



A Draft **Renewable  
Energy** Policy  
for Malta

# Table of Contents

<b>1.</b>	<b>Introduction</b>	<b>3</b>
1.1	Renewable Energy and Energy Policy	3
1.2	Renewable Energy – What is Included?	3
1.3	Key Players and Stakeholders	4
1.4	Links to National Energy Policy	4
<b>2.</b>	<b>Policy Objectives And Background</b>	<b>5</b>
2.1	Renewable Energy Policy Objectives	5
2.2	Background	6
<b>3.</b>	<b>Promotion Of Renewable Energy Sources</b>	<b>9</b>
3.1	Setting Ambitious, yet Feasible Targets	9
3.2	Regulatory and Administrative Issues	14
3.3	Financial Support Mechanisms	16
<b>4.</b>	<b>Quality of Life</b>	<b>19</b>
4.1	Environmental Benefits of RES	19
4.2	Environmental Impact Assessments	20
<b>5.</b>	<b>Horizontal Issues - Information Dissemination, Research Development and Innovation, Human Resource Development</b>	<b>23</b>
5.1	Information Dissemination and Public Participation	23
5.2	Human Resource Development	24
5.3	Research and Development	24
5.4	Incentives to Private Enterprise and Business	25
<b>Annex 1</b>		<b>27</b>
<b>Acronyms</b>		<b>32</b>



# chapter 1 Introduction

## 1.1 Renewable Energy and Energy Policy

Government has developed its energy policy for the Maltese Islands.

That policy is based upon three objectives – security of supply, environmental protection, the social dimension, affordability and competitiveness – all pursued in a balanced way to move towards a sustainable energy supply.

Government has now proceeded with developing this policy document to focus in greater detail on one segment of the energy sector – that of renewable energy.

While energy use efficiency remains the most rewarding and preferred policy option to attain the stated policy objectives, renewable energy also contributes significantly to promoting security of supply and is very relevant to promote environmentally sound energy production. It is credited with being a long-term option to contribute to meeting the energy challenges that the country is facing.

This is the first formal Renewable Energy (RE) Policy for Malta. As the uptake of RES gains ground in the context of a liberalised energy market, more aggressive and innovative policies are expected to be developed.

## 1.2 Renewable Energy – What is Included?

Renewable energy sources are energy resources that are replaced rapidly by a natural process.

The definition of RES that is generally accepted (in Directive 2001/77/EC) is rather wide. Besides solar, wind, wave, hydropower, geothermal and

tidal energy, biomass<sup>1</sup>, landfill gas, sewage treatment plant, gas and biogases are included.

This policy document takes all those sources of renewable energy that are of practical relevance to Malta into account.

<sup>1</sup> Biomass is defined as the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste

## 1.3 Key Players and Stakeholders

In following up this draft RE policy, Government is cognisant of the role and support of key players and stakeholders for its effective implementation. Government will ensure that its entities including the Malta Resources Authority, the Malta Environment and Planning Authority, Malta Enterprise, Enemalta Corporation, and other authorities and agencies will :

- establish, implement and/or work to effective regulatory frameworks to support RES;
- be amongst the first responders to RES projects;

- provide and disseminate neutral and unbiased information to the public on RES technologies, support measures, costs and benefits;
- ensure development of appropriate business environment for RES uptake and assisting private initiatives.

Industry, non governmental organisations, private investment and enterprise, social partners, civil society organisations and the consumers all have important roles to play in supporting greater penetration of RES in Malta.

## 1.4 Links to National Energy Policy

The measures being considered and proposed in the national energy policy with respect to renewable energy include:

- (i) promotion of all forms of renewable energy sources (RES) through :
  - a continuation in the development of the strategy for the promotion of RES to meet 2010 targets and identifying which cost efficient efforts are necessary to establish and achieve longer term targets;
  - establishment of support mechanisms for electricity generated from RES (RES-E);
- (ii) measures related specifically to wind and solar energy (PV and solar heating) and to biomass (solid waste, wastewater and biodiesel) including:
  - promotion of small-scale RES systems;
  - promotion of off-shore wind farms if viable and feasible;
  - promotion of solar thermal applications;
  - recovery of energy from waste;
  - promotion of the manufacture of biofuels produced from indigenous sources, primarily waste biomass;
  - monitoring the use of biodiesel and amending strategy and targets accordingly.

# chapter 2 Policy Objective and Background

## 2.1 Renewable Energy Policy Objectives

The following have been identified by Government as three key objectives.

### 1. Promotion of RES

Recognising the benefits of long term energy and environmental sustainability in the short and long term, and Malta's obligations as a member of the international community, Government is committed towards adoption of RES. Government will promote renewable energy by setting ambitious goals and targets for penetration of the market by these energy sources as well as putting in place appropriate support schemes and regulatory measures to encourage meaningful public investment and participation. Government will also lead by example.

### 2. Quality of Life

Improvement in the quality of life is an overriding objective of Government's policies. While appreciating the benefits of RES, Government is also mindful of their impacts and characteristics. In considering and promoting their

development, it will seek to ensure that the quality of life of citizens is not compromised or negatively affected by the choices made.

### 3) Support facilities and services

Government will seek the holistic, most suitable and robust adoption of RES by ensuring that support services and development facilities are available and accessible. These facilities and services include access to and dissemination of information, the promotion of public participation and acceptance of RES projects as well as human resource development to participate meaningfully and with excellence in the development and uptake of RES.

Complementary to these key policy objectives, Government has also identified a series of strategic measures and actions. It intends to pursue these measures to attain its policy objectives. In so doing, Government values the crucial role of all stakeholders including business, social partners, civil society, organizations and the consumers.

## 2.2 Background

### 2.2.1 Why do we support RES?

The benefits normally associated with green energy include improved security of supply, reduction of greenhouse gas emissions that affect climate change, the availability of an energy source that is immune from price volatility, enhanced competitiveness for renewable energies technology industries and job creation.

