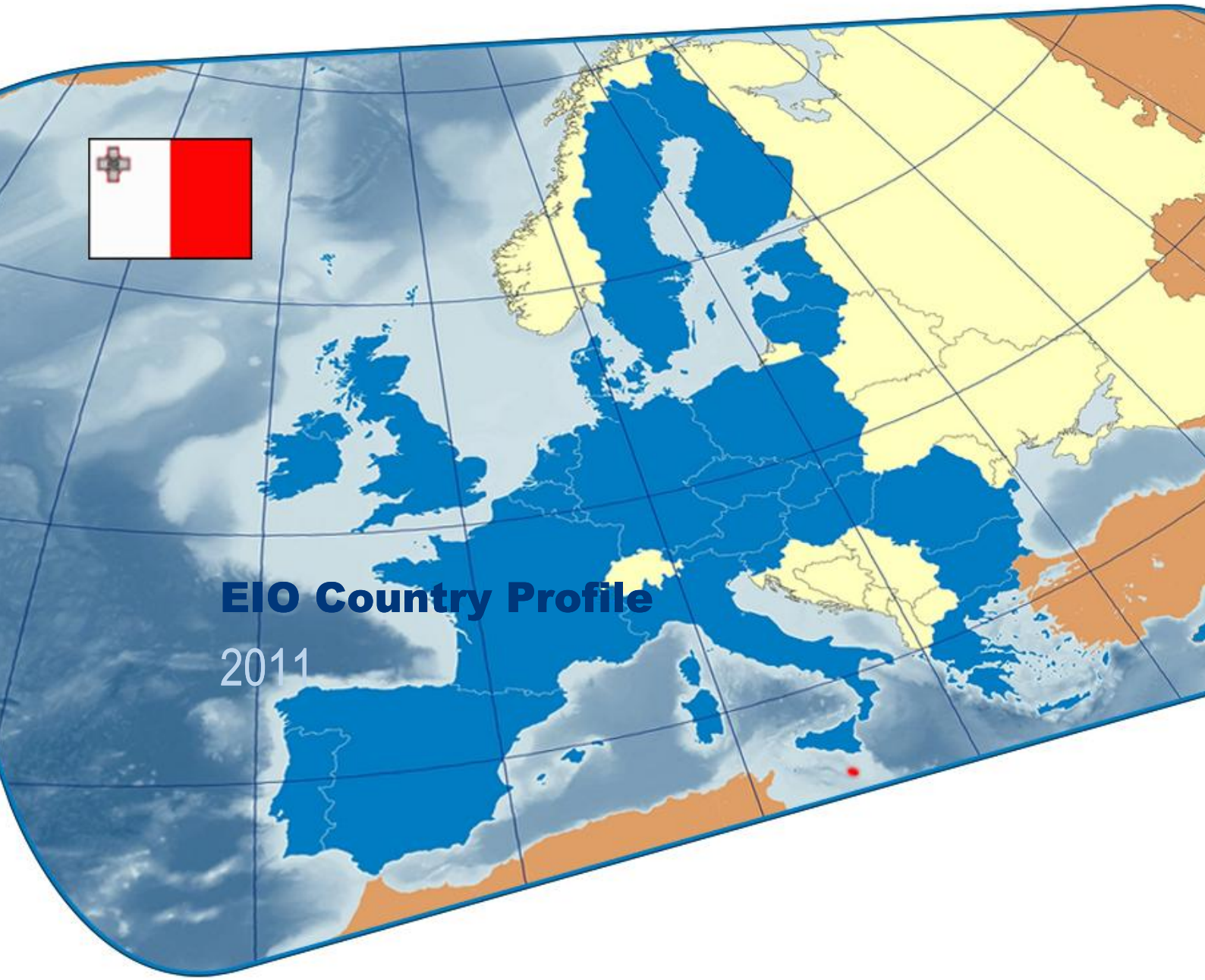
Eco-innovation in Malta



EIO Country Profile

2011

Eco-Innovation Observatory

The Eco-Innovation Observatory functions as a platform for the structured collection and analysis of an extensive range of eco-innovation information, gathered from across the European Union and key economic regions around the globe, providing a much-needed integrated information source on eco-innovation for companies and innovation service providers, as well as providing a solid decision-making basis for policy development.

The Observatory approaches eco-innovation as a persuasive phenomenon present in all economic sectors and therefore relevant for all types of innovation, defining eco-innovation as:

“Eco-innovation is any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle”.

To find out more, visit **www.eco-innovation.eu**

Eco-Innovation Observatory

Country Profile 2011: Malta

Authors
Kevin Gatt, Suzanne Gatt

Coordinator of the work package
Technopolis Group Belgium

Acknowledgments
In developing this report the authors would like to extend their profound gratitude to the Malta Council for Science and Technology, Malta Enterprise, Malta's Permanent Representation to the European Union, the Planning and Priorities Co-ordination Division, WasteServ Malta Limited, the Malta Resources Authority and the Tourism and Sustainable Development Unit. Moreover the authors' extended gratitude goes to all those firms and their respective individuals who have contributed to the submission of the case studies of best practice. Without all these players this report would not have been possible.

A note to Readers
Any views or opinions expressed in this report are solely those of the authors and do not necessarily reflect the position of the European Commission. A number of companies are presented as illustrative examples of eco-innovation in this report. Their inclusion in this report does not imply that EIO endorses these companies and, it should also be noted that, the report is not an exhaustive source of information on innovation at company level.

This brief is available for download from www.eco-innovation.eu/Malta

Table of contents

Summary **4**

1 | Introduction **5**

2 | Eco-innovation performance **6**

3 | Established eco-innovation areas and markets **10**

4 | New trends and emerging eco-innovation markets **17**

5 | Public policy in support of eco-innovation **21**

6 | Main findings **24**

6.1 Strengths and weaknesses of eco-innovation in Malta *24*

6.2 Opportunities and threats to eco-innovation in Malta *25*

References **27**

ANNEX 1. Policy measures addressing eco-innovations in Malta **29**

Summary

Malta is characterised by its small size, its climatological parameters and its long coastline. This sets the context for specific eco-innovation activities to be stimulated and developed not only for local use but also for international replication. Europe is going through difficult economic times which have had their knock on effect on most countries of which Malta is no exception. However, during 2010, GDP registered an increase of 3.2% in real terms and 6.2% in nominal terms.

Malta's Research and Innovation (R&I) strategy, Malta's draft Energy Policy, Malta's Operational Programme I as well as the financial incentives offered by Malta Enterprise set the context for the development of eco-innovation within the headline innovation bracket. In fact both Research and Development (R&D) and eco-innovation are recognised as a pillar for Malta's economic development.

Malta ranked in 17th place in the 2011 Eco-Innovation Scoreboard, up a place from last year. This shows that whilst Malta is registering notable progress, it is still catching up on the EU-27 average. Notwithstanding, it ranks 4th amongst the New Member States, a comparative rank worth mentioning. Government R&D outlay in environment and energy is the lowest with respect to the EU-27 in absolute and relative terms. Malta ranks 21st in the percentage of R&D personnel and researchers compared to total employment and fares poorly in the number of registered patents, the number of environmental management systems adopted as well as in the number of academic papers related to eco-innovation. Malta fares positively in the media coverage that it gives to eco-innovation events which demonstrates the growing interest in pursuing this avenue of growth. Malta ranks joint 1st with Luxembourg in material productivity and joint 1st with Ireland in energy productivity. The Water Footprint Network places Malta in 16th place.

Renewable Energy, Energy Efficiency, Water Resources, Tourism and Public Awareness seem to be the areas where most of the potential for eco-innovation lies. Malta's dependency on imported fossil fuels, its scarcity of water resources, the newly available water resource resulting from full treatment of sewage prior to disposal which can mitigate water scarcity and the economic impact of tourism are the main factors which drive eco-innovation to focus on these areas. Malta's incentives schemes could also be a catalyst to foster further growth.

Although it has been identified that Malta is still in the early stages of tackling eco-innovation a focus on more tangible deliverables is required. Whilst its limited size and resources make it a country where replication activities are more easily grown, the innovative capacity needs to grow further. Malta's human resources are considered to be of very high quality and it is therefore only logical to target efforts towards increasing this pool with a view to retain a competitive edge in the skills to cost ratio of such an important human capital asset.

1 | Introduction

The Maltese Islands consist of three inhabited islands namely Malta, Gozo and Comino and which together have a land area of 315.59km^2. The Maltese Islands are located in the centre of the Mediterranean Sea, 100 km to the south of Sicily and 290 km north of the African continent (Micallef & Sammut, 2010).

Global financial and economic turbulences negatively affected Malta particularly in the local manufacturing and tourism industries, as well as in the labour market (Economic Policy Department, 2010). However, during 2010, GDP registered an increase of 3.2% in real terms and 6.2% in nominal terms. Growth was mainly export driven contributing 3.7% to real growth whilst the domestic sector amounted to 1.2% attributable to a decline in real private consumption as well as reflecting lower consumer confidence and a subdued increase in employee compensation (MFEI, 2011). Such a climate instils a rather cautious approach towards new investment, which is inherently riskier than the replication of tried and tested solutions.

Malta's small size and significant population density places considerable pressure on the consumption of resources. Its size also runs counter to developing a wide export base which makes it vulnerable to external shocks. Malta's dependency on fossil fuels for transportation and energy needs is symptomatic of Malta's vulnerability to external circumstances and which often, both from a financial and perhaps from an environmental perspective, provide the stimulus for eco-innovation initiatives. The obligation to reduce GHG emissions in turn provides further stimulus for the development of eco-innovative solutions that are applicable to these sectors. In particular, Malta's high urban development rate brings to the fore the need for energy efficiency in buildings and the opportunity for the development of products that may be readily available on the market and affordable as substitutes for traditional products.

Similarly, from a resource perspective, freshwater volumes in Malta are insufficient to meet demand. This has led to extensive reliance on desalinated water. The Water Framework Directive requires groundwater bodies to have good qualitative and quantitative status. This has in turn contributed to serve as a catalyst for the development of solutions which permit the reuse of treated sewage effluent as an alternative to groundwater supplies.

