of training. All types of forecasting include calculated assumptions that translate into differences in the accuracy levels. The calculated assumptions are most likely taken on the basis of the condition of the economy at the time. VET institutions may therefore require both short and long-term forecasts that cater for different levels of urgency depending upon the growth rate of the industry.

The secondary barrier that was identified as being an obstacle was that of limited funding. The cost to develop a course from its inception to the actual implementation in a classroom far exceeds actual provisions. Although the local government and EU funding provisions have aided the cause in question, this may not be sufficient in light of the substantial increase in training provisions required. The fact that all the VET providers who supply training within this field are public entities also means that the allocated funding must be distributed between these stakeholders.

It is also worth explaining that education in Malta is highly subsided by the government and, in most cases, is free of charge. All IVET provisions at MCAST are available to youths at no charge, while the CVET provisions at MCAST and UoM are highly subsidised. The training provisions provided by the DLLL and ETC are also provided to the public at no charge. The result of which is considerable expenditure by the government to fund both the courses and the institutions.

8.6 Funding

8.6.1 RES and EE Incentives and Grants

The incentives for RES and EE offered by the local government, as explained in the section 4.3, have created increased investment within the sector. This has been complimented in recent years by substantial grants from the EU. However since the funding is staggered and packaged into four separately issued schemes, the demand on the industry suppliers increased dramatically and then subsequently fell sharply. Some of the incentives that have been implemented include a clause that stipulates that the RES and EE system must be installed and fully functional within a predetermined period. This resulted in an initial high uptake by clients who required their installation to be completed before the end date for access to the incentive capital. These individuals are only willing to invest during the period that the incentive is offered. Once the funding is exhausted the incentive is terminated and the demand stops abruptly.

This has led to an extremely volatile industry wherein demand has become almost entirely dependent on incentives. Stakeholders have actually started to keep a list of interested investors who would like to be first on the list when the incentives are re-issued. One of the consequences of this issue is the fluctuation in the labour demand. Some of the companies interviewed have explained that it is in fact not in their best interest to employ installers of EE and RES on a full time basis but rather to engage them when and if the need arises. This therefore means that the remuneration for the installers may also take the form of payment per installation carried out. Unfortunately the result is qualified installers may become unemployed during periods whilst incentives are not being offered.

8.6.2 Training Provisions

As explained in previous chapters primary, secondary and tertiary education provided in public institutions in Malta is free. This also applies to VET, where IVET is offered free of charge and CVET is highly subsided. The substantial funding requirements for the provision of education in Malta originate from national funds that have recently been supplemented by EU funding. Although this has increased the availability of training programmes, further funding resources are required to increase the sustainability of the education industry.

Programmes such as the European Social Fund project number 2.85 entitled "Linking Industrial Needs and VET to Optimise Human Capital" have provided the local VET scene with a much-needed boost for continued training. This project's budget was in excess of €350,000 (85% co-financed by the ESF) and was divided into two phases, namely:

Phase 1

This included the identification of skill gaps and industry requirements for a total of 10 sectors. Although a research analyst was appointed, a considerable number of stakeholders and companies from the industries in question contributed directly to the creation and course development. This ensured that the courses developed and the relevant course content actually tackled the needs of the different industries. The first phase also included 'Train the Trainer' courses to ensure that trainers possessed the required skills and knowledge to teach the proposed courses. Further investment in retooling, equipment and upgrading of the teaching environments and educational infrastructure also took place within the first phase.

Phase 2

The second phase of funding was allocated to the provision of the actual training provisions developed. For the ten sectors in question, a total of 118 courses (Malta College of Arts, Science & Technology, the Institute of Tourism Studies and the Malta Qualifications Council, 2013) were designed, 18 of which have actually been delivered. Although a number of courses have yet to commence due to insufficient specialised trainers or lack of participation, 145 individuals have already received training through the courses created.

Chapter Nine
Conclusions

9.1 Introduction

The research for the National Status Quo indicates that within Malta's 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 chapter brings together all the observations and conclusions from the entire report and attempts to provide feasible recommendations to address them.

9.2 Observations and Recommendations

9.2.1 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 data that is available relates to the construction industry as a whole and is not subdivided according to specific activities. As already stated the lack of a formal definition for the green construction industry, green jobs and green skills 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 providing:

- Education directed at consumers
- Improved financial incentives for consumers to invest
- Enforcement of the EPC legislation which indirectly promotes energy efficient dwellings
- Promotion of Eco-label and Eco-certification schemes in various sectors of the industry

9.2.2 Training

Different approaches to the provision of training by stakeholders were noted. While some 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 and some attempted to solve this by offering free training on condition the workers passed the relevant exams.

Although the benefits are widely understood, since formal training is yet to become 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.