These benefits are not reaped uniformly by all countries because of the constraints imposed by natural characteristics and circumstances. Malta cannot benefit from several of the complementary activity associated with renewable energy, such as the cultivation of energy crops because of the scarcity of land and water, but still recognises some opportunities for development offered by RES as well as its moral commitment to participate in international efforts in this regard.

A start in deploying what is deemed feasible and appropriate to Maltese circumstances in RES cannot be delayed. Education and a shift in public attitude, including the commercial and industrial sectors, towards accepting that RES will be having an increasingly greater impact in the future, and research and development effort to increase efficiency and lower costs, all take time. Higher deployment and production levels of RES plant will lead to increased reliability and lower costs.

#### Security of supply

Clearly, like all other countries, Malta has to have a clear strategic direction to reduce its dependence on fossil-fuel based sources of energy.

Today Malta relies practically 100% on conventional fossil fuels. On the global market, prices are presently steadily rising due to various factors amongst which is the rapidly increasing demand for the product. Over and above this general increase, very significant spikes in the prices occur as a result

of specific events or threats, which could be either of a political origin or natural calamities. There is no reason to believe in a reversal of this trend. In time, fossil fuels could become unaffordable or at least a significant drag on the economy.

Renewable energy conceptually provides a partial solution to this state of affairs and this is a compelling reason for our interest in renewables. The country has to move in this direction to obtain at least partial relief from price volatility and product scarcity. Such relief comes at a price over and above what we would otherwise pay today for our energy needs but this has to be considered as an investment for the future. Malta has to be enterprising to take full benefit of such RE sources as are within our control.

#### Environmental reasons

As we become more conscious of the need to reverse the pollution trends causing climate change and of the benefits of a cleaner environment, environmental policies become more demanding. Standards are becoming increasingly higher. States are becoming more conscious of their environmental responsibilities and obligations, which in turn are reflected in their relationships. While several measures – e.g. cleaner fuels – all contribute towards this end, it is clear that most renewable energy sources offer an opportunity to obtain a jump in the environmental quality in energy exploitation.

RES contribute towards meeting obligations under various EU directives such as limits placed on the energy generation sector under the emissions trading directive and national emissions ceilings.

#### Economic reasons

The benefits accruing from green energy are not easily internalised or accounted for. The market has up to now generally been biased against RES

due to long-term, often hidden, subsidies given to electricity generation from conventional sources and the lack of incorporation of externalities.

Some RE sources, e.g. large scale wind-farms, produce energy that is becoming increasingly competitive with fossil fuels at today's prices, even excluding externalities. On the other hand, the generation of electricity using certain technologies such as photovoltaics (PVs) is still expensive and requires support and incentive schemes to ensure penetration of the market.

The cost of energy from RE schemes can be judged against the cost of energy derived from fossil fuels. The higher the price of fossil fuel, the more relatively attractive RE becomes.

Today, a market for emission trading has been created and this could be a driver towards increased utilisation of RES. In January 2005 the European Union Greenhouse Gas Emission Trading Scheme (EU ETS) established a multi-country, multi-sector greenhouse gas emission trading scheme. Reductions in emissions are 'converted' to credits that may also be used in the emissions trading scheme established

by Directive 2003/87/EC. Malta is currently preparing its 2nd National Allocation Plan pursuant to its obligations under this Directive.

Emission reductions can also be used by Annex I parties to the Kyoto Protocol for compliance with their Kyoto Protocol commitments. Malta is however a non-Annex I party to the Kyoto Protocol and also is excluded from the list of EU Member States forming part of the burden-sharing agreement under Council Decision 2002/358/EC concerning the approval, on behalf of the European Community, of the *Kyoto Protocol to the United Nations Framework Convention on Climate Change* and the joint fulfilment of commitments thereunder.

### Job Creation

A new RE industry in Malta offers potential for job-creation. Small-scale RES is labour-intensive in installation. Large scale RES will require skilled and qualified manpower for manufacture, erection and maintenance and the possibility of offering these services to neighbouring countries.



# chapter 3 Promotion of Renewable Energy Sources

Recognising the benefits of energy and environmental sustainability in the short and long term, and our obligations as a member of the international community, Government is committed towards the promotion of renewable energy:

- by identifying and keeping under review what natural resources can be exploited in Malta at any time in the light of available technology and the balance of their benefits and costs;
- by setting clear, feasible goals and ambitious national indicative targets for penetration of the market by these energy sources;
- by keeping its policy under constant review to encourage best practice standards to promote rather than inhibit RES together with energy efficiency;
- by putting in place appropriate support mechanisms and financing options and establish regulatory and administrative procedures that minimise as much as possible the burden associated with them;
- by leading by example and encouraging the Maltese public to take up renewable energy as a matter of economic, social and environmental choice.

## 3.1 Setting Ambitious, Yet Feasible Targets

### 3.1.1 What is our potential?

The Treaty of Accession of Malta to the EU sets a target of 5 per cent of the total electric energy to be generated in 2010 to be

generated from renewable energy sources.

Detailed studies on the potential of renewable energy sources in Malta have since been carried out.

### 3.1.2 Feasible Technologies

Wind, solar and biomass waste are feasible sources of renewable energy for Malta. Other types – hydropower, biomass (energy crops), wave, tidal, and geothermal – are not considered to be feasible for exploitation at least in the short term for various reasons, including absence or low level of resource intensity and/or state of development of the technology.

Just as a fuel and technology mix is beneficial in managing a fuel economy based on fossil fuels, so also a technology mix is beneficial in RE. Annex 1 Table A2 shows at a high level the relative strengths and weaknesses of various forms of RES with potential application in Malta.

### 3.1.3 Progress and update towards specific targets

In line with its policy of ambitious target-setting, Government has been considering various options and proposals for development and exploitation of RES post-2010. An overview of the progress is given in below.