Malta's economic affluence has also resulted in increased waste management volumes. At the same time it has become increasingly important to minimise landfill volumes not only in the light of regulatory requirements but also in terms of land use limitations. Hence waste minimisation and treatment solutions, traditional or innovative, come to the fore with the aim of maximising the waste resource whilst at the same time minimising waste volumes landfilled.

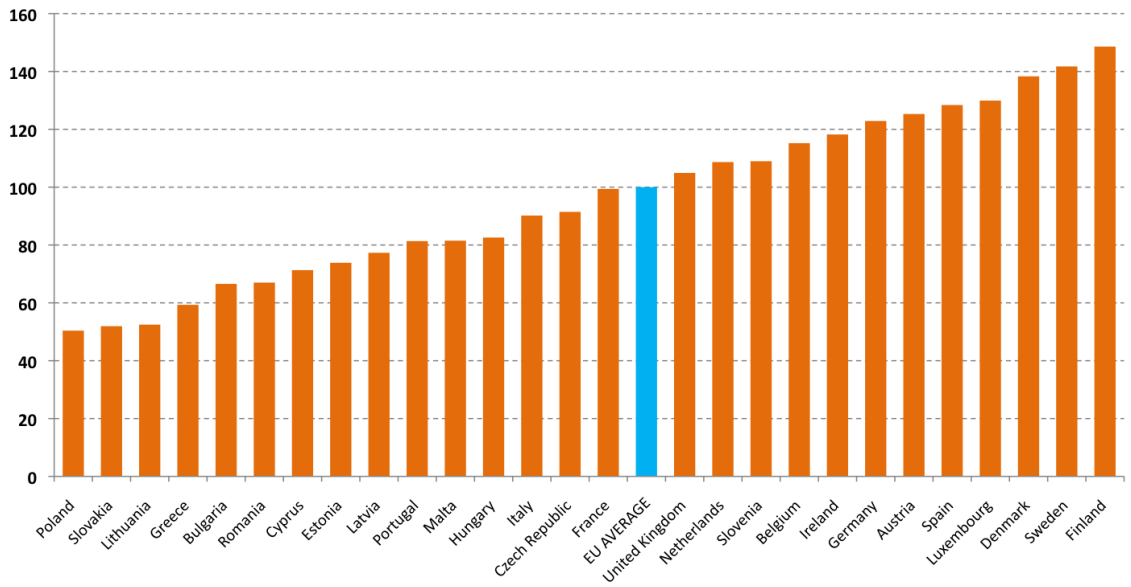
Tourism is one of Malta's major economic sectors. However it comes at an environmental price with 2011 bringing to the islands over 2 million tourists. This 'added' population contributes to the resource consumption momentum of the resident population and eco-innovative concepts need to be developed to better equip the tourism industry to mitigate negative environmental effects whilst maximising resource efficiency.

It is in the context of inherent restrictions of natural, material and human resources that eco-innovation is more of a challenge particularly when, in the wider innovation sphere, Malta has still not caught up with most of its European peers.

2 | Eco-innovation performance

The analysis in this section is based on the EU 27 Eco-innovation scoreboard (Eco-IS) for the year 2011. Eco-IS via its composite Eco-innovation index demonstrates the eco-innovation performance of a country compared with the EU average and with the EU top performers. Eco-IS is based on 16 indicators which are aggregated into five components: eco-innovation inputs, eco-innovation activities and eco-innovation outputs as well as environmental outcomes and socio-economic outcomes.

Figure 2.1 EU27 Eco-innovation scoreboard 2011, composite index



Source: EIO, 2011

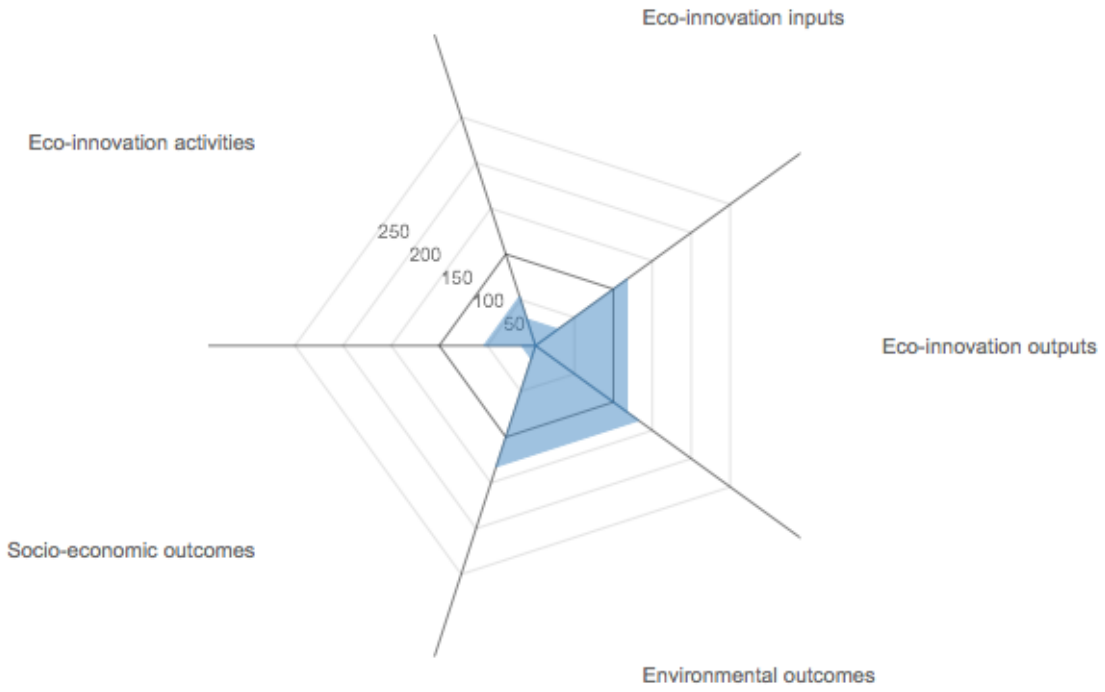
Malta's composite index in 2011 stood at 81.50 compared to the EU-27 index of 100. Malta ranked in 17th place, up a place from last year when its composite index stood at 65.77. This shows that whilst Malta is registering notable progress, it is catching up on the EU-27 average. In fact it ranks 4th amongst the New Member States, a comparative rank worth mentioning.

The overall scoreboard is made up of 5 sub-criteria (sub-indicators in brackets) namely:

- Eco-innovation inputs (government investments in environmental and energy R&D, green early stage investments and total R&D personnel);
- Eco-innovation activities (Implementation of innovation activities to reduce material inputs per unit of output in companies, implementation of innovation activities to reduce energy inputs per unit of output in companies and firms with environmental management (ISO 14001) systems);
- Eco-innovation outputs (eco-innovation related patents, academic publications related to eco-innovation and coverage of "eco-innovation" in electronic media);
- Environmental outcomes (countries' productivities in material consumption, energy use and water use as well as countries' intensity of GHG emissions); and
- Socio-economic outcomes (Exports of products from eco-industries (% of total exports), employment in eco-industries (% of total workforce) and turnover in eco-industries).

Figure 2.2 charts out these sub-criteria for Malta against the 100 mark for the EU-27.

Figure 2.2 Components of the eco-innovation composite index 2011 for Malta



Source: EIO, 2011

Malta seems to exceed the EU-27 performance in terms of Eco-innovation outputs and Environmental outcomes (117.34 and 132.11 respectively) but lags behind in Eco-innovation inputs, Eco-innovation activities and Socio-economic outcomes (28.69, 53.43 and 14.12 respectively).

Eco-Innovation Inputs

Malta's Eco-Innovation Input index for 2011 stood at 28.69, up from 21.65 in 2010. In this respect it is significantly lower than the EU-27 average and ranks 24th. However, with respect to 2010, Malta has moved up three places. A closer look at the indicators that make up this criterion shows that Malta is below the EU-27 in all three indicators. However, the indicator that draws Malta's position downwards the most is the absence of any green early stage investments between 2007-2009 (Cleantech). Government R&D outlay in environment and energy is also the lowest with respect to the EU-27 in absolute and relative terms, in the latter case sharing similar ratings with Bulgaria, Cyprus and Lithuania. (Eurostat 2009).

Malta's best performance is that related to the percentage of R&I personnel and researchers compared to total employment (Eurostat 2007). Although low when compared to the EU-27 average, Malta is in 7th place with respect to the new Member States but 21st overall. In fact, Malta's S&T graduates amount to 7 per 1000 of the population between 20-29 and R&D personnel comprise 0.51% of the total labour force thus not exceeding 50% of the EU27 average. More specifically, the higher education sector contributes to 56.9% of Malta's total researchers compared to the business sector's 25.5% and Government's 4.6%. From a qualitative overview of R&D opportunities in Malta there is a discrepancy between this and the various efforts made by Government to promote the number of doctoral students through scholarships as well as to provide incentives for R&D activities in businesses.

Eco-Innovation Activities

Malta's Eco-Innovation headline index for 2011 stood at 53.43 up from 43.96 from the previous year. This is still low when compared to the EU-27 and in fact Malta stands in 23rd place in this respect. Malta has in fact dropped 7 places from the 16th position it held last year having been leapfrogged by Hungary, Romania, Slovakia, the Netherlands, Lithuania, Cyprus, the United Kingdom and Slovenia.

In order to further understand Malta's positioning, a closer look at the three indicators characterising the headline indicator will be taken. The headline indicator is drawn down significantly due to Malta's poor performance in ISO 14001 registered organisations. ISO Survey of Certifications 2009 places Malta's index at 25 which is the lowest together with Greece and Poland.

In terms of the percentage of total firms having implemented innovation activities aiming at a reduction of material input per unit output, Eurostat statistics for 2008 place Malta in 15th position. Similarly the indicator for the percentage of total firms having implemented innovation activities aiming at a reduction of energy input per unit output, Eurostat statistics for 2008 place Malta in 13th position.