The local VET provisions, as outlined in section 6.4, 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 masons, draughts persons and other relevant site workers need to include training about the detailing and installation of:

- New construction methods
- RES technologies
- EE heating systems and materials
- Detailing and installation of insulated doors, windows and other building components

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 would be required. To increase the demand for training the following recommendations can be implemented:

- Increased awareness about the available systems
- A better understanding of the cost benefits of EE and RES systems
- Increased marketing of partially and fully funded training provisions
- The need for increased enforcement of the EPC system resulting in increased demand for green construction services
- Clear indicators from the government to the industry that new jobs are required within the green construction industry to warrant training

9.2.3 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. The following are the proposed recommendations for each of the scenarios:

Construction

The characteristics of a building that could reduce its energy consumption are more easily altered at the design stage. The current EPC enables an assessment to be carried out at this stage, allowing the architects or engineers to make changes. Should architects choose to promote the long term benefits of energy conservation to developers, this would in increase: work for EPB assessors; awareness for the potential buyers of the properties and increased work for the tradesmen who would carry out the work.

Sale

Both potential clients and sellers can also use EPC's as a comparative marketing tool. When properties are in the process of being sold, then both the bank could request an EPC in order to issue a mortgage, as could a notary prior to the drafting of a contract of sale. If EPC's are requested by banks, together with all other documentation, the use of the system will increase, and the same can be done by notaries when collating data for their research.

Rental

Short-term rentals: Whilst the use of EPC's within the short let rental market is challenging due to the number of undeclared rentals that take place, it could be one of the required documents for a "Holiday Furnished Premises License".

Long-term rentals: In the case of the long let rental market, EPC's could become valuable tools particularly within energy intensive sectors. When letting for an extended period the client is generally expected to pay the utility bills, and a more energy efficient property could have a pronounced effect on the monthly costs.

9.2.4 Accreditation and Skill Cards

The workers who attend VET courses are currently being accredited for the competences gained from the training received. However the process of accrediting the current workforce is yet to formally commence. The introduction of the skills card system 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 system would:

- Facilitate accreditation of both formal and informal training
- Simplify the employment process
- Complement CV's for tradesmen
- Ease the comparison process of skills and competences
- Provide an indication of the quality expected from the tradesmen since the accreditation will be linked to the MQF
- Increase employment mobility
- Increase international employment mobility since the MQF is aligned to the EQF
- Ensure continuous updating of knowledge and up skilling as the periodic reissuing of the card would be dependent upon the attendance of a predetermined number of hours of CPD
- Facilitate human resources departments to quantify the skills and competences held within a firm related to EE and RES
- Simplify the preparation of a tender bid which could include strict selection criteria related to green competences that must be held within a firm

The introduction of the skill cards and mandatory 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. Their flexibility to fill gaps wherever they may be required and their habitual good work ethic means that they are inadvertedly an asset.

9.3 Conclusions

9.3.1 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 outlined in section 7.4, namely:

- Installers of Renewable Energy Solutions and other Technical Systems
- Building Inspectors & Auditors for EE & RES
- HVAC Technicians
- Installers of Energy Efficient Materials & Building Envelope Systems (Curtain Walls, Cladding and Façade Systems)
- Installers of Insulated Glazing and Aperture Systems

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.

Current Workforce	
Number of workers in the construction industry	11,099[8]
Number of workers in the target group	4,885[9]
Number of persons entering the labour force after IVET	161
Number of persons trained per year - CVET	386

Table 33: The Size of the Current Workforce within the Construction Industry

8 (Government of Malta, National Statistics Office, Labour Market and Education Statistics Unit, 2013)

9 (Government of Malta, National Statistics Office, 2013)

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 34: Table 35: The Size of the Proposed Workforce for the Construction Industry

9.3.2 Industry Growth

Although a recent decrease in the rate of construction and employment has been experienced, the data collected 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.

Although incentives from the government to install EE and RES measures may increase employment for short periods, it is thought yearly quotas for retrofitting the building stock is a more sustainable solution. 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 this report, and which were summarised within this chapter. The strategy must address the following pertinent issues:

- The drafting of appropriate occupational profiles
- Updated methods for the enforcement of the EPC system
- Stricter compulsory regulations regarding EE in buildings with incentives to encourage investment and appropriate enforcement or regulation
- Increased trainer knowledge of relevant topics such as EE and RES
- Accreditation of existing skills held by the current workforce
- The introduction of mandatory CPD to ensure continuous updating of knowledge
- Increased awareness about available VET provisions on offer

- Appropriate forecasting of future VET requirements and the fostering of greater involvement of the private sector in this process. (Business Europe, 2013)
- Introduction of the skill cards system
- Marked increase in awareness for the public and professionals
- Clear understanding and marketing of the cost benefits of RES and EE and how the end user would actually benefit directly
- A long term plan for incentives to ensure continued investment by consumers for both the residential and commercial sectors

Chapter Ten
Authors and Contributors

10.1 The Malta Chamber Foundation

The Malta Chamber Foundation, which forms part of the Malta Chamber of Commerce, Enterprise and Industry, is one of the four project partners which form part of the BUILD UP Skills Malta Project. This Intelligent Energy Europe funded project, is divided into two pillars, each consisting of a number of work packages. One the work packages assigned to the Malta Chamber Foundation within the first pillar was the drafting of this report, namely the National Status Quo Report for Malta. The strong ties this organisation has with the local business industry, made it the ideal project partner to carry out such a task.