#### Solar energy

Noting the cost of PV systems for the generation of electricity, and benchmarking the penetration in other countries, it has been estimated that a reasonable penetration rate in Malta would be 120-240 kW peak (kWp) per year which would increase electricity generated using photovoltaics by an estimated annual 168-336 MWh per annum (a negligible 0.02-0.04 per cent of estimated electricity consumption of 2010). This of course depends on support schemes in place from time to time.

Large land-based solar farms are not considered attractive because of their footprint per unit output and the impact of the hardware on the local landscape.

A more cost-effective use of solar energy is in its use in solar water heaters. The introduction of solar water heaters in Malta has been rather slow, but there seems to be an upward trend, especially following the incentives offered by Government. However a recent survey by the University's Institute for Energy Technology showed that many units had not been properly installed thus rendering them somewhat ineffective. This mode of exploiting solar energy needs to be studied further and in depth to better understand how its use can be optimised in relation to consumer habits and likely developments in (electric) energy management.

Another use of solar energy could be in cooling. This could be particularly attractive to Malta. Whilst it is possible to find on the market units of a relative large size, units suitable for a domestic market are harder to come by. A number of initiatives on an international scale are however underway to address this problem. This development will be followed closely.

#### Wind energy

Wind is the technology that is most attractive because it has the potential to make a significant impact on the energy economy of Malta in the medium term (next ten years).

#### **Land-based wind farms (large and medium wind):**

The large wind-generator units of rating 0.75MW and above (common sizes 2 and 5MW) are very large – of the order of 80-120 metre hub heights and 80-120 metre rotor diameters. As such, they have enormous visual and other impacts which will dominate the Maltese landscape and interfere with the overall quality of life in these islands.

Seen in this context and considering the very small impact that the application of this technology at practical levels will have on the energy mix and the energy economy of

Table 3.2: Progress towards RES targets (2010 & post 2010)

	Resource	Update on Progress towards - 2010 target GWh/annum	Estimated Contribution - post 2010 GWh /annum TENTATIVE	Comments
Solar	Photovoltaic	0.5 - 1.1	Annual penetration rate: 0.48 GWh/annum	
	Large scale – onshore (WT > 0.5 MW)	0	0	System will not be adopted
Wind	Offshore (at depths < 20m)	0	60	Subject to further investigation <b>Note:</b> If deepwater windfarm is developed, system may probably not be adopted
	Offshore (at depths > 20m)	Not expected to be developed before 2010	240	Deepwater windfarm proposal being evaluated
	Medium scale wind (20 - 500kW)	1.45	Annual penetration rate: 0.18-0.36 GWh/annum	Targets are subject to planning permission and mitigation of impacts
	Micro wind (WT < 20kW)	Negligible		
Biomass	Solid waste	7 – 10		Target 2010 – based on St. Antnin Solid Waste Treatment Plant
		18.68		Possible construction of 2 further MBTs subject to funding by 2010
			36	RDF in waste to energy plant
	Solid waste – energy recovery from landfills	2.6	11	1. A 0.3 MW generator planned for 2006/07 2. A 0.5 MW generator planned for 2010 3. A 0.5 MW generator planned for 2013
	Sewage	Not expected to be developed before 2010	6.7	Energy recovery from Malta South Sewage Treatment Plants being considered
	Animal waste	Not expected to be developed before 2010	24	Anaerobic digestion of animal waste being evaluated

these islands, Government considers that the construction of large-scale wind farms on land is unjustified, and so no such farms will be authorised.

#### **Medium near-shore wind-farms at sea (depth of seabed <50m):**

A windfarm with an installed peak capacity of 27 MW built at the site currently considered as the most attractive in terms of economy and other impacts – Sikka I-Bajda – may yield approximately 60 GWh of electrical energy per year (equivalent to around 2.1 per cent of electricity consumption of 2010). No decision to go ahead with this project has yet been taken because of the impact of the impact of such a project on current established economic activity. Current analysis indicates that disadvantages of this mode of RES exploitation may outweigh its advantages.

#### **Large scale offshore windfarms (within Maltese territorial waters with depths >50m):**

This possibility is currently being examined. If built, a typical wind-farm with an installed capacity of 100 MW peak may yield around 270 GWh/annum (equivalent to around 9.5 per cent of electricity consumption of 2010). Some aspects of such farms involve new emerging technology which is as yet unproven. However, they are very attractive because they do away with most of the negative impacts associated with near-shore installations. As at today, no targets have been adopted pending a better diligent evaluation of the risks and the rewards involved. A call for expressions of interest open to potential developers competent and interested in setting up projects in Maltese territorial waters was published recently.

#### **Medium scale wind (turbines sized between 20 kW- 500 kW):**

Offer some possibility to contribution to the national indicative targets. Direct use of wind energy for pumping water within rural areas or agricultural land has been a widespread practice in the past. Similar installations today would be used for electricity generation to satisfy local area needs. However it is also

recognised that there may also be some planning, visual and landscape impacts associated with this type of development.

Microwind may provide a small contribution in electricity generated from RES but this is also associated with other constraints originating from its visual impacts on the Maltese townscape, good neighbourhood and planning policies.

#### **Solid waste**

In line with Council Directive 99/31/EC of 26 April 1999 on the landfill of waste Malta is in the process of establishing a national strategy for the implementation of the reduction of biodegradable waste going to landfills.

A new plant for the processing of 35,000 tons of organic municipal solid waste is planned for 2008. It was originally estimated that the plant would yield around 6.8 GWh/ annum (equivalent to around 0.2 per cent of electricity consumption of 2010) (Hackl, 2005). Further studies indicate that the processing of organic waste in an anaerobic digestion plant could possibly produce between 12,100 Nm<sup>3</sup>/day – 18,200 Nm<sup>3</sup>/day (cubic meters/ day at standard normal conditions). The amount of biogas (which depends on the waste characteristic – hence calorific value) produced may vary partly due to fluctuations in biogas, maintenance and down time of installation, and occurrences of excess biogas in the buffer which would have to be flared. Electricity produced may range between 7–10 GWh/ annum (equivalent to around 0.24-0.35 per cent of electricity consumption of 2010).