Eco-Innovation Outputs

Malta's eco-innovation outputs headline index demonstrates a performance 17 percentage points above the EU-27 average. Malta is in fact ranked in 10th place, leading the new member states and above countries such as the UK, Italy and Portugal. This index is boosted by Malta's strong performance in Eco-innovation related media coverage (per number of electronic media) where, in 2010 Malta placed 1st jointly with Austria. This emphasises the active role of media in this area. As for Eco-innovation related patents (per mln pop), Patstat 2008 places Malta in 26th position with Romania whilst in terms of Eco-innovation related publications (per mln pop), Scopus 2010 places Malta in 26th position jointly with Bulgaria. Hence there is evidence that Malta needs to focus efforts on the 'harder' more tangible outcomes of patent registration and academic publications related to eco-innovation. These two indices are a reflection of the weaker position that Malta has sustained under previous headings.

Environmental Outcomes

Malta has maintained 4th place for the past two consecutive years in this headline indicator. It is the leader of the new Member States and is only preceded by Luxembourg, the Netherlands and the UK. It is worth examining the four indicators which contribute to this headline outcome in order to understand further Malta's particular performance.

Malta ranks joint 1st with Luxembourg in Material productivity (GDP/Domestic Material Consumption, €/kg) according to Eurostat 2007 statistics. Its also ranks jointly 1st with Ireland in Energy productivity (GDP/gross inland energy consumption) based on Eurostat 2009 statistics. In these two indicators Malta's performance is 124 and 28 points respectively above the EU-27 average. This may be in reflection of the gradual transformation of Malta's economy base in the last decade or so from a manufacturing to a service oriented one.

The Water Footprint Network (2001) places Malta in 16th place, from the 22 countries providing data input. This statistic is rather outdated but as it is used for the purpose of establishing Malta's overall eco-innovation ranking, due comment is required. Since 2001, Malta has continued to improve upon its water resources potential with the completion of three new sewage treatment plants which make the country the first Mediterranean country to treat all sewage prior to disposal.

Malta also performs above the EU-27 average in respect of GHG emissions intensity (CO2e/GDP) based on Eurostat 2009 figures. This puts Malta in 7th place, leading new Member States as well as above high profile countries with strong eco-innovation track records.

Socio-economic Outcomes

Malta's socio-economic outcomes headline indicator dropped from 45 to 14 between 2010 and 2011 with a resultant fall in ranking from 24th to 27th respectively. Not much can be said on the realistic nature of this headline indicator as Ecorys 2008 does not carry statistics for Malta's performance related to Employment in eco-industries (% of total workforce) and Turnover in eco-industries. The only indicator reported is that for Exports of products from eco-industries (% of total exports) in which Malta is well below the EU-27 average at an index of 14, jointly last with Latvia.

3 | Established eco-innovation areas and markets

Eurostat statistics for electricity generated from renewable sources show that up till 2008 Malta had barely any sources of renewable energy. In its Council Recommendation of the 12 July 2011 (Council of the EU, 2011) emphasis was made on Malta's need to reduce its dependence on imported oil, by bringing forward investments in renewable energies (RES) and making full use of available EU funds to upgrade infrastructure and promote energy efficiency. Malta's Draft National Energy Policy (MRRA, 2009) echoes this and sets the share of renewable energy consumption to 10% by 2020. Malta's National Strategy for Policy and Abatement Measures Relating to the Reduction of Greenhouse Gas Emissions (MRRA, 2009) outlines ways in which Government intends to stimulate the penetration and use of RES whilst Malta's Operational Programme I (Government of Malta, 2009) paves the way for investments to be made in renewable energy sources.

It is this context that one can see clear trends in the energy sector as one of the main areas of focus. Moreover the building sector also plays a related role in trying to provide building products that encourage energy efficiency in buildings. Water and waste management projects also make a consistent appearance. The tourism industry also plays a leading role in Malta's economy.

Energy Efficiency

Complementing renewable energy sources is the energy efficiency domain. 22.3% of Malta's land surface is urbanised (MEPA & NSO, 2010) and as such it is not surprising for energy efficiency to feature high on the country's agenda. The construction sector features heavily in this respect and new products are being introduced which, for example, combine insulation into hollow concrete bricks for improved performance. The construction sector's activity can be characterised by its support to 6.8% of those in employment (NSO, 2011). In 2008, firms involved in construction of building and civil engineering had an expenditure related to innovation amounting to €443,000, equivalent to 0.41% of total expenditure and of which €387,000 was related to machinery and equipment.

Complementing this is the expenditure in architectural and engineering services where innovation expenditure amounted to €381,000, equivalent to 0.36% of total expenditure, and with €156,000 allocated to machinery and equipment and €34,000 to the acquisition of external knowledge (NSO, 2010). Electrical installations are also being optimised with a view towards reducing unnecessary consumption. It is important to note that, to date, under the Structural Funds 2007-2013 programming period industry has benefited from €7 million for innovation, €3 million for environmental innovation, €4.5 in R&D grants, €15 million in energy grants and €17million for the promotion of renewable energy sources in domestic buildings.

Water Resources Management

Malta's lack of natural freshwater resources is an acute one. In fact Malta's potable water resources are augmented by means of desalination technology which accounts for over 50% of total metered water. Malta has recently become the first Mediterranean state to treat all its sewage prior to disposal with an annual potential treatment volume of around 60,000m^3/day. In the light of Malta's freshwater shortage, it is not surprising that significant focus is being made for the maximisation of the sewage effluent to be treated in a manner where it can augment water supplies. Thus efforts for various treatment technologies for sewage to be treated to second class and potable quality standards are well developed and ready for commercialisation.

Sustainable Tourism

The tourism sector in Malta is of great importance to the economy. Considering NACE classifications 55, 56 and 79, innovation expenditure amounted to €571,000 amounting to 0.53% of total expenditure most of which was in plant and machinery. As at 2007, Hotels and Restaurants supported 6.9% of the employed population (NSO, 2008). Emerging destinations and greener credentials continue to increase the level of competition in the sector. Maltese operators in the hospitality sector have secured funding in order to strengthen their green credentials. Although most of the interventions are a replication of existing technologies, this still reflects the growing awareness of environmental and innovation issues. The areas which are usually tackled involve energy efficiency in order to minimise unnecessary wastage, renewable energy with a view to reducing the cost of electricity consumption and water management. The Eco-Certification system managed by the Malta Tourism Authority is the result of extensive research taking into consideration visitors' perceptions of environmental issues, actual environmental impact, and other environmental schemes. Eco-certification encourages hotels to deliver a better product to meet the demand of the increasingly environmentally aware tourist and at the same time to recognise the hotels for their effort. This initiative was listed as a best case example in the 2010 Eco-Innovation Country Report for Malta. Under the ERDF 2007-2013 programming period, the tourism industry has benefited from €10 million in grants to promote sustainable tourism.

Eco-innovation markets

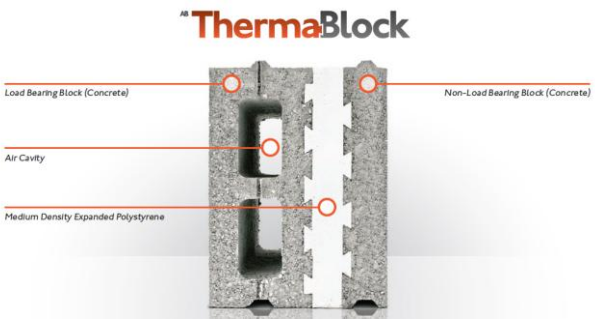
There is limited specific information related to eco-innovation products and services. Perhaps this is due to the nature of required reporting systems that have so far not created a separate platform for eco-innovation specific reporting rather than having it as a subset of innovation.

However, in order to attempt to size up the market from available information it is pertinent to note that since 2008:

- Grants have facilitated the installation of 1,761 photovoltaic systems and 6,199 solar water heaters whilst a further 278 installations were installed without calling for a grant.
- €700,000 were allocated for projects under the Energy & Environment area of Malta's R&I programme.
- €10 million was allocated for sustainable tourism products.
- €20 million in aid was allocated to industry but it is hard to determine the size of that component which might be classified as eco-innovative.
- €1.5 million on projects under an ERDF grant scheme which qualified as being of eco-innovative orientation.

In this context one cannot, at this stage of eco-innovation development, really identify any systematic (transformative or radical) eco-innovation.

Thermal Block



The concept behind this novel block is to produce a structural element similar to the existing HCB, but with greater thermal properties. AB ThermaBlock is made out of three elements; a load bearing brick which has known qualities of thermal inertia, which acts as a heat sink, in summer and winter, an insulation layer and a protective skin on the outside. The air cavity is retained to assist in thermal performance, reducing thickness of insulation as well as acting as a moisture barrier.

After identifying the shift towards energy efficiency, particularly with the introduction of insulation products in construction, Attard Bros. recognized the need to have a block with mechanical properties similar to standard hollow core blocks but developing it to be a building element that also maintains 'quasi-ideal' temperature closer to the thermal comfort range inside a building.

The AB ThermaBlock is a sandwiched precast concrete block cast using normal density limestone concrete aggregates, ordinary Portland cement and an insulated layer of medium density expanded polystyrene. The combination of the factors mentioned in the short description above, helps in absorbing and moderating any temperature fluctuations that occur in peak summer and winter months. Limiting such temperature fluctuations also limits the demand for cooling and heating, thus curtailing energy bills. This also means installing HVAC equipment of a smaller capacity. Both of these effects create an immediate economic advantage and a long term environmental benefit. A wall built with AB ThermaBlock creates a thermal barrier. Heat transfer through external walls can be reduced by up to 57% (when compared to a wall with a U-value of 1.57W/m2K) hence reducing the monthly energy costs related to both heating and cooling. It offers advantages in both the scorching summer months as well as the lean cold months of winter. ThermaBlock reduces peak loading times for heating and cooling. This results in smaller HVAC equipment required and low power consumed, thus yielding to lower investment and running costs respectively.