10.2 The Author

The Malta Chamber Foundation subcontracted and employed a consultant to draft the National Status Quo Report for Malta. As outlined in section 1.4, this document is a detailed report highlighting the current VET provisions and identifying skill gaps within the green construction industry.

Ian Borg Bellanti, the selected candidate, who was solely responsible for the drafting of this report, is a graduate in Architecture and Civil Engineering from the University of Malta. The author was responsible for all the tasks related to preparation of this document from the initial data collection through to its analysis. The drafting and formatting of all the findings into one comprehensive account of the current scenario for Malta's construction industry was also the responsibility of this individual.

10.3 Contributors

The author of this report obtained first hand information through interviews and surveys from numerous stakeholders directly involved within the local construction industry. Whilst the Malta Chamber Foundation has chosen not to list these stakeholders, it would however like to extend its gratitude for their time and assistance.

The author would also like to personally thank the Director General of the Malta Chamber of Commerce, Enterprise and Industry Mr. Kevin J. Borg for his continuous support and insight into Malta's business environment. Special thanks must also be addressed to Mrs. Jeanelle Brincat, who provided the author with continued assistance particularly in the field of the local educational system and European funded projects.

The Building Industry Consultative Council (BICC), the Malta College of Arts, Science & Technology (MCAST) and the Malta Intelligent Energy Management Agency (MIEMA), which together with the Malta Chamber Foundation form the BUILD UP Skills Malta Project must also be thanked. Each project partner provided vital information about their respective fields of expertise from the local construction, education and energy industries respectively.

10.3.1 National Status Quo - Vetting Consultant

The Malta Chamber Foundation subcontracted the task of vetting the National Status Quo Report to AIS Ltd. The consultant was selected after a call for applicants was made by the named entity in the local press. After a strict and rigorous selection procedure, Ing. Bernard Brincat was chosen on behalf of AIS Ltd. to carry out the required task.

Ing. Bernard Brincat is a Projects Manager working for AIS Ltd., a company supplying customised automation solutions for a wide variety of applications, and particularly focused on the area of Building Management. Ing. Brincat is a specialist in control and instrumentation and has applied this knowledge to the field of energy conservation and management within buildings. The appointee maintains an active interest in the field and has furthered his qualifications by becoming an Accredited Assessor of Energy Performance of Buildings. He is also a Visiting Lecturer at the MCAST Institute of Building and Construction Engineering, lecturing on topics such as Building Management Systems, Energy Conservation and Environmental Control.

Bibliography

National Commission for Higher Education. (2007). *A Quality Assurance Framework for Further and Higher Education in Malta - Report by the National Commission for Higher Education.* Valletta: National Commission for Higher Education.

Bianchi, P. (2009, February). Appreciating Maltese Modern Architecture. *Din l'Art Helwa, Newsletter, no. 14(14)*, 12. Malta: Din l'Art Helwa.

Briguglio, M., Brown , M., & Aquilina, D. (2011). A Civil Society Perspective of Sustainable Energy Policy and Green Jobs in Malta as a Small EU State. In S. Rizzo (Ed.), *Green Jobs from a Small State Perspective. Case studies from Malta* (pp. 10-19). Luxembourg: Green European Foundation.

Buhagiar, V., & Yousif, C. (2005). *A post-occupancy evaluation of energy efficient measures in the housing sector: A case study for Malta.*

Business Europe. (2013, March 11). The importance of VET for Tackling Youth Unemployment – speaking notes. *Business Europe Speaking Notes*. Brussels: Business Europe.

Central Bank of Malta. (2011). *Financial Stability Report 2011.* Valletta: Central Bank of Malta.

Directorate - General for Energy and Transport. (2008). *Malta Renewable Energy Fact Sheet.* European Commission - Directorate - General for Energy and Transport.

Enemalta Corporation. (2009, June 27). *Press Releases - Archived*. Retrieved 03 21, 2013, from Enemalta: https://www.enemalta.com.mt/newsDetails.aspx?id=1201

Ernst & Young - Environment and Sustainability Services (France). (2006). *European Commission DG Environment - Eco-Industry, its size, employment, perspectives and barriers to growth in an enlarged EU.* European Commission - DG ENV.

European Association for Quality Assurance in Higher Education. (2005). *Standards and Guidelines for Quality Assurance in the European Higher Education Area.* Helsinki: European Association for Quality Assurance in Higher Education.

European Centre for the Development of Vocational Training (CEDEFOP). (2004). *Terminology of vocational training policy – A multilingual glossary for an enlarged Europe.* Luxembourg: Publications Office of the European Union.

European Centre for the Development of Vocational Training (CEDEFOP). (2009). *European guidelines for validating non-formal and informal learning.* Luxembourg: Office for Official Publication of the European Communities.

European Centre for the Development of Vocational Training (CEDEFOP). (2010). *Skills for Green Jobs - European Synthesis Report.* Thessaloniki: Luxembourg: Publications Office of the European Union.