The organic waste is partly generated from source sorting and partly the result of waste sorting at a materials recovery facility, which also produces refuse derived fuel, RDF.

The target for 2008 is the production of 11,000 tons RDF (from St. Antnin Solid Waste

Treatment Plant) having an energy content of 14 to 17.5 MJ/kg.

The waste treatment capacity will also be tripled by introducing a new plant in the Northern part of Malta and possibly another in Gozo resulting in around 24 GWh/annum electricity generation from biogas (equivalent to 0.85 per cent of estimated electricity consumption of 2010). Furthermore, the total RDF produced (including the RDF produced from St. Antnin Solid Waste Treatment Plant) is estimated at 35,000 tonnes/annum which may generate 36 GWh/annum electricity by 2013 (equivalent to around 1.27 per cent of electricity consumption of 2010).

Thus the total electricity generated from solid waste is estimated at 60 GWh/annum (equivalent to 2.11 per cent of estimated electricity consumption of 2010) by 2013.

Energy will also be recovered from the landfills. A conservative rating of the gas potential at Ta' Zwejra and at Għallies is 200m<sup>3</sup>/h in 2006 rising to between 600m<sup>3</sup>/h and 800m<sup>3</sup>/h in 2010 staying at or above this level until 2023. The installation of a 300 kW generator is planned for 2006/7 to be supplemented by a further 0.5 MW in 2010 and another 0.5 MW in 2013.

### Sewage and animal waste

The potential of energy recovery from sewage sludge and the waste resulting from animal husbandry is not yet established but this may be significant. Co-digestion of various waste streams with solid waste is being considered for this type of waste.

The Water Services Corporation is presently implementing the sewage treatment infrastructure and namely the construction of three new sewage treatment plants, one in Gozo and two in Malta. The Gozo plant (40,000 population equivalent capacity)

and Malta North plant (45,000 population equivalent capacity) will be operational by the 3rd quarter 2007. The largest plant in the South with an anticipated treatment capacity of 438,000 population equivalent will be equipped with anaerobic sludge digestion facilities generating enough biogas to supply 80 per cent of the plant's electrical power requirements. The energy recovery would equate to approximately 18,400 kWh per day or 6.72 GWh annually (equivalent to 0.24 per cent of estimated electricity consumption of 2010). The Malta South plant is expected to come on stream by the end of 2010.

Government has commissioned an Agricultural Waste Management Plan to study and to propose cost-effective solutions for management of animal waste. This study proposes the construction of anaerobic digestion plants which can provide an on-site energy source (Sustech Consulting et al. 2005). Government is currently reviewing the proposals submitted including the cost-effectiveness of such plants.

### Biofuels for Road Transport

In line with EU Directive 2003/30/EC (promotion of the use of biofuels or other renewable fuels for transport), Government has established a target for the use of biofuels in 2005 of 0.03% of all fuel sold for road transport.

Production (from waste cooking oil, abattoir waste and imported virgin oil) has increased following the interest generated in the product with biodiesel accounting for 0.5% of total fuel used for road transport in 2005, a significant improvement on the 0.1% achieved in 2004. A more ambitious target for biofuels for road transport for 2010 will be established in 2007, as indicated in the directive.

There is limited possibility of growing crops

for the production of biofuels in Malta due to shortage of land and water. Thus any increase in the use of biodiesel and the possible introduction of bioethanol can only be made possible through the importation of the biofuels or the raw material from which they can be produced.

### 3.1.4 Revision and Updating of Targets

Government will continue to keep targets under review and updated according to progress and changing situations. Knowledge-

based targets which are based upon national renewable energy resource evaluations and taking into account best available technology, costs, feasible penetration rates and other constraints will be set. While taking into account the requirements of EU Directives 2001/77/EC and 2003/30/EC, Malta will maximise the reasonable and feasible exploitation of renewable energy potential in Malta including electricity usage offset by solar thermal installations and others that may not be covered by existing Directives. It will be alert to new and emergent technologies as well as improvement to current technology.

## 3.2 Regulatory and Administrative Issues

### 3.2.1 How do we support RES?

Government will seek to support the exploitation of RES through:

- Simple permitting, registration and other regulatory procedures;
- Judicious financial support measures and incentives;
- Encouraging Public Private initiatives;
- Being a role model and a first responder to uptake of RES.

In the design and application of such support schemes, Government will take the criteria set by the Commission in Com (2005)627 into account, that is:

- (i) Increasing legislative stability and reducing investment risk;
- (ii) Reducing administrative barriers;
- (iii) Addressing grid issues;
- (iv) Encouraging technology diversity;
- (v) Better use of tax exemptions and reductions offered to RES;

- (vi) Ensuring compatibility with the internal market;
- (vii) Encouraging employment and local and regional benefits;
- (viii) Twinning actions on energy efficiency and demand management;
- (ix) economic instruments to penalise polluters and reward initiatives aimed at promulgating RES.

### 3.2.2 Better Regulation

Regulatory arrangements form an important element in a coherent structure that increases and promotes the reasonable uptake of RES, one that is not bureaucratic and that effectively does not act as a barrier to private initiative and investment.

Government has within the wider civil service set up a better regulation unit to closely monitor all developments in order to ensure that no unnecessary burden, financial and/or administrative is imposed on individuals or business.

### 3.2.3 Reduction of Administrative Barriers

In line with the objectives for better regulation, Government will continue to seek the elimination and/or simplification of burdensome regulations, administrative procedures or fees. (This has been done in the case of small generators with the establishment of fast-track notification of small-scale auto-generators by the Malta Resources Authority. Net-metering arrangements have also been established.)