Source: www.attardbros.com/group/index.php/production/therma-block

Picture source: www.attardbros.com/group/index.php/production/therma-block

Grassblock

Attard Bros. have for long produced the 'Grassblock'. The product's general idea is that it is a precast concrete paving flag that allows space for soil to be inserted into inbuilt cavities inside the paving flag. Turf seeds can then be planted into the soil and once it grows, it would improve the surroundings by increasing the 'green aspect'. The product transforms the paving from an industrial look, into an area with an aspect of soft landscaping.

The grassblock creates useable, hard-standing spaces whilst retaining the benefits of a natural grassed area, creating oxygen-producing driveways. Its cavities are designed to facilitate the growth of

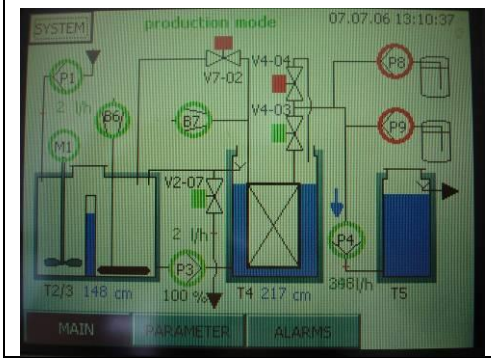
grass within a supporting concrete matrix, allowing grass to be cut in a conventional manner. Having an area with only natural turf would render the location inaccessible to vehicles as, the load imposed by such vehicles on the grass, would damage the turf. Therefore, the main advantage of the grassblock is that it eliminates the dilemma of having to choose between a turfed area and a vehicular area. Having the grass block not only improves the visual aspect of the paved area, but also the functional feature. Should normal paving blocks be used, there has to be storage for rainwater. The grassblock facilitates this process by having the water seep through its cavities, watering the turf, and then collected in underground reservoirs. This eliminates the problem of flooding. The concept of permeable paving is to be supported more by the local government as water is one of the most scarce resources that we have in Malta and through an intelligent selection of materials (permeable paving as opposed to impermeable type) we can have more water flow through the ground and into the underground water tables that, which presently is not being replenished at a sustainable rate. This is resulting from an ever increasing amount of impermeable surfaces being built, mainly resulting from asphalted and paved areas. Some applications, such as driveways, parking areas and public gardens could use more permeable paving.

Information and picture source: www.attardbros.com/group/index.php/hardscaping/grassblock

HOTER - Wastewater Recycling in the Hospitality Sector

The HOTER process is a tried and tested process based on the innovative concept of combining two membrane treatment processes in series to make it possible to recover as much as 85% of the water being brought in by a hotel or a large commercial establishment. The process can provide first-class water to EU Drinking Water standards for use as potable water in the guest rooms of the hotel, whilst also supplying a lower grade water to meet all second class water requirements (for toilet cistern flushing, laundries and landscaping purposes) – in a cost-effective and environmentally-friendly manner.

Hotels, by nature, are inherently large consumers of water, and generate huge volumes of wastewater that must be disposed safely to avoid pollution. A typical hotel may consume approximately 100 cubic metres of potable water a day and discharges the same volume as wastewater every day. Current practice is that hotels generally get their water from the town water supply. Unfortunately, this results in (expensive) potable water being used for non-potable applications such as the flushing of toilets, laundry, swimming pools, landscaping etc, which may make up as much as 50% of all the water requirements of a hotel. This is inherently inefficient as a high value product (potable water) is being used for a low-value application (flushing of toilets).



It is ideal to have a cost effective process with two sources

of water at any premises – 1st class water that can be safely used for kitchens, showers, baths and wash-hand basins, and a source of 2nd class water that can be used specifically where there is no contact with humans such as landscaping.

There is an inherent demand for a technology that addresses the inefficiencies of catering for water demand and wastewater treatment within large water-consuming establishments, such as hotels.

There is a need for a technology that can:

- provide first-class water to EU Drinking Water standards for use as potable water in the guest rooms of the hotel, whilst also supplying a lower grade water to meet all second class water requirements (for toilet cistern flushing, laundries and landscaping purposes);
- is compact, so that it can fit within the premises of a hotel or a commercial establishment; is reliable and can consistently provide water that is of a good quality;
- is energy-efficient, and has low running costs (incl. chemicals);
- has inherent operational flexibility to cater for seasonal and daily fluctuations in wastewater supply/water demand; is cost effective and can compete with other conventional sources of water.

Sustech Consulting has developed a proprietary innovative wastewater recycling process – the HOTER process – that meets all of the above requirements. HOTER eliminates the inherent inefficiencies of conventional water supplies and wastewater disposal/treatment systems by providing water of the right quality, on-site and on demand at a fraction of the cost of conventional sources.

The process is the result of 2 years research and development carried out by Sustech Consulting at the Golden Sands Resort and Spa in Malta, where a prototype was designed, built and tested over 12 months.

At the current stage of development HOTER is cost-effective when:

- The demand for water consumption by the hotel or establishment is not less than 150m³ per day.
- The current unit price for water and wastewater treatment exceeds €4 per m³.

The HOTER process is most suitable for large consumers of potable water where the cost of water is already high (and increasing). Global combined water and wastewater tariffs rose by an average 8.2% between June 2009 and June 2010, and the forecasts show that this trend will continue.

Moreover, the cost of the HOTER process's main component – membranes - is falling as more and more suppliers enter the supply market. HOTER's ability to provide two functions – wastewater treatment and water production – at one go, and within the same premises (i.e. no pumping costs and no leakages) – make it a very cost-effective alternative to conventional methods of water supply and municipal sewage collection and treatment.

HOTER also provides a more holistic solution by cleaning up wastewater and providing fresh water in abundant supply, directly proportional to its demand. The potential of HOTER in the global market is huge, and this has been attested to by the number and prestige of international awards won by HOTER to date.

Source: www.sustechconsulting.com

Picture source: www.sustechconsulting.com

NEPTUME - No-discharge Energy Efficient Prototype for the Treatment of Urban Municipal Effluent

Like many other countries, Malta is experiencing increasingly severe drought conditions and chronic water shortages. Second class water, produced from urban municipal waste, has great potential for irrigation purposes in agriculture as well as landscaping. Yet piping wastewater over long distances for treatment leads to inefficiencies. This project studies the treatment of municipal sewage in situ using an innovative, compact membrane system coupled with a phytoremediation process to polish water for public spaces, irrigation, fountains and more. The research comprises state of the art continuous monitoring of the physical and chemical parameters of the water with real time data capture.

NEPTUME combines the latest developments in flat sheet membrane technology with the nutrient-removal potential of follow-on biological phytoremediation processes, studying the benefits in the context of the regeneration of the derelict inner-harbour area around Dock One, Cospicua. This research project will act as a catalyst in combining the expertise of Malta's water utility, the Water Services Corporation, in water technology with the extensive experience of the University's Department of Biology in the field of environmental research, together with AP's architectural and landscaping design expertise.

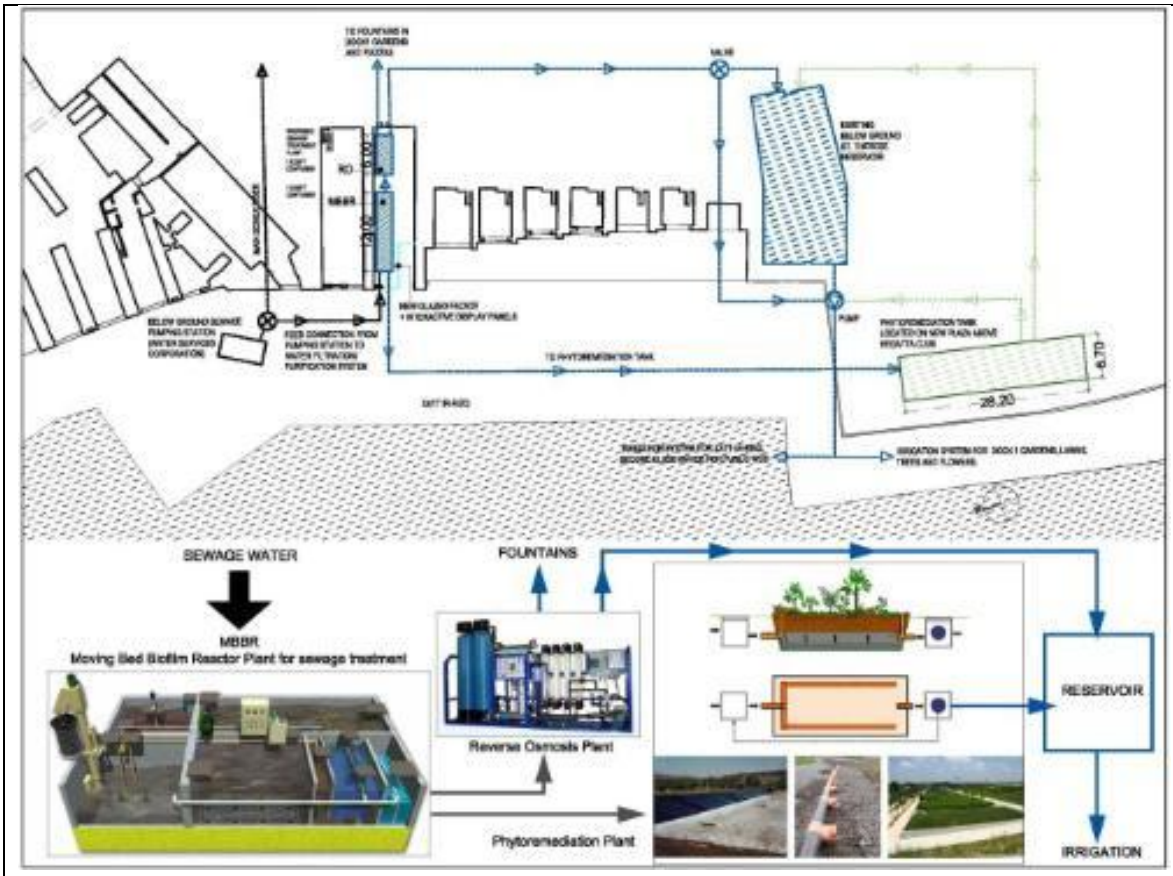
Since the process will result in the reduced cost for the production of irrigation water, the commercialisation potential for both the MBBR plant, and the MBBR + phytoremediation solution is high. The compactness and portability of the MBBR plant and its ease of operation make it ideal for ;

- Remote locations with no direct access to water where this mobile unitised solution is a "plug & play'' solution for purposes of irrigation without the need of skilled operators.
- Water-starved areas where clean water produced from phytoremediation technology may be used in industry, agriculture and concurrently biomass production
- Sustainable gardens, public areas, golf courses and sports grounds, hotels etc..