European Commission. (2013, March 24). *Small and medium-sized enterprises (SMEs)*. Retrieved from European Commission - Enterprise and Industry: http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm

European Commission. (2013, March 22). *The ESF in Malta*. Retrieved from European Commission - European Social Fund: http://ec.europa.eu/esf/main.jsp?catId=391

European Commission. (2013, March 22). *The European Qualifications Framework (EQF)*. Retrieved from European Commission - Education and Training: http://ec.europa.eu/education/lifelong-learning-policy/eqf_en.htm

European Commission for Energy. (2009). *Low Energy Buildings in Europe: Current State of Play. Definitions and Best Practices .* Brussels: European Commission.

European Commission, Joint Research Centre, Institute for Energy. (2011). *The European Green Building Projects Catalogue January 2006 – June 2010.* Ispra: Publications Office of the European Union.

Farrugia, R. N., Fsadni, M., Yousif, C., & Mallia, E. (2005). The Renewable Energy Potential of the Maltese Islands. *Xjenza*, 32-42.

Galea, L. (2003, April 5). MCAST: an investment in Malta's future. *Times of Malta*.

Gatt, T. (2012). The Early Use of Concrete in Public Buildings: An Investigation of the quality of concrete executed in Malta in the period following post-war reconstruction and independence. Malta: Institute of Building and Construction Engineering - Malta College of Arts Sciences and Technology.

Government of Malta, Malta Resources Authority. (2012). *The uptake of Photovoltaic systems in the Maltese Residential Sector.* Marsa: Government of Malta, Malta Resources Authority.

Government of Malta. (2004). Legal Notice 186 of 2004 . Valletta: Government of Malta.

Government of Malta. (2005). Government Notice 203 of 2005. Valletta: Government of Malta.

Government of Malta. (2006). Government Notice 55 of 2006 . Valletta: Government of Malta.

Government of Malta. (2006). Government Notice 135 of 2006. Valletta: Government of Malta.

Government of Malta. (2006). Government Notice 136 of 2006. Valletta: Government of Malta.

Government of Malta. (2006). Legal Notice 238 of 2006. Valletta: Government of Malta.

Government of Malta. (2006). Legal Notice 269 of 2006. Valletta: Government of Malta.

Government of Malta. (2008). Government Notice 261 of 2008. Valletta: Government of Malta.

Government of Malta. (2008). Legal Notice 261 of 2008. Valletta: Government of Malta.

Government of Malta. (2008). *National Energy Efficiency Action Plan 2008.* Valletta: Government of Malta.

Government of Malta. (2008). Subsidary Legislation 463.04: Enterprise Support Incentive Regulations. Valletta: Government of Malta.

Government of Malta. (2009). Government Notice 81 of 2009. Valletta: Government of Malta.

Government of Malta. (2010). Government Notice 161 of 2010. Valletta: Government of Malta.

Government of Malta. (2010). Legal Notice 162 of 2010. Valletta: Government of Malta.

Government of Malta. (2010). Legal Notice 422 of 2010. Valletta: Government of Malta.

Government of Malta. (2010). *Malta's National Renewable Energy Action Plan as required by Article 4(2) of Directive 2009/28/EC.* Valletta: Government of Malta.

Government of Malta. (2010). Subsidiary Legislation 423.46: Feed-in Tariff (Electricity Generated from Solar Photovoltaic Installations) Regulations. Valletta: Government of Malta.

Government of Malta. (2011, April 15). Malta Resources Authority: MRA/Schemes/1/2011: 2011/SWH/ national. *Government Gazette*. Valletta: Government of Malta.

Government of Malta. (2011, April 15). Malta Resources Authority: MRA/Schemes/2/2011: 2011/SWH/ERDF . *Government Gazette*. Valletta: Government of Malta.

Government of Malta. (2012). Government Notice 409 of 2012. Valletta: Government of Malta.

Government of Malta. (2012). Legal Notice 295 of 2012 . Valletta: Government of Malta.

Government of Malta. (2012). Legal Notice 376 of 2012 . Valletta: Government of Malta.

Government of Malta. (2013). Legal Notice 71 of 2013. Valletta: Government of Malta.

Government of Malta, Employment Training Centre. (2007). *Employment in the Environmental Goods and Services Industry in Malta.* Valletta: Government of Malta, Employment Training Centre.

Government of Malta, Environment and Regional Statistics Unit, National Statistics Office. (2002). *Environment Statistics - Official Statistics of Malta.* Valletta: Government of Malta, National Statistics Office.

Government of Malta, Malta Qualifications Council . (2013, March 22). *About Us*. Retrieved from Malta Qualifications Council : http://www.mqc.gov.mt/about-us?l=1

Government of Malta, Malta Qualifications Council. (2007). *A National Qualifications Framework for Lifelong Learning – A Second Guide .* St Venera: Malta Qualifications Council.

Government of Malta, Malta Qualifications Council. (2009). *The Essential Framework – A quick glance at the level descriptors of the Malta Qualifications Framework for Lifelong Learning.* St Venera: Malta Qualifications Council.