A one-stop shop authorisation arrangement will be established with overall responsibility for co-ordination of multiple permits, licences and authorisations currently being administered and issued by different agencies and entities (MEPA, MRA, Enemalta etc). In addition monitoring of the performance of new procedures established and the results attained will also be carried out.

### 3.2.4 Reduction of Planning Barriers

Planning barriers have been reviewed and MEPA has introduced amendments to planning policy and design guidelines with respect to photovoltaic installations and solar water heaters.

The building control guidelines will continue to be amended to cater for the safe installation of renewable energy schemes within buildings.

The planning guidance and regulations will also be amended to establish minimum requirements for the integration of renewable energy considerations in the design and construction of new buildings, particularly large scale developments.

Government will establish lighter procedures and reduce further planning barriers for smaller generators using RES and incorporate such projects within the Development Notification Order.

Larger installations such as offshore wind farms fall under the scope of the Development

Planning Act 1992, as amended. Such installations for the harnessing of wind power may require environmental impact assessments (EIA) under Directive 85/337/EC as amended by Directive 97/11/EC, as well as under L.N. 204 of 2001. The EIA would need to justify the selection of the particular site as well as identify and assess the significant potential impact of the development.

The Environmental Impact Assessment should not take longer than 6 months to complete.

### 3.2.5 Easier Access to Grid and Infrastructure

#### Transparency of costs and pricing

Enemalta will implement the series of measures designed to facilitate access to the electricity grid in a fair and transparent manner as put forward in Article 7 of EU Directive 2001/77/EC.

These measures include the setting of a legal framework that ensures:

- Fair and transparent rules for cost bearing and sharing relating to grid connection and reinforcement to integrate new producers to the system;
- Fair and transparent pricing of electricity that takes into account the benefits of embedded generation such as RES.

#### Grid Infrastructure Development

Government will also support and encourage the grid infrastructure development by the distribution system operator - Enemalta - to accommodate renewable electricity generation that is in line with its other policies.

Government will also explore and promote the financing of grid development and infrastructure under the Structural Fund Budgets and the Trans-European Networks (TEN-E), subject to a wider national economy perspective.

## 3.3 Financial Support Mechanisms

### 3.3.1 Costs of Renewable Energies

The costs of generation and distribution of RES vary widely according to type. Some – for example large scale wind – already compete favourably with conventional electricity generation from fossil fuel. For other types, the margin of costs is decreasing further, as a result of the increasingly higher and more volatile oil prices and instability in various oil producing regions. While renewable energies have zero fuel and low operating costs, their high cost generally arise from high up-front capital costs, finance related risks and other barriers.

### 3.3.2 Support measures for RES

#### General Support Measures for RES-E

Government will establish support schemes to ensure that wherever possible a mix of appropriate technologies (PVs, biomass, microwind) is effectively promoted at different levels (large, medium and micro) whilst taking into account the relative costs of the technologies and associated financing implications.

Specific support schemes currently in effect in Malta are given in Annex 1.

Experience in other countries has shown that a feed-in tariff provides the highest level of investment confidence for independent generators of renewable electricity, and this mechanism has been most successful in delivering renewable energy projects. Pricing regulations (feed-in regulations) that are suitable and appropriate to encourage a diversity of technologies will be established. The distribution system operator (Enemalta Corporation) is already obliged to connect renewable energy plants to the electricity grid, and to purchase any electricity generated with renewable resources at fixed, published prices. These prices will generally be set and be

guaranteed for a specified period of time to spur investment in renewables.

Government will on its part seek to increase state funding in support schemes. Surplus electricity exported to the grid will be fairly valued taking into account the benefits associated with distributed generation.

Permitting of large scale RES projects will be facilitated, with public-private partnership schemes encouraged.

#### Specific Support measures for RES-E

##### Photovoltaics

Malta receives a significant amount of solar radiation and therefore has a high unconstrained potential for solar energy use. The PV-generation potential per installed kW peak in Malta has been estimated around 1600 kWh/annum compared to around 600 kWh/annum in Northern Europe. The costs of photovoltaics have been falling over the past 20 years at a rate of around 5 per cent per annum with increased worldwide market development. However, these today still remain at the more expensive end of commercially viable RES technologies and investment costs are relatively high. This constitutes the main constraint to PV application in Malta and in fact the uptake of PVs in Malta has to now been and is likely to remain relatively small.

Some support measures such as quota type schemes favour least cost technologies and would therefore be more applicable to technologies which are close to market competitiveness. In such schemes, PVs would find difficulty in penetration in the market unless the schemes are designed to be technology specific.

In the interest of promoting technology mix, Government has introduced various support measures for RES to increase the penetration

of electricity generation from photovoltaics which include:

- Capital grants for photovoltaic installation in domestic households;
- Establishment of a net metering arrangement where the excess electricity generated from small scale PV systems is purchased by Enemalta and waiving of meter costs for domestic consumers.

### **Microwind**

Government has also introduced support measures for electricity generation from micro-wind systems in the form of capital grants for micro-wind generation systems for domestic households.

Microwind however is not expected to contribute significantly to the national indicative targets for RES-E particularly due to the impacts and planning constraints that are likely to originate due to visual impacts on the Maltese townscape.

### **3.3.3 Specific support measures for biofuels**

Government has already introduced an exemption on the biomass content (i.e. percentage element) in biodiesel from excise duty. The biodiesel produced in Malta originates from waste cooking oil. Targets for use of biofuels in road transport have also been established and there is increasing interest and uptake in this emerging market.

Government will review existing measures to support biofuels and will study appropriate additional support measures where necessary.

### **3.3.4 Specific support measures for energy from waste**

The Eco Contribution introduced earlier already provides an incentive towards recovery, recycling and/or proper treatment of various waste fractions.

### **3.3.5 Specific support measures for solar thermal installations**

Government has established a support scheme for solar thermal installations. Capital grants for solar thermal water heaters installed by domestic consumers and given by Government, and meter installation charges for new domestic consumer are waived by Enemalta for consumers installing these systems.