A plant the size of a 20 foot container caters for a population of around 200 persons. Phytoremediation strategies may be further applied to polish domestic and grey water for reuse within industry.

Similar small portable containerised sewage treatment plant will reduce the capital infrastructural or transportation cost by treating the water at source.

Benefits include a reduction in the national water production costs and electrical consumption, a reduction of water abstraction from the aquifer, greater availability of good quality water for irrigation and potential aquifer recharge; the project will also result in the reduction of treated sewage effluent discharge into the sea.



Information and picture source: www.ap.com.mt/projects.asp?c=16&p=89

4 | New trends and emerging eco-innovation markets

It emerges clearly from the initiatives that have been reported in the previous section that the areas which prospect a bright future are those related to eco-innovation in the field of renewable energy, energy efficiency (including energy efficient building products) and water. It is clear that these areas have been active in attracting financing and some are in an initial stage of development or commercialisation and may yield their true potential within a few years. It is also interesting to note that Malta has submitted a proposal under the NER 300 mechanism for RES signifying a certain degree for Malta to be an area for eco-innovation developments (EC).

Renewable Energy

In the light of Malta's dependency on imported fossil fuels, it is expected that considerable efforts are directed towards securing energy from renewable sources. There is no doubt whatsoever that replication of tried and tested technologies such as photovoltaic panels on buildings have been the most popular. This is also due to the schemes for domestic and industrial buildings which have been introduced where subsidies of up to 50% have been awarded. Malta is a densely built island and as such building rooftops are considered as a resource which has to be utilised to increase the penetration of renewable sources of energy. Moreover, buildings are estimated to account for 30% of Malta's energy demand (University of Malta). Naturally, with Malta's solar resource it is expected that this area remains fertile for other innovations. In fact work is being undertaken on the design of low-cost, locally manufactured, solar water heaters as well as on the integration of PV panels in facades and the performance analysis of vertical grid connected photovoltaic (PV) system.

In the renewables sector, efforts seem to be focused on exploring the potential generation of energy from wind, wave action and biomass. Such projects, should they be found to be commercially viable, can contribute towards Malta's economic growth in the sector as well as to increase green jobs. Malta's land area is very small and therefore the offshore potential needs to be looked into in terms of maximising the energy potential that may be derived there from. Hence wind farms in deep waters (over and above the proposal to have a wind farm on a shallower reef off the coast of Malta) and energy from wave action all offer potential for further investigation. Having said this, landward side activities in this area are also present in the form of experimenting with different configurations for the harnessing of wind energy as well as the production of algae-derived biofuels.

A project is currently under way in order to determine the potential of generating biodiesel from algae. Microalgae tend to grow very fast (double their size in 24 hours), and the most common growing technology is by the use of photo bioreactors which are mainly transparent tubes supported by a frame containing water, algae, nutrients and Carbon Dioxide. Currently the concept of bio-refinery is being introduced, where every component of the biomass is used to produce usable products, thus making the cycle more efficient (WasteServ). This project is being undertaken jointly by the private sector as well as by Government's waste management company.

Another area of ongoing research is a private sector venture to establish the feasibility for investing in wave to energy convertors in the Mediterranean and how to best customise these for the particular microclimate. This project is seen as a means of exploiting Malta's waters as an additional land surface given that landward space might be restricted.

Further exploration into on-land wind energy is also being undertaken through the development of augmented lift – self adjusting – vertical axis wind turbines for use in the urban wind context.

Water Resources Management

In the case of water, the main foci would be the improved balance in the groundwater body and the augmentation of the reuse potential, through further treatment of treated sewage effluent. Such initiatives are expected to be led by both the private and public sectors. Malta has a shortage in its freshwater supplies and the qualitative and quantitative status of Malta's groundwater require the support of such initiatives to work towards the goals and objectives of the Water Framework Directive. The Water Services Corporation in Malta has excelled in this area not only from a technical standpoint but also in lowering the energy requirements of such plants and recovering spent energy for reintegration.

These developments take their time to mature and, given their development time, cannot be partitioned into different years but need to be seen as a systematic development and transformation of Maltese industry.

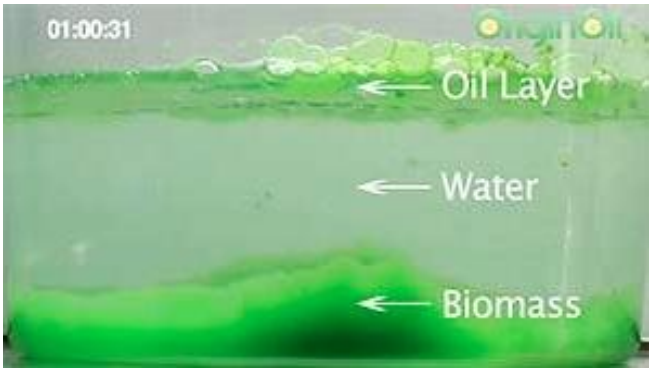
Blue Ocean Energy

This project involves the development of technology for the generation of electricity from waves, from the North Sea to the characteristics and properties of the Mediterranean Sea. The main aim is to explore the possibility of use of wave energy in Malta as well as add green jobs related to this new energy as well as create a new market within the Mediterranean region.

The purpose of the BLUE OCEAN ENERGY® project (BOE) based on the DEXAWAVE converter is to transfer technology from DEXAWAVE ApS to DEXAWAVE Energy Malta for the adaptation of the DEXAWAVE converter from North Sea conditions to Mediterranean conditions. This will be done by constructing a 1:10 scale model of the converters which will be subjected to real Mediterranean sea conditions. This project will provide the Government of Malta, the Ministry for Resources & Rural Affairs, Enemalta Corporation and the consortium behind the project with sufficient information to justify acceptance, modification or rejection of the proposed project for further financing. If the results of the 1:10 project are positive, the eventual full scale pilot project that shall be deployed in Malta shall provide Megawatts of clean energy and shall be used as a showcase for the technology and put Malta on the forefront of wave energy conversion. Moreover the converters shall be manufactured locally creating jobs, exports and improving GDP.

Information and picture source:
www.oceania.research.um.edu.mt/cms/blueocean/index.php?option=com_content&view=article&id=11:mcst-funded-wave-project-kicks-off&catid=7&Itemid=125

Algae Biofuel and Algae By-Products developments by Altern Limited



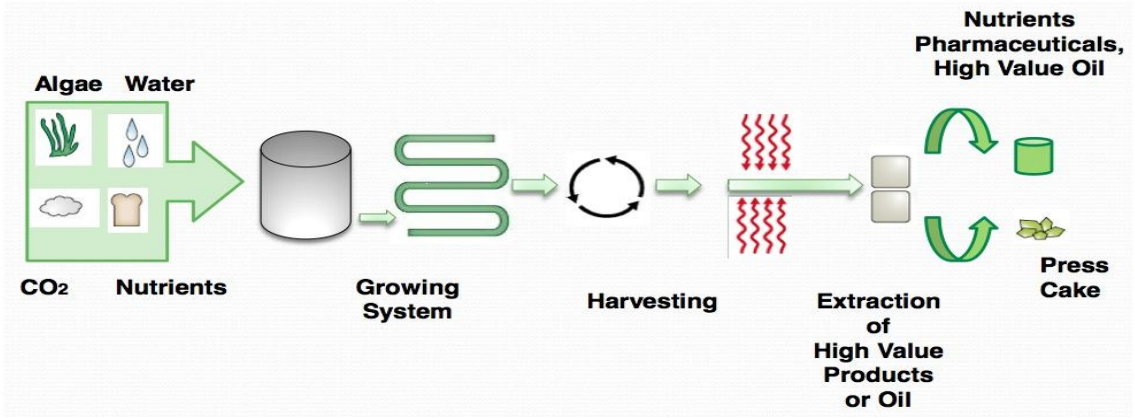
Energy is the cornerstone of any society, and over 25% of the energy fuels the transport sector. In view of this, Altern was set up to identify alternative sources that can replace the current fossil diesel. On research performed during 2009, algae-derived biofuel was identified as having all the necessary characteristics to offer an alternative solution to fossil fuel. The main Objective of Altern R&D is to bring Algae derived Biofuel to a commercial standpoint. While Alge Biofuel is a long term goal, By-Products such as Protein, Aquaculture nutrients, and Fertilisers are currently technically and financially feasible to produce and sell.

Biodiesel is an alternative fuel similar to conventional fossil fuel, and is typically made up by chemically reacting lipids such as vegetable oil, animal fat etc. The final product is produced by the trans esterification of a triglyceride and an alcohol. Biodiesel can be used in a conventional internal combustion engine with minimal or no alterations.

Microalgae tend to grow very fast (double their size in 24 hours), and the most common growing technology is by the use of Photo bioreactors which are mainly transparent tubes supported by a frame containing water, algae, nutrients and Carbon Dioxide. Currently the concept of bio-refinery is being introduced, where every component of the biomass is used to produce usable products, thus making the cycle more efficient. On a more specific nature, the management team has identified a number of goals that are being addressed to by the company. From a Biological standpoint, these include identification of the right strains of algae and investigation on the growing factors which algae are dependent on. On the other hand, currently the engineering team is investigating the ideal methods of growing the algae and extracting, feasibly, the products form the algae cells, in the light of the Maltese scenario.