Government of Malta, Malta Qualifications Council. (2013, March 22). *Malta Qualifications Framework*. Retrieved from Malta Qualifications Council: http://www.mqc.gov.mt/malta-qualifications-framework?l=1

Government of Malta, Malta Qualifications Council. (2013, March 22). *Work Programme - 2011*. Retrieved from Malta Qualifications Council: http://www.mqc.gov.mt/workprogramme2011?l=1

Government of Malta, Malta Resources Authority. (2009). *Analysis of Potential for Co-Generation on the Maltese Islands.* Valletta: Government of Malta, Malta Resources Authority.

Government of Malta, Ministry for Resources and Rural Affairs. (2009). *A Proposal for an Energy Policy for Malta.* Valletta: Government of Malta, Ministry for Resources and Rural Affairs.

Government of Malta, Ministry for Resources and Rural Affairs. (2010). *Proposed National Renewable Energy Action Plan.* Valletta: Government of Malta, Ministry for Resources and Rural Affairs.

Government of Malta, Ministry for Resources and Rural Affairs. (2012). *The National Energy Policy for the Maltese Islands.* Valletta: Government of Malta, Ministry for Resources and Rural Affairs.

Government of Malta, Ministry for Resources and Rural Affairs, Works and Services. (2013, February 18). *Periti Warranting Board*. Retrieved from Government of Malta, Ministry for Resources and Rural Affairs, Works and Services: http://www.resources.gov.mt/perwar_brd

Government of Malta, Ministry of Education and Employment. (2012). *Referencing of the Malta Qualifications Framework (MQF) to the European Qualifications Framework (EQF) and the Qualifications Framework of the European Higher Education Area (QF/EHEA) - A Document for Further Consultation and Implementation.* Valletta: Government of Malta, Ministry of Education and Employment.

Government of Malta, Ministry of Finance, the Economy and Investment. (2012, November). Budget 2013. Valletta: Government of Malta, Ministry of Finance, the Economy and Investment.

Government of Malta, National Commission for Higher Education. (2013, March 22). *About NCHE*. Retrieved from National Commission for Higher Education: https://www.nche.gov.mt/page.aspx?pageid=12

Government of Malta, National Commission for Higher Education. (2013, March 22). *Commission*. Retrieved from National Commission for Higher Education: https://www.nche.gov.mt/page.aspx?pageid=46

Government of Malta, National Commission for Higher Education. (2013, March 22). *History*. Retrieved from National Commission for Higher Education: https://www.nche.gov.mt/page.aspx?pageid=52

Government of Malta, National Commission for Higher Education. (2013, March 22). *Secretariat*. Retrieved from National Commission for Higher Education: https://www.nche.gov.mt/page.aspx?pageid=55

Government of Malta, National Statistics Office. (2010). *Sustainable Development Indicators For Malta 2010.* Valletta: Government of Malta, National Statistics Office.

Government of Malta, National Statistics Office. (2011). *Malta in Figures 2011.* Valletta: Government of Malta, National Statistics Office.

Government of Malta, National Statistics Office. (2012). *Regional Gross Domestic Product: 2007-2011.* External Cooperation and Communications Unit. Valletta: Government of Malta, National Statistics Office.

Government of Malta, National Statistics Office. (2012). *Short-term construction indicators: Q3/2012.* Valletta: Government of Malta, National Statistics Office.

Government of Malta, National Statistics Office. (2013). *Gainfully Occupied Population: August 2012.* External Cooperation and Communications Unit. Valletta: Government of Malta, National Statistics Office.

Government of Malta, National Statistics Office, Business Registers Unit. (2012). *Business Demographics 2006-2011 .* Valletta: Government of Malta, National Statistics Office.

Government of Malta, National Statistics Office, Environment and Resources Unit. (2012). *Energy Consumption in Malta: 2000-2011.* Valletta: Government of Malta, National Statistics Office.

Government of Malta, National Statistics Office, Labour Market and Education Statistics Unit. (2013). *Labour Force Survey: Q3/2012 .* Valletta: Government of Malta, National Statistics Office.

Government of Malta, National Statistics Ofiice. (2012). *Business Demographics: 2006-2011.* External Cooperation and Communications Unit. Valletta: Government of Malta, National Statistics Ofiice.

Government of Malta, Research and Methodology Unit, National Statistics Office. (2007). *Census of Population and Housing 2005, Volume 1 Population.* Valleta: Government of Malta, National Statistics Office.

Government of Malta, Research and Methodology Unit, National Statistics Office. (2007). *Census of Population and Housing 2005, Volume 2 Dwelling.* Valletta: Government of Malta, National Statistics Office.

Government of Malta, Research and Methodology Unit, National Statistics Office. (2012). *Census of population and housing 2011 - Preliminary Report.* Valletta: Government of Malta, National Statistics Office.

Government of Malta, Research and Methodology Unit, National Statistics Office. (2012). *Census of Population and Housing 2011 Preliminary Report.* Valletta: Government of Malta, National Statistics Office .

Government of Malta, Services Division, Building Regulations Office. (2006). *Technical Guidance F - Conservation of Fuel, Energy and Natural Resources (minimum requirements on the energy performance of building regulations, 2006).* Valletta: Government of Malta, Building Regulations Office.