Government will continue to extend the support scheme and review its mechanisms to ensure the greatest value to consumers. In addition implementation of specific support schemes particularly in low-income housing may be given a priority.

Government will consider revisions to the building regulations and planning permits to make inclusion of solar water heating a mandatory element in all new housing, tourism and major retrofit projects. Exceptions will need to be approved where applicant clearly demonstrates that other energy efficiency measures have been included.

### **3.3.6 External Costs**

Government will promote studies on the external costs of electricity generation in Malta and where appropriate seek to internalise these external costs. In line with its policy of knowledge-based decisions, Government will conduct an exercise based on ExternE to obtain the best understanding of the externalities associated with electricity generation in Malta.

### **3.3.7 Financing Options**

RES projects have high upfront capital costs. Financing institutions will be encouraged to establish low interest and guaranteed loans as well as flexible repayment schemes for renewable energy projects.

Financing under the Clean Development Mechanism may also be considered.

The Clean Development Mechanism (CDM) is defined in Article 12 of the Kyoto Protocol and provides for Annex I Parties to implement project activities that reduce emissions in non-Annex I Parties, in return for certified emission reductions

(CERs). The CERs generated by such project activities can be used by Annex I Parties to help meet their emissions targets under the Kyoto Protocol. As a non-Annex I party, Malta is eligible to host Clean Development Mechanism (CDM) projects that are funded by Annex I parties. This Clean Development Mechanism is thus one financing option which will be considered further.

# chapter 4 Quality of Life

Improvement in the quality of life is an overriding objective of Government's policies. While appreciating the benefits of RES, Government is mindful of their impacts and characteristics. In considering and promoting their development, it will seek to ensure that the quality of life of citizens is not compromised or negatively affected by the choices made.

## 4.1 Environmental Benefits of RES

Renewable energy is generally associated with several benefits that directly impact quality of life. The most significant of these are environmental – the harnessing of energy without the pollution associated with conventional energy obtained from fossil fuels, both at the local level and also at the level of global climate change. Other benefits such as the reduction of the dependence on imports of fossil fuel are less significant because of their relatively small contribution to the energy budget of Malta.

The nature of renewable energy sources however results in several impacts on the environment which in a small country such as Malta are very intrusive. The extent and dimension of the environmental impacts depend upon various factors including the location, the type and scale of the project, the type and sensitivity of the receiving environment and impacts associated with cumulative effects.

The low intensity of naturally occurring energy implies that large areas of land have to be utilised per unit of energy harnessed from land-based sources. This is obviously a handicap in a small densely populated country as are the Maltese Islands. The hardware employed to harvest renewable energy on a large scale is large and so very visible in the limited Maltese landscape. The proximity to urban areas, which is unavoidable in a small country, renders other impacts (such as noise and other visual and flicker effects) unacceptable to citizens.

- In managing the introduction of renewable energy sources, Government will ensure that on balance, the overall quality of life of citizens is not adversely affected or compromised. Diverse technologies have different characteristics and their impact on the quality of life needs to be determined individually.

- Small scale systems – photovoltaics, solar thermal panels and micro-wind – are acceptable as, subject to proper building rules, they should not be unduly intrusive. They generally utilize land which is otherwise not used or which has relatively small value.
- Large scale windfarms are not to be located on land. Within the constraints of available technology and cost, every effort will be made to locate them out to sea where their environmental impact and their impact on other sectors of the economy can be contained or eliminated.
- Using energy from organic waste, which originally has been deposited at landfills, gives an environmental benefit. Separating at source the organic waste fraction from the waste streams deposited at the landfill will reduce methane production at the landfill, but will avoid risks of escaping methane gas which is a very strong greenhouse gas. Improved benefit can be obtained by treating the separated biowaste for the recovery of renewable energy and stabilise the end product to avoid landfilling. The energy from the organic waste for the production of electricity is CO<sub>2</sub> neutral.
- Renewable energy that is likely to be reasonably available for exploitation in Malta is expensive and generally requires financial support. While Government will offer specific focused subsidy schemes to encourage adoption of preferred technologies, it will consider these subsidies holistically such as in conjunction with energy efficiency incentives and other environment-friendly investment.
- All projects and proposals for RES projects will be subjected to a robust and fair but fast environmental assessment analysis.
- The potential of innovative ways to integrate renewable energy generation within the urban development will be investigated.

## 4.2 Environmental Impact Assessments

### 4.2.1 Environmental Assessment Tools and Methodologies

Government considers that established rational environmental impact assessment as well as strategic environmental assessment requirements and procedures are essential tools in ensuring environmental assessment and protection.

Government will seek and ensure good quality assessments of the environmental impacts and risks associated with any such proposed large scale development and identification and adoption (if development is approved) of suitable and acceptable mitigation measures. Where

possible Government will seek to establish or promote methodologies for such assessments. Government will seek to further streamline and develop efficient consenting procedures for RES development particularly where previous similar studies have already been executed and results of such studies may be incorporated in new environmental assessments.

### 4.2.2 Environmental Impacts of Onshore Wind Power

Wind power is the fastest growing electricity generation technology and has seen significant

development particularly in Europe in the last decade. Wind power is one of the main renewable energy sources with potential in Malta. Large onshore wind development appears to be the most cost-effective technology. However despite this significant wind resource potential, Government is conscious of a number of constraints associated with this development. This includes:

- high visual and landscape impacts and the sensitivity of the Maltese landscape to this type of development;
- high population, small size and limited available land resources with impacts associated with conflicting land uses (e.g. impacts on aviation, impacts on tourism and recreation etc.);
- ecological impacts (bird strikes and impacts on protected areas);
- impacts associated with operation of the windfarms (light flicker, shadow effects, noise and vibration, and electromagnetic interference).

Government is aware of both the positive and negative environmental impacts associated with large scale wind power. Government is concerned of the high visual and landscape impacts within the urban Maltese environment associated with this type of development. The relevant competent authorities (MRA and MEPA) have been notified of this policy in their authorisation and permitting processes for new generation plant.