Phase 3 is expected to commence towards the end of 2012 and will comprise the setting up a commercial pilot plant, which uses all the knowhow acquired in the past years to have an on-going running system. This will form the bases of all other plants and developments in the future.

As explained, in order to ensure economic feasibility, the company is looking into markets for the by-products produced from the production of biofuels from algae. These mainly comprise of protein and fertilizers, both of which can be successful products in the feedstock and agricultural market. The yield of such by-products is usually around 50% of the algae biomass and thus considerable production sizes are expected. Add to this, high quality protein is a sought after ingredient, thus making such a product highly important in making the venture a more successful one. Add to this, current research is working on using Algae Growth (which requires Carbon Dioxide) to sequestrate CO2 from Flue Gas produced by Gas-combusting electricity generating engines. This further reduces the Carbon Footrpint of such machine and consequently improves the Sustainability of the holistic cycle.



Source: www.wasteservmalta.com/projects.aspx?id=238

Picture source: www.wasteservmalta.com/projects.aspx?id=238

5 | Public policy in support of eco-innovation

Often enough there is a general tendency to cover policies qualifying as being purely of an eco-innovation nature under the general innovation heading. Often enough direct references to innovation, particularly support policies and financial assistance instruments, cover eco-innovation as well. Notwithstanding, Government considers all forms of innovation as vital for the further development of Malta's economic development and there has been a very strong emphasis on policies that support eco-innovation resulting in greater resource and energy efficiency. This has been witnessed through grants for innovation, and hence eco-innovation, and the adoption of such technologies. Government's policies are designed in such a way as to offer flexible pathways that support all forms of eco-innovation whilst also encouraging both local-based as well as international firms to set up such activities in Malta.

Malta's policies addressing eco-innovation are represented by a mix of 1st and 2nd generation policy measures. Policies supporting innovative solutions that improve pollution control and other end of pipe environmental technologies have been supported by grants schemes offered by Malta Enterprise funded nationally or through structural funds.

With the transformation of Malta's economy from a manufacturing base to a services based one and with an additional focus on high value manufacturing, R&I has become an important facet to add value to Malta's economic performance. Malta's Research and Innovation policy is clearly driven by the National Strategy for Research and Innovation (2007-2010) where water, energy and the environment have emerged as key focus areas. Malta's National Strategic Plan for Research & Innovation (2011-2020), which albeit being at consultation stage, consolidates investment in eco-innovation through the setting up of a thematic platform and the preparation of a dedicated R&I strategy for energy and environment and to provide support to local capacity building in these areas through the National R&I Programme and the award of scholarships (MCST, 2011). It defines eco-innovation as "*all forms of innovation aimed at reducing environmental impacts and/ or optimising the use of resources throughout the lifecycle of related activities. It includes new production processes, new products or services and new management and business methods.*"

Malta's draft Environment Policy (September 2011) dovetails with the R&I Strategy concepts by placing an emphasis on the green economy and eco-innovation and identifying the need for "*a high level of research and development (R&D) and innovation*" (NEP, 2011). Eco-innovation if often referred to as environmentally friendly innovation, with environmental technologies considered to offer business opportunities in the national and international markets. Current policy supports the establishment of public private partnerships for promoting this kind of innovation where Malta has gained sufficient experience. Eco-innovation is considered to promotes economic growth, while limiting the burden on the economy, and is thus an essential pillar of the green economy In terms of greening the economy, the draft Environment Policy (Section 1.3) mentions the use of market based instruments, environmental taxation, eco-innovation, green jobs, enabling the private sector to take a stronger role in environmental management, green public procurement and mobilising finance for the green economy. This policy cements the promotion of eco-innovation for the years to come ensuring that the environment remains a horizontal theme in government's policy making. Green jobs are also expected to be supported through a dedicated strategy which will also address education and business incubation.

Malta's draft National Environment Policy for Consultation (OPM, 2011) identifies damage to the economy, society and the environment as priorities. The unsustainable use of energy and associated GHG emissions, groundwater over-abstraction and meeting EU targets related to waste emerge as priorities. It recognises specific areas such as:

- water – ground water, the economics of the desalination process, drainage;
- energy – cost of oil and limited use of solar energy or alternative energy technologies; and
- environment – transforming waste into green friendly technologies.

Eco-innovation is recognised as a pillar of Malta's policy development with the pre-Budget document 2012 committed to promote eco-innovation and green technologies also as drivers of the green economy.

During the November 2011 Budget, the Minister responsible for Finance announced that Government is close to launching "*our strategy for boosting the Green Economy"* (Budget Speech, 2011) aimed at creating another sector in the economy contributing to more jobs and wealth. This was complemented by Government's reaffirmation of its commitment towards an industrial policy which makes better use of the most competitive resources of the country and which exploits markets adapted to the areas of Malta's economy which show most potential, including tourism, science, research and innovation and the environment (Budget Speech, 2011).

The adoption of Environmental Management Systems and Eco-Certification by the private sector will remain Government's goal with a view to further greening business operations. Green public procurement sees ambitious targets being set with the aim of ensuring that 50% of public procurement adheres to EU Green Public Procurement (GPP) criteria by 2015. The Environment Policy also makes emphasis on the need for resource efficiency but rather than grouping all thematics under the resource title it delves into mentioning the specific resources such as land, water, energy and transport.

Malta's National Climate Change Adaptation Strategy (2010) proposes that Government should introduce a legal instrument, designed on the principles of the EU LIFE programme, directed to boost local research in promoting technological response strategies and tools for adaptation measures as well as in investing in the capacity building of human capital in climate change adaptation disciplines.

The newly formed Malta Competition and Consumer Affairs Authority is another step to strengthen the institutional capability for the promotion of environmental certification through EMAS and ISO 14001.

Government's support to eco-innovation has been translated from policy into action through the various funding schemes that have been promoted by its agencies in order to support businesses and higher education institutions in their pursuance of eco-innovation business activities and research. Without this funding eco-innovation activity would not have arrived to the point where it is today. It is equally true that there will be calls for increased support in this area.

Figure 5.1 Policy measures addressing eco-innovations in Malta

	Group of policy measures	*Type of policy measure*	**Focus of policy measures** (tick if applies)				
			Generic focus on eco-innovation	Resource efficiency improvement	Energy efficiency improvement	Reduction of emissions incl. CO2	Other relevant areas (e.g. renewable energy, etc)
SUPPLY SIDE FOCUS	**Equity/business support**	Venture capita funds					
		Public guarantee funds	x				
	Support for R&D in public sector and industry	R&D funding	x	x	x	X	x
		Collaborative grants	x				
		R&D infrastructure					
	Fiscal measures	Tax incentives for R&D and start-ups					
		Tax incentives for R&D personnel					
	Education, training and mobility	Tailored training courses for companies, entrepreneurs					
		Advise/consulting for start ups, companies, entrepreneurs					
		Placement schemes for students					
		Support for R&D workers recruitments					
	Networks and partnerships	Competence centres, clusters, science-technology parks					
		Technology platforms and innovation networks					
		Foresight and common vision building	x				
		Market intelligence and other forms of information sharing					
DEMAND SIDE FOCUS	**Regulations and standards**	Regulations, targets, cap & trade schemes					
		Performance standards, labeling, certification	X				
	Public procurement	"Green" public procurement of goods and services	x				
		R&D procurement					
		Pre-commercial procurement					
	Technology Transfer	Advisory support for technology adopters					
		Financial or fiscal support for technology adopters (e.g. grants for purchasing new technology)					
	Support of private demand	Tax incentives for consumers (e.g. for purchasing environmentally efficient products)			x	X	x
		Tax reductions for products and services (e.g. VAT reductions)					
		Demand subsidies (e.g. eco-vouchers, consumer subsidies)					
		Awareness raising and information provision	x				

6 | Main findings

Malta's policies spell out an encouraging perspective for the development of R&I and in particular eco-innovation. The realities of the economic climate across Europe and internationally cannot be neglected and will characterise the level of investment, both public and private, into R&D. Notwithstanding, Malta has made moderate progress in R&I. However, more needs to be done in order to approach the EU27 average particularly in securing tangible deliverables such as increased funding for R&D, the adoption of environmental management systems, registering of patents and further supporting the development of the green economy. There is no doubt that Malta has raised the ante when it comes to media coverage of R&I activities where it placed first. This reflects the commitment and interest that has been generated as well as the level of activity in the public and private sectors. This demonstrates that Malta is fertile ground for the growth of this sector. Malta has performed strongly in terms of material productivity and energy productivity. However Malta needs to be more effective in the tangible outputs such as patent registration, adoption of Environment Management Systems (EMS) and academic publications.

6.1 Strengths and weaknesses of eco-innovation in Malta

Malta's limited size and specific island characteristics cannot be ignored and set the perspective in which eco-innovation develops and matures. It is positive to note that the policy framework in terms of eco-innovation is clearly set and framed in Malta's R&I strategy, Environmental Policy and its Operational Programmes. The suite of financial incentives is also very encouraging and presents fertile ground for the growth of the sector. Traditionally, Malta has always produced technically able graduates which are the backbone of R&I activities. It is now time to turn these opportunities into tangible realities that address the performance characteristics of this sector. Growth in investment, human resources and general business support needs to materialise further, taking into account the limitation and potential of the Maltese economy.

Malta has always responded positively to financial incentives and if this is the recipe for increased growth then it is important to see how such incentives can continue to stimulate eco-innovation. Business incubation and handholding those who desire to explore the area of R&D and eco-innovation need to be in place so as to allow business to focus on what they do best whilst providing them with the administrative support to deal with such programmes. In order for Malta to progress further it is important for the country to stimulate an environment in which hard deliverables are apparent. Shifting one's focus to patents and IP or to the adoption of an EMS has consequent knock on effects on the resourcing required by business and clever and attractive solutions are required in order to achieve the optimum balance. It is also important to tailor an eco-innovation message which includes information, knowledge and training of eco-innovation and the benefits which accrue in order for stakeholders to be more informed, and hence more successful, in pursuing eco-innovation activities in Malta.