Government of Malta, Services Division, Ministry for Resources and Rural Affairs. (2010). *Implementation of the EPBD in Malta, Status in November 2010.* Valletta: Government of Malta, Ministry for Resources and Rural Affairs.

Government of Malta. Employment Training Centre. (2013, March 22). *Information To Jobseekers*. Retrieved from Employment Training Centre: www.etc.gov.mt/category/3/12/info_jobseekers.aspx

Malta College of Arts, Science & Technology. (2012). *Prospectus 2012/2013.* Paola: Malta College of Arts, Science & Technology.

Malta College of Arts, Science & Technology, the Institute of Tourism Studies and the Malta Qualifications Council. (2013, March 22). *Introduction to the Project*. Retrieved from ESF 2.85 Linking Industrial Needs and Vocational Education & Training to Optimise Human Capital: http://e3i.mcast.edu.mt/esf2.85/

Malta Enterprise. (2010, January 15). ERDF Energy Grant Scheme: Enterprise Support Incentives Regulations, 2008 . *Incentive Guidelines*. Pieta: Malta Enterprise.

Malta Environment & Planning Authority. (2007). *Development Control – Policy and Design Guidance 2007.* Marsa: Malta Environment & Planning Authority.

Malta Environment & Planning Authority. (2012). *The Environment Report Indicators 2010-2011.* Marsa: Malta Environment & Planning Authority in partnership with the National Statistics Office.

Malta Environment and Planning Authority . (2013, March 18). *Map Server*. Retrieved from Malta Environment and Planning Authority : http://mapserver.mepa.org.mt/frame.php?site=malta_internet&lang=en&group=public&resol=2

Malta Environment and Planning Authority. (2010). *Planning Guidance for Micro-Wind Turbines.* Marsa: Malta Environment and Planning Authority.

Mott MacDonald. (2009). *Feasibility Study for Increasing Renewable Energy Credentials.* Glasgow - Marsa: Mott MacDonald in collaboration with Malta Resources Authroity.

National Commission for Further and Higher Education. (2013, March 22). *The Education System in Malta.* Retrieved from National Commission for Higher Education: https://www.nche.gov.mt/page.aspx?pageid=129

Sciberras, J., Borg, A., Miller, K., & Tabone, M. (2009). *Further and Higher Education Strategy 2020 – Recommendations of the National Commission for Higher Education.* Valletta: National Commission for Higher Education.

Thomsen, K. E., Wittchen, K. B., & EuroACE. (2008). *European national strategies to move towards very low energy buildings.* Danish Building Research Institute. SBi, Statens Byggeforskningsinstitut, Danish Building Research Institute.

Appendices

11.1 Appendix 1: Template of One To One Interview Questions - Companies

1) **How many staff does your company employ?** *Tick where applicable*			
a) 1		d) 50-249	
b) 2-9		e) 250 - 499	
c) 10-49		f) 500+	
2) **What industry do you work in?** *Tick where applicable*			
a) Installation of lighting products and systems			
b) Installation of heating products and systems			
c) Installation of insulation (roof, walls & retrofitted)			
d) Installation of solar photovoltaic systems			
e) Installation of solar hot water heaters			
f) Installation of double glazed windows			
g) Installation of insulated window and door frames			
h) Installation of double leaf and curtain walls			
i) Installation of ventilated facades and cladding systems			
j) Installation of HVAC systems			
k) Installation of geothermal heat pumps			
l) Installation of other renewable energy solutions			
m) Energy efficiency or environmental consultancy			
n) Mechanical, electrical or civil engineering consultancy (Please state which applies)			
o) Building and construction			
p) Building repairs and maintenance			

q) Others, please specify: _____									
3) **How much of your client base is willing to invest in green technology?** *Tick one of the below; 1 = Very few, 10 = All*									
1	2	3	4	5	6	7	8	9	10
4) **How important is it for your company to invest in green technology and renewables?** *Tick one of the below; 1 = Not important at all, 10 = Critical*									
1	2	3	4	5	6	7	8	9	10

5) **Why is renewable energy and green technology important to your company?** *Tick the three most important reasons*			
a) Environmental benefits		b) Energy security	
c) Reduced costs		d) Standard of living	
e) Economic impact		f) Energy for future generations	

6) **Vocational Educational Training (VET):** *Tick Yes or No*	**Yes**	**No**
a) Do you know of any local VET courses?		
b) Have you, or any of your employees, attended a VET course in the last two years?		
c) Can you name the institutions which provide such training? _____		

7) **Green Skills:** *Tick Yes or No for each*	Yes	No
a) Do you have difficulties in finding employees with the required skills in the green job sector?		
b) Do you outsource these activities?		
c) Do you conduct internal training due to the shortage of available courses?		
d) Do you send your employees for training to MCAST, University of Malta, any other local institutions or overseas?		
e) Do you employ foreigners to fill these skill gaps?		