#### 4.2.3 Environmental Impacts of Offshore Wind Power

Government will promote relevant national agencies and institutions to undertake further research on possible environmental effects of large scale RES development particularly offshore wind power.

Government will establish clear areas for development of offshore windfarms based upon marine spatial planning tools and Strategic Environmental Assessments to ensure compatibility with other maritime values

#### 4.2.4 Restoration of the Magħtab, Fulija and il-Qortin Landfill Sites

The rehabilitation of the closed landfills shall include the collection of most of the gases being emitted to the atmosphere. Two main collection systems shall be available to enable the utilisation of the good quality gases for production of electricity. The engineered landfills being developed and in use since April 2004, shall have their landfill gases collected and directed to the same plant for the conversion to electrical energy. Works are already in progress to develop the necessary internal high voltage installation to enable the export of this energy to the national grid.

These landfill sites comprise large surface areas at various levels and gradients. When these sites are rehabilitated they may offer an opportunity to be dedicated for the generation of more green energy, making use of the installations supporting the generation of the energy from the landfills.



# chapter 5 Horizontal Issues

## Information Dissemination, Research Development And Innovation, Human Resource Development

Government will seek the holistic, proper and robust adoption of RES by ensuring that support services and development facilities are available and accessible. These facilities and services include access to and dissemination of information, the promotion of public participation and acceptance of RES projects as well as human resource development to participate meaningfully and with excellence in the development and uptake of RES.

### 5.1 Information Dissemination and Public Participation

Education and information dissemination on sustainable energy use in general, and on policies and strategies for promoting renewable energy in particular, are considered as key elements in the effective implementation of the renewable energy programmes.

Public awareness on the benefits of renewable energies needs to be increased. The Government will therefore seek to promote knowledge and greater public acceptance of RES projects.

The mass media has an important role in communicating the benefits of renewable and raising awareness. Media channels will be explored as they are powerful and effective methods to reach out to the

general public. Government will continue to sustain the national educational campaign that is being implemented in 2006 on sustainable energy use and on RES to clearly highlight in neutral terms both the environmental benefits and the disadvantages of RES technologies.

Government will promote greater public participation in the development planning process of RES with involvement of local communities. It will seek to increase the community's sense of ownership of RES and promote educational activities including visualisation work on large scale projects. It will also work in partnership with local communities and particularly local councils to promote best-practice examples for RES technologies.

## 5.2 Human Resource Development

Availability of an adequate knowledgeable and skilled human resource base is fundamental for the meaningful adoption of RES and for the maximising of benefits therefrom. Government intends to strengthen and promote institutional capacities in education and information particularly through participation in the Mediterranean Renewable Energy Programme.

Government will seek to promote continuing professional development with respect to RES. Training, accreditation and certification of providers of RE equipment is essential to prevent against the negative effects of bad workmanship, poor installations and poor quality equipment.

The University of Malta and its institutes (particularly the Institute for Energy Technology), national centres such as the Malta Council for Science and Technology (MCST), the Employment and Training Corporation (ETC), the Malta College for Arts, Science and Technology (MCAST), and other educational institutions have an important role to carry out specific research, training and education and to support the respective ministries. Government will seek to ensure collaboration and cooperation between the different agencies.

Through support of RES, additional benefits are expected to occur through job creation and investment in local production of components and systems, and in the training and certification of installers.

## 5.3 Research and Development

One of priority areas for action to tackle climate change identified by the EU in the 6th Environmental Action Programme is the use of other appropriate instruments such as:

- encouraging environmental agreements with industry sectors on greenhouse gas emission reductions;
- ensuring climate change as a major theme of Community policy for research and technological development and for national research programmes.

The Malta Council for Science and Technology (MCST) has been established as the national advisory body to Government on science and technology policy. The MCST is also the national agency responsible for management of the local RTDI programme and the national

contact organisation for the Sixth Framework Programme.

The MCST, will seek to promote participation in research, development and demonstration projects and the development of innovative solutions with a view to reducing costs of solar power and offshore wind power and mitigation of environmental impacts. Government will support and promote participation by its own entities and non-governmental organisations in EU funded RTD projects.

Government will also seek to promote research and innovation in application of RES to local conditions such as in solar thermal and cooling technologies and application of ground source heat pumps particularly for large buildings.

## 5.4 Incentives To Private Enterprise and Business

Malta is essentially a “technology taker” and the scope for research on technologies in Malta is thus limited. However characterisation and monitoring of technologies is useful. Being a small country, the application of large state solutions can be inappropriate and therefore greater attention is required to focus and seek linkages with states facing similar challenges and business environments.

Government will give priority and seek to incentivise RES industries especially the solar thermal and solar photovoltaic industries. These include fiscal incentives, such as advantageous tax rates, special loans and loan guarantees, training grants and subsidised property rates.

Government will promote human resource development and training in these technologies to attract further enterprise and private investment to the country and creation of new jobs in the sector.

Government encourages the participation of private enterprise. It will identify projects

which are appropriate for implementation through ‘public private partnership’ arrangements, where the risks are shared between the parties.

### 5.4.1 Demonstration Projects

Government will lead by example in the introduction of renewable energy technologies. Government will promote installation of photovoltaic systems and micro wind energy systems on public buildings and information and results of these demonstration projects disseminated to the public.

### 5.4.2 Corporate Social Responsibility

Government will encourage corporate social responsibility to accelerate market penetration of RES. Transparent reporting on energy consumption and use of RES both by government entities themselves and by private enterprise shall be promoted.