The private sector has shown that it is capable of pursuing eco-innovation activities with a view to lead Malta's transition in this area effectively and efficiently. It is the private sector's entrepreneurship, Malta's researchers and Government's support that together offer a scenario of further success in eco-innovation. There are difficult choices that lie ahead and which make decision-making a very tight balancing act which, whilst promoting and encouraging the growth sectors, protects social cohesion.

Malta has been very strong in raising awareness on the importance of a more environmentally friendly approach to life. In this respect the Eco Gozo concept wherein Gozo, one of the islands making up the Maltese archipelago, is intended to be developed along the principles of sustainable development permeates the most important concepts across citizens and businesses. WasteServ, the public

company responsible for waste management services, has also been active in this respect with different outreach activities to promote more sustainable waste management practices and engaging disadvantaged groups such as the unemployed and the migrant community.

Figure 6.1 Strengths and Weaknesses of Malta in promotion of eco-innovations

Strengths	Weaknesses
– Malta demonstrating significant growth in innovation performance. Open, excellent and attractive research systems and intellectual assets, strengthened research infrastructure. R&D personnel and researchers as a percentage of the gainfully employed on the rise. Good access to educational pathways – A number of financial incentives available to business for R&D and EI – Government commitment towards innovation, R&D and eco-innovation and an established institutional governance framework – Strong media coverage for eco-innovation activities – Strong response from the private sector	– Low R&D expenditure, personnel, researchers and outputs when compared to EU27 average and still catching up. Low Government R&D outlay in environment and energy – Lack of financial assistance and support to facilitate access to finance and opportunities, support entrepreneurship, business incubation and to promote green jobs – Lack of balance between polluter pays and environmental taxation differentiation

6.2 Opportunities and threats to eco-innovation in Malta

The impact which structural funds have had on R&D have provided a first phase of transformation to the scenario that prevailed. The negotiation of the new financial perspectives should continue to stimulate the opportunities that arise from such financial assistance. Malta's human capital has also been an attraction to foreign companies wishing to undertake R&I development in Malta. This needs to be sustained as on-going developments in the energy sector, for example, need human capital to continue to reside within Maltese shores. Moreover labour costs are still very competitive and offer an attractive incentive for foreign companies wishing to utilise Maltese resources. This also emphasises the need for a strong university which plays a central role in R&I activities.

No business can take off without the appropriate economic and financial climate. The Maltese Government needs to establish and permeate a financial and economic climate which is conducive to establishing the island as a centre for R&I activities. Regulatory regimes need to be sensitive to the demands of R&I without compromising human health and the environment or the delay of establishing oneself in Malta. Better regulation activities should also contribute positively towards reducing administrative and information obligation burdens leaving more time for business to focus on breaking new ground and increasing their financial performance.

Figure 6.2 Opportunities and Threats for eco-innovations in Malta

Opportunities	Threats
– Dependency on imported fuels and the need for security of supply makes RES a focus area for Malta – Competitive labour costs for R&D personnel can attract foreign R&D to be conducted locally. Interest from foreign firms in conducting research in Malta – New life science park and interactive science centre – Setting up a business in Malta related to R&D and Eco-innovation will benefit from a number of incentives offered by Malta Enterprise	– Lack of government investment to support R&D activities may make Malta a less attractive place to invest – Income tax and VAT regimes are not favorable for incentivising investment in R&D and eco-innovation – Regulatory regimes is still not sensitive to R&D and EI initiatives – Inflationary pressures may make other countries a more attractive business proposition for investment

– Malta's geo-climatic characteristics provide fertile ground for international research to be carried out locally	

References

Council of the European Union, 2011. *Council Recommendation of the 12 July 2011on the National Reform Programme 2011 of Malta and delivering a Council opinion on the updated Stability Programme of Malta 2011-2014*. Luxembourg: Publications Office of the European Union.

Economic Policy Department, 2010. *Economic Survey – October 2010*. Malta: Ministry of Finance, the Economy and Investment

Eurostat, online query. *Research and development expenditure, by sectors of performance (% of GDP) (All sectors)*. Available at: http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tsc00001&language=en [last visited 15 October 2011]

Government of Malta, 2009. *Investing in Competitiveness for a Better Quality of Life*. Malta: Government of Malta.

Malta Council for Science and Technology, 2006. *National Strategic Plan for Research and Innovation: 2007-2010: Building and Sustaining the R&I Enabling Framework*. Malta: MCST

Malta Council for Science and Technology, 2011. Malta's *National Strategic Plan for Research and Innovation: 2011-2020: A Vision for Knowledge-Driven Growth*. Malta: MCST

MEPA & NSO, 2010. *The Environment Report 2008*. Malta: NSO

Micallef, A. and Sammut, C. (Ed), 2010. *The Second National Communication of Malta to the United Nations Framework Convention on Climate Change*. Malta: Ministry for Resources and Rural Affairs

Ministry for Resources and Rural Affairs, 2009. *A proposal for a National Energy Policy*. Malta: Ministry for Resources and Rural Affairs.

Ministry for Resources and Rural Affairs, 2009. *Malta's National Strategy for Policy and Abatement Measures Relating to the Reduction of Greenhouse Gas Emissions*. Malta: Ministry for Resources and Rural Affairs.

Ministry of Finance, the Economy and Investment, 2011. *Budget Speech 2012*. Malta: Ministry of Finance, the Economy and Investment

Ministry of Finance, the Economy and Investment, 2011. *Pre-Budget Document 2011*. Malta: Ministry of Finance, the Economy and Investment

NSO, 2010. *Malta in Figures 2010*. Malta: NSO

NSO, 2011. *Expenditure on Research and Development in the General - Government Sector: 2008-2010 – News Release 126/2011*. Malta: NSO. Available at: http://www.nso.gov.mt/statdoc/document_file.aspx?id=3065 [last visited 15 October 2011]

Office of the Prime Minister, 2011. *National Environment Policy – Draft for Consultation – September 2011*. Malta: Office of the Prime Minister

Pro-Inno Europe, 2011. *Innovation Union Scoreboard 2010*. Available at: http://www.proinno-europe.eu/sites/all/modules/pubdlcnt/pubdlcnt.php?file=http://www.proinno-europe.eu/sites/default/files/docs_EIS2010/IUS_2010_final.pdf&nid=26367 [last visited 15 October 2011]

http://www.mcst.gov.mt/page.aspx?id=124 [last visited 24 October 2011]

http://www.mcst.gov.mt/page.aspx?id=119 [last visited 24 October 2011]

http://support.maltaenterprise.com/Documents/SM-Environment/Guidelines.pdf [last visited 24 October 2011]

https://secure2.gov.mt/TSDU/file.aspx?f=1346 [last visited 24 October 2011]

http://www.um.edu.mt/iet/researchactivities [last visited 23 October 2011]

http://www.wasteservmalta.com/projects.aspx?id=237 [last visited 23 October 2011]

http://support.maltaenterprise.net/documents/IA-Investment/Guidelines.pdf [last visited 26 October 2011]

Laws of Malta – Investment Aid Regulations http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=11607&l=1 [last visited 26 October 2011]

http://support.maltaenterprise.com/Documents/SM-SMEDev/Guidelines.pdf

Laws of Malta - Assistance to Small and Medium-Sized Undertakings http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=11608&l=1 [last visited 26 October 2011]

http://support.maltaenterprise.com/Documents/ES-Advisor/Guidelines.pdf [last visited 27 October 2011]

http://support.maltaenterprise.com/Documents/SM-Innovation/Guidelines.pdf [last visited 27 October 2011]

http://support.maltaenterprise.com/Documents/SM-InnoStart/Guidelines.pdf [last visited 27 October 2011]

http://support.maltaenterprise.net/Documents/ES-Energy/Guidelines.pdf [last visited 27 October 2011]

http://support.maltaenterprise.com/Documents/SM-Exploratory/Guidelines.pdf [last visited 27 October 2011]

http://support.maltaenterprise.com/Documents/R&D-TaxCredits/Guidelines.pdf [last visited 27 October 2011]

http://support.maltaenterprise.net/documents/R&D-Collaboration/Guidelines.pdf [last visited 27 October 2011]

http://support.maltaenterprise.com/Documents/R&D-Studies/guidelines.pdf [last visited 27 October 2011]

http://support.maltaenterprise.com/Documents/R&D-Experts/Guidelines.pdf [last visited 27 October 2011]

http://ec.europa.eu/clima/funding/ner300/docs/projects_perms_en.pdf [last visited 28 October 2011]