8) **To what extent has training taken place amongst your workforce?** *Tick where applicable*					
	None	**25% of workforce**	**50% of workforce**	**75% of workforce**	**100% of workforce**
a) Installation of lighting products and systems					
b) Installation of heating products and systems					
c) Installation of insulation (roof, walls & retrofitted)					
d) Installation of solar photovoltaic systems					
e) Installation of solar hot water heaters					
f) Installation of double glazed windows					
g) Installation of insulated window and door frames					
h) Installation of double leaf and curtain walls					
i) Installation of ventilated facades and cladding systems					
j) Installation of HVAC systems					
k) Installation of geothermal heat pumps					
l) Installation of other renewable energy solutions					
m) New construction processes and techniques					
n) Energy efficient materials					
o) Low and zero carbon legislation					
p) Kindly state the names of the courses that your employees have attended: _____ _____					

9) **Continuous Professional Development (CPD)** *Tick Yes or No for each*	Yes	No
a) Is CPD available for the green job sector?		
b) If not, would you be interested in sending employees to CPD courses?		
c) Would your employees be prepared to take time off to attend certified CPD courses?		
d) Would your employees prefer to attend a certified CPD course after work?		
e) If your employees have received non-formal training, is it beneficial for them to be examined and accredited for their skills?		
f) What effect would this accreditation have? _____ _____		

10) **Future demand for green jobs:** *Tick Yes or No for each*	Yes	No
a) Do you envisage growth for green jobs in the next five years?		
b) Assuming you envisage growth, do you anticipate youths and newcomers will fill in the gaps, or will current workers move into the new sections?		
c) Do you think the local education system currently provides the required skills to serve these needs?		

11) **What would prompt you to invest in energy efficiency training?** *Mark each from 1 to 10; 1 = least important, 10 = critical*	
a) Partially funded training for energy efficiency courses	
b) Fully funded training for energy efficiency courses	
c) Increased customer demand for energy efficient products and systems	
d) Tax/financial incentives for customers	
e) Financial incentives for employers	
f) Changes to building regulations	
g) Others, please specify: _____ _____	

12) **What potential barriers do you think Malta faces in relation to meeting the 2020 energy efficiency targets?** The 2020 EU energy targets consist of three main objectives: the 20% reduction in EU greenhouse gas emissions from 1990 levels, a 20% improvement in the EU's energy efficiency and raising the share of EU energy consumption produced from renewable resources to 20%. *Mark each from 1 to 10; 1 = least important, 10 = critical*	
a) Insufficient number of trained workers	
b) Lack of awareness regarding the 2020 energy targets	
c) Uncertainty in the built environment sector	
d) Training provisions are insufficient and not fit for purpose	
e) Lack of consumer demand for energy efficient technologies	
f) Lack of government incentives	
g) Limited funding for training	
h) Language issues for migrant/foreign workers	
i) Lack of co-ordination in the sector	
j) Others, please specify: _____ _____	

13) **What percentage of the workforce do you forecast may need additional training for Malta to reach the 2020 energy targets?** *Tick where applicable*		
	Within Your Own Company	Within Sub-Contractors You Use
a) 0-25%		
b) 26-50%		
c) 51-75%		
d) 76-100%		

14) **Energy Performance Certificates (EPC's):** An EPC (Energy Performance Certificate) is an official document which forms part of an energy performance assessment and is carried out according to the methodology established by LN 261/2008. *Tick where applicable*	Yes	No
a) Have you ever heard of EPC's?		
b) Have you ever had to use, or have needed EPC's?		
c) If yes, was it challenging to locate a sufficiently trained individual to conduct the energy performance assessment?		

11.2 Appendix 2: Template of One To One Interview Questions– VET Providers

1) **What Vocational Educational Training (VET) do you provide at your institutions? Number of attendees?** i. Current ii. Over the last 5 years *Tick where applicable*	**Number of Students**									
	0-5		**6-10**		**11-20**		**21-50**		**50+**	
Skills:										
a) Installation of lighting products and systems										
b) Installation of heating products and systems										
c) Installation of insulation (roofs, walls & retrofitted)										
d) Installation of solar photovoltaic systems										
e) Installation of solar hot water heaters										
f) Installation of double glazed windows										
g) Installation of insulated window & door frames										
h) Installation of double leaf and curtain walls										
i) Installation of ventilated facades & cladding systems										
j) Installation of & maintenance of HVAC systems										
k) Installation of geothermal heat pumps										
l) Installation of other renewable energy solutions										
m) New construction processes and techniques										
n) Energy efficient materials										
o) Low and zero carbon legislation										
p) Others, please specify: _____ _____										

2) **Why is renewable energy and green technology important to your institution?** *Tick the three most important reasons*			
a) Environmental Benefits		b) Energy security	
c) Reduced costs		d) Standard of living	
e) Economic impact		f) Energy for future generations	