ANNEX 1. Policy measures addressing eco-innovations in Malta

	Group of policy measures	*Type of policy measure*	***Specific measure*** *Please provide reference to or brief summary of specific measures (national, regional)* add cells if necessary	**Focus of policy measure** (tick if relevant)				
				Generic focus on eco-innovation	Resource efficiency improvement	Energy efficiency improvement	Reduction of emissions incl. CO2	Other relevant areas (e.g. renewable energy, etc)
SUPPLY SIDE FOCUS	**Equity/business support**	Venture capita funds						
		Public guarantee funds	Bank of Valletta's JEREMIE Financing Package offers advantageous interest rates and enhanced collateral requirements earmarked for SMEs as part of the EU's 2020 Strategy. Target sectors include: • Tourism and related services including accommodation and food service activities; • Creative sector including arts, entertainment and recreation; • Information, Communication and Technology; • Manufacturing of traditional and new products and services such as aviation; • Professional, scientific and technical services; and • Wholesale, retail and the associated storage services. Through the BOV JEREMIE Financing Package, SMEs and micro-enterprises will be able to: • Improve the performance of their operations through capital investment in plant and equipment; • Launch new products and services in new niche markets through capital investment; • Tap into new export markets by improving the Malta-based operations; • Enhance the presence on the World Wide Web; • Invest in Green Technology; and • Promote and transform Gozo as an ecological island.	X				

			https://www.bov.com/page.asp?p=13355&l=1					
	Support for R&D in public sector and industry	R&D funding	Various offers are available to assist innovative enterprises to engage in research and development. These can take the form of grants or tax incentives. http://support.maltaenterprise.net/	X	x	x	x	x
		Collaborative grants	The collaborative R&D Grant Scheme supports Maltese enterprises that carry out an industrial research or experimental development project in collaboration with other enterprises. The project should lead to the development of innovative products, processes and services based on advanced technologies. Projects may only be funded if they are endorsed by the EUREKA network or approved through the Eurostars Joint Programme. Support is provided through refunds that part-finance pre-approved costs. Such costs may include: • Personal costs (wages) of researchers and technicians; • Depreciation costs of new instruments and equipment; • The costs of material, supplies and similar products, bought specifically for the research project; • Cost incurred for the procurement of technical knowledge and acquisition of patented knowledge and technology; • EUREKA is an intergovernmental network launched in 1985, to support market-oriented R&D and innovation projects across all technological sectors. http://support.maltaenterprise.net/index_files/CollaborativeRD.htm	x				
		R&D infrastructure	Various schemes are available to support R&D Infrastructure including the ERDF Research and Development Grant Scheme providing grants to enterprises carrying out Industrial Research and Experiential Development activities leading to the development of new or significantly improved products, processes or services. The scheme will part-finance eligible costs related to industrial research projects and experimental development projects. These costs include: • wages of researchers and technicians; • depreciation costs of new instruments and new equipment; • costs of material, supplies and similar products, bought specifically for the					

			research project; • subcontracted research; • the purchase of technical knowledge and patents. http://support.maltaenterprise.net/index_files/Page453.htm http://support.maltaenterprise.net/index_files/Page340.htm					
	Fiscal measures	Tax incentives for R&D and start-ups	This incentive has the scope of: • providing assistance to enterprises investing in Industrial Research and Experimental Development to develop innovative products and solutions. • supporting Small and Medium-sized Enterprises (SMEs) in protecting the knowledge gained from Industrial Research and Experimental Development projects. • encouraging cooperation between firms by providing additional assistance for collaborative Industrial Research and Experimental Development. http://support.maltaenterprise.com/Documents/R&D-TaxCredits/Guidelines.pdf http://support.maltaenterprise.com/Documents/SM-SmallStart/Guidelines.pdf					
		Tax incentives for R&D personnel	This incentive has the scope of: • providing assistance to enterprises investing in Industrial Research and Experimental Development to develop innovative products and solutions. • supporting Small and Medium-sized Enterprises (SMEs) in protecting the knowledge gained from Industrial Research and Experimental Development projects. • encouraging cooperation between firms by providing additional assistance for collaborative Industrial Research and Experimental Development. http://support.maltaenterprise.com/Documents/R&D-TaxCredits/Guidelines.pdf					
	Education, training and mobility	Tailored training courses for companies, entrepreneurs	The Training Aid Framework is a unique opportunity where local companies can invest in their human resources. Through the Training Aid Framework financial assistance is given to those companies that invest in the training of their workforce. This scheme is available for companies in the private sector and the subsidy will vary according to the type of training and the size of the enterprise. Training can be in-house or out-sourced and can be given in Malta or					

			abroad through distance learning. The Training can be a course at the University of Malta or at a foreign university. The training can even lead to a PhD. Self-employed persons will also be eligible. Each company will be eligible for a maximum of €250,000 each year. http://www.etc.gov.mt/site/page.aspx?pageid=2280 http://www.etc.gov.mt/docs/TAF%20New%20Guidelines%20June2011.pdf					
		Advise/consulting for start ups, companies, entrepreneurs	Small and Medium Enterprises (SMEs) can benefit from the temporarily engaging highly qualified experts to work on R&D&I projects. In this way SMEs can access new knowledge and increased innovation capabilities. The expert will help the SMEs to carry out an Industrial Research and Experimental Development projects. Malta Enterprise may provide part financing of the costs directly related to the secondment of highly qualified personnel, seconded from a research organisation or large enterprise. These costs may consist of wages paid by the SME to seconded personnel or fees charged by the research institute or large undertaking for such secondment. http://support.maltaenterprise.com/Documents/R&D-Experts/Guidelines.pdf Malta Enterprise provides business advisory services in the below areas: • Marketing & Business Management • Research, Technological Development & Innovation • Business Advisory & Enterprise Support Enterprises may benefit from the expertise of the advisors that will support them in their particular needs for development. Business Advisory Services are charged at €40 per hour, part of which is part financed by Malta Enterprise. The Corporation may also allocate up to ten hours of free advisory services to help the enterprises and the assigned advisor to carry out preliminary assessments. http://support.maltaenterprise.com/Documents/ES-Advisor/Guidelines.pdf					
		Placement schemes for students	The Technician Apprenticeship Scheme (TAS) leads the apprentice to obtain an occupational competence at technician level (level 4 according to the MQF Level Descriptors). This means that at the end of the apprenticeship you will have the competence to supervise the routine work of others, taking some responsibility for the evaluation and improvement of work. http://www.etc.gov.mt/site/page.aspx?pageid=2188 INT (*Ibda Negozju Tieghek*)(Start Your Own Business) is a one stop entrepreneurship programme aimed at promoting an enterprise culture among those people who are interested in taking up self-employment by opening up their own small business. The programme is a direct response to the rapid changes that are occurring in the local and international labour markets. Among the salient needs are the ever-					

			growing imperatives of innovation, initiative and entrepreneurship. The entrepreneurial start-up offers a challenge and, therefore, ETC aims to provide advice and training to prospective entrepreneurs. To reach these objectives the corporation had established a Unit to provide this advice and assistance to emerging entrepreneurs. This will assist these people in the starting-up, development and running of their business. http://www.etc.gov.mt/site/page.aspx?pageid=2309 The Training Subsidy Scheme, part of the ESF Funded Employability Programme, aims to assist self-employed persons and persons employed in micro-enterprises of **10 or less** employees, apprentices, the unemployed, NGO and Local Council employees to develop their skills by participating in further **off-the-job** vocational education and training. The Training Subsidy Scheme offers assistance in the form of a training grant to aid participants with costs related to training. This grant will be awarded to the individuals after successful completion of their training. http://www.etc.gov.mt/site/page.aspx?pageid=2284					
		Support for R&D workers recruitments	STEPS aims at providing more opportunities to promote further specialisation at higher levels of education. This is done by supporting an increase in the number of students following postgraduate courses, hence increasing the availability and employment of high-level graduates in the priority of sectors of the knowledge-based economy in Malta. https://www.meef.gov.mt/Page.aspx?pid=266&depid=2&pageid=13					
	Networks and partnerships	Competence centres, clusters, science-technology parks	A life sciences park aimed at consolidating and boosting Malta's research and innovation capacity is currently being developed and envisaged to be completed in 2013.					
		Technology platforms and innovation networks	The principal objective of EuroMedITI is that of engaging European and Mediterranean Businesses, Academic and Research Entities, and National Governments for the development, customisation and deployment of innovating technologies in sectors that have a special relevance to the Euro-Mediterranean Region. http://www.mcst.gov.mt/files/uploaded/EuroMedITIExecutiveSummary.pdf	X				

		Foresight and common vision building	Foresight initiatives are usually organised by the Malta Council for Science and Technology www.mcst.gov.mt	X				
		Market intelligence and other forms of information sharing						
DEMAND SIDE FOCUS	**Regulations and standards**	Regulations, targets, cap & trade schemes						
		Performance standards, labeling, certification	Registration of EMAS sites. http://www.msa.org.mt/emas/index.htm Accreditation of EMAS verifiers. http://www.msa.org.mt/accreditation/index.htm European Eco-Label Scheme http://www.msa.org.mt/ecolabel/index.htm MSA EN ISO 14001:2004 - Environmental Management System Certification http://www.msa.org.mt/certification/services14001.htm Eco-certification of hotels http://www.mta.com.mt/eco-certification	x				
	Public procurement	"Green" public procurement of goods and services	A green public procurement strategy document is currently being prepared.	X				
		R&D procurement						
		Pre-commercial procurement						

	Technology Transfer	Advisory support for technology adopters	Various support measures are offered by Malta Enterprise to assist in the adoption of new technology. http://support.maltaenterprise.net/					
		Financial or fiscal support for technology adopters (e.g. grants for purchasing new technology)	Various support measures are offered by Malta Enterprise to assist in the adoption of new technology. http://support.maltaenterprise.net/					
	Support of private demand	Tax incentives for consumers (e.g. for purchasing environmentally efficient products)	Electrical vehicles and PV systems http://www.mra.org.mt/Support%20Schemes%202011-EV.shtml Solar water heaters, solar collectors http://www.mra.org.mt/Support%20Schemes%202011-SWH.shtml PV panels http://www.mra.org.mt/Support%20Schemes%202011-PV.shtml Wind energy systems http://www.mra.org.mt/microwind.shtml			X	x	X
		Tax reductions for products and services (e.g. VAT reductions)						
		Demand subsidies (e.g. eco-vouchers, consumer subsidies)						
		Awareness raising and information provision	Various initiatives may be taken from time to time by Ministries, departments and entities to raise awareness and disseminate information.	X				

About the Eco-Innovation Observatory (EIO)

The Eco-Innovation Observatory (EIO) is a 3-year initiative financed by the European Commission's Directorate-General for the Environment from the Competitiveness and Innovation framework Programme (CIP). The Observatory is developing an integrated information source and a series of analyses on eco-innovation trends and markets, targeting business, innovation service providers, policy makers as well as researchers and analysts. The EIO directly informs two major EU initiatives: the Environmental Technologies Action Plan (ETAP) and Europe INNOVA.

Visit our website and register to get access to more information and to discuss all EIO reports, briefs and databases.

www.eco-innovation.eu