3) **What future plans exist for training in energy efficiency?** *Tick where applicable*	**Not sure**	**Decrease**	**Remain Constant**	**Increase**
a) Installation of renewable technologies				
b) Installation of insulated doors and windows				
c) Installation of insulation (roofs, walls, etc.)				
d) New construction processes and techniques				
e) Energy efficient materials				
f) Energy efficient systems				
g) Low and zero carbon legislation				
4) **How do you think employers' demands for energy efficiency training will change over the next five years?** *Tick where applicable*	**Not sure**	**Decrease**	**Remain Constant**	**Increase**
a) New construction processes and techniques				
b) Energy efficient lighting products and systems				
c) Energy efficient heating products and systems				
d) Installation of insulated doors and windows				
e) Installation of insulation (roof, walls, etc.)				
f) Energy efficient materials				
g) Installation of renewable energy technologies				
5) **What would encourage you to invest in energy efficiency training?** *Tick where applicable*	**Not sure**	**Not at all**	**To some extent**	**To a significant extent**
a) Improved employer awareness				
b) Improved employee awareness				
c) Improved physical training facilities				
d) Improved tutor knowledge				
e) Recruitment of more specialist tutors				
f) Target funding towards apprenticeships				
g) Increased funding for short courses				
h) Increased funding for accredited qualifications				

6)	**What barriers do you face when seeking to develop new training provisions for the green job sector?** *Mark each from 1 to 10; 1 = least important, 10 = critical*	
a)	Insufficient funding	
b)	Uncertainty about future employer demand	
c)	Uncertainty about funding availability	
d)	Insufficient physical facilities	
e)	Insufficient number of tutors	
f)	Insufficient tutor knowledge	
g)	Insufficient train-the-trainer courses	
h)	Others, please specify: - _____ _____ ___	
7)	**What potential barriers do you think Malta faces in relation to meeting the 2020 energy efficiency targets?** The 2020 EU energy targets consist of three main objectives: the 20% reduction in EU greenhouse gas emissions from 1990 levels, a 20% improvement in the EU's energy efficiency and raising the share of EU energy consumption produced from renewable resources to 20%. *Mark each from 1 to 10; 1 = least important, 10 = critical*	
a)	Insufficient number of trained workers	
b)	Lack of awareness regarding the 2020 energy targets	
c)	Uncertainty in the built environment sector	
d)	Training provisions are insufficient and not fit for purpose	
e)	Lack of consumer demand for energy efficient technologies	
f)	Lack of government incentives	
g)	Limited funding for training	
h)	Language issues for migrant/foreign workers	
i)	Lack of co-ordination in the sector	
j)	Others, please specify: - _____ _____	

11.3 Appendix 3: Template of the Survey

1) **How many staff does your company employ?** *Tick where applicable*					
a) 1		b) 2-9		c) 10-49	
d) 50-249		e) 250 - 499		f) 500+	

2) **What industry do you work in?** *Tick where applicable*			
a) Lighting/Heating		b) Solar Water Heaters/ Photovoltaic	
c) Double leaf and curtain walls		d) Ventilated facades/cladding systems	
e) HVAC systems		f) Geothermal heat pumps	
g) Other renewable energy solutions		h) Insulation (roof, walls & retrofitted)	
i) Building repairs and maintenance		j) Building and construction	
k) Energy efficiency or environmental consultancy		l) Double glazing / insulated window & door frames	
m) Mechanical, electrical or civil engineering consultancy *(Please underline which applies)*		n) Others, please specify:	

3) **How much of your client base is willing to invest in green technology?** *Tick one of the below; 1 = Very few, 10 = All*									
1	2	3	4	5	6	7	8	9	10

4) **How important is it for your company to invest in green technology and renewables?** *Tick one of the below; 1 = Not important at all, 10 = Critical*									
1	2	3	4	5	6	7	8	9	10

5) **Why is renewable energy and green technology important to your company?** *Tick the three most important reasons*					
Environmental benefits		Economic impact		Standard of living	
Reduced costs		Energy security		Energy for future generations	

6) **Vocational Educational Training (VET):** *Tick Yes or No*	**Yes**	**No**
a) Do you know of any local VET courses?		
b) Have you, or any of your employees, attended a VET course in the last two years?		
c) Can you name the institutions which provide such training? _____		

7) **Green Skills:** *Tick Yes or No for each*	**Yes**	**No**
a) Do you have difficulties in finding employees with the required skills in the green job sector?		
b) Do you outsource these activities?		
c) Do you conduct internal training due to the shortage of available courses?		
d) Do you send your employees for training to MCAST, University of Malta, any other local institutions or overseas?		
e) Do you employ foreigners to fill these skill gaps?		

8) **To what extent has energy efficiency training taken place amongst your workforce?** *Tick where applicable*				
None	**25% of workforce**	**50% of workforce**	**75% of workforce**	**100% of workforce**

9) **Future demand for green jobs:** *Tick Yes or No for each*		**Yes**	**No**
a)	Do you envisage growth for green jobs in the next five years?		
b)	Assuming you envisage growth, do you anticipate youths and newcomers will fill in the gaps?		
c)	Or will the current work force move into the new sections?		
d)	Do you think the local education system currently provides the required skills to serve these needs?		

10) **What would prompt you to invest in energy efficiency training?** *Mark each from 1 to 10; 1 = least important, 10 = critical*		
a)	Partially funded training for energy efficiency courses	
b)	Fully funded training for energy efficiency courses	
c)	Increased customer demand for energy efficient products and systems	
d)	Tax/financial incentives for customers	
e)	Financial incentives for employers	
f)	Changes to building regulations	
g)	Others, please specify: _____ _____	