# Annex 1

Table A1: Existing Support Schemes			
	Type of Investment	Grant on Capital	kWh purchase price
Photovoltaic systems	Small PV systems minimum size 1 kW peak (kWp) (+/- 5%) and up to 3.7 kWp installed capacity for domestic use	20% of purchase price of PV system  Subject to maximum Lm 500 plus additional grant of Lm 250 for every additional 1 kWp (+/-5%) above the minimum 1 kWp.  <b>Note:</b> fractions of 1 kWp above minimum 1 kWp are treated pro rata	Net metering 3c/kWh for any excess electricity fed to the grid
Solar Thermal Systems	Solar heating energy saver for domestic use	25% of purchase price Subject to a maximum of Lm 100	Not applicable
Wind energy systems	Microwind systems with generation capacity up to 3.7 kWp for domestic use	25 % of purchase price Subject to a maximum of Lm 100	

**Table A2: Characteristics of Various Renewable Energy Technologies** (continues on next page)

	Solar		Small Scale Wind		Large Scale Wind		
	Thermal	PV	Microwind	Medium scale wind	Onshore Wind farms	Offshore wind farms (30 metres Depth)	Distant Offshore wind farms
Estimated average cost of power,*		14- 16 c/kWh	5 c / kWh	4.4 c /kWh	2.2 c / kWh <sup>1</sup>	3.1 c / kWh <sup>1</sup>	Innovative and emerging technologies – estimated 4c/kWh <sup>2</sup>
Contribution to national energy economy at practical penetration rates *	Very low	Very low	Very low	Very low	Low e.g. 1% at Marfa Ridge	3.1 c / kWh	Can be very significant e.g. 10% per farm
Interface with national electricity grid	Not directly connected to the grid	No problems – they are small, distributed and stable	Though variable they are small in relation to grid and hence no problem		Grid stability issues, the severity of which depends on the ratio of the generated power in relation to grid load. Hence will vary between day and night in our small isolated system and will be eliminated once Malta is linked to the European Grid.		
Compatibility with energy demand patterns	<p>Problematic:</p> <ul style="list-style-type: none"> <li>Full potential may not be utilised depending on consumer habits. This might change when solar air-conditioning technology becomes available.</li> <li>Highly disadvantaged when dual tariff (Cheap night) schemes are introduced.</li> </ul>	<p>Excellent:</p> <ul style="list-style-type: none"> <li>Full potential can be exploited through export to the grid.</li> <li>Full production coincides with daytime peak demand.</li> <li>Will be advantaged when dual tariffs are introduced.</li> </ul>	Energy output depends on wind characteristics and full potential can be exploited through connection to the grid. No structured relationship with energy demand patterns.		Energy output depends on wind characteristics. No structured relationship with energy demand patterns.  Due to grid stability issues, energy that can be accepted by the network depends on the demand on the network at that point in time, until Malta remains a small isolated system.		
Maturity and potential development of the technology	Technologies involved are low level and well known. No major improvement expected except for solar-driven air conditioning	Potential of significant rise in efficiency but difficult science involved	Though can be refined, no significant change is likely		No jump in performance likely but development will lead to increased reliability and less maintenance on hardware.		
Public Acceptability	No problems	No problems	No problems in moderation. May give rise to issues of good neighbourhood & planning problems.	Visually intensive	Shallow sites in Malta are all close to the shore, hence very significant visual intrusion and other impacts		As for onshore and near offshore sites, except that platform technology for deep sites is still in its infancy. Its reliability is currently being demonstrated.  Should give rise to no visual intrusion and public acceptability problem since such farms can be located well out of sight.

<sup>1</sup> Based on amortisation period of 15 years

<sup>2</sup> Based on amortisation period of 8 years (due to unproven technology and financing conditions)

**Table A2: Characteristics of Various Renewable Energy Technologies** (continued from previous page)

	Solar		Small Scale Wind		Large Scale Wind		
	Thermal	PV	Microwind	Medium scale wind	Onshore wind farms	Offshore wind farms (30 metres Depth)	Distant Offshore wind farms
Land use issues	Generally on roofs – low value sites	Generally on roofs – low value site. Development leading to membrane type (walk on) and wall-cladding format.	Generally on roofs – low value site	Generally in rural settings	Significant in a small country	In Malta's case, shallow sites are reefs. Reefs are considered of significant ecological, environmental and economic value	Careful site selection required given essential activities around Malta, but otherwise main impacts may be limited or mitigated effectively
Main potential environmental impacts	Visual impacts	<ol style="list-style-type: none"> <li>1. Environmental impacts associated with manufacture of solar PV units</li> <li>2. Visual impacts</li> </ol>	<ol style="list-style-type: none"> <li>1. Visual impacts</li> <li>2. Light flicker and potential nuisance to neighbouring buildings</li> </ol>	<ol style="list-style-type: none"> <li>1. Visual impacts</li> <li>2. Light flicker and shadows effects – bird strikes, etc.</li> <li>3. Ecological impacts</li> <li>4. Noise and vibration</li> <li>5. Conflicts with other uses: tourism and recreation etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Visual impacts</li> <li>2. Light flicker and shadows effects – bird strikes, etc.</li> <li>3. Ecological impacts</li> <li>4. Noise and vibration</li> <li>5. Conflicts with other uses: aviation, tourism, recreation etc.</li> </ol>	<ol style="list-style-type: none"> <li>1. Potential interference with coastal and maritime activities, fishing, and collision risks etc.</li> <li>2. Visual impacts</li> <li>3. Impacts on marine environment – seabed impacts, water Column potential impacts, surface and air potential impacts</li> <li>4. Ecological – bird strikes.</li> <li>5. Impacts on protected areas</li> </ol>	<ol style="list-style-type: none"> <li>1. Potential interference with coastal and maritime activities, fishing, and collision risks etc.</li> <li>2. Impacts on marine environment – seabed impacts, water Column potential impacts, surface and air potential impacts</li> <li>3. Ecological – bird strikes.</li> <li>4. Impacts on protected marine areas</li> </ol>



# Acronyms

c	Malta cents
CDM	clean development mechanism
CER	certified emission reduction
CO <sub>2</sub>	carbon dioxide
EIA	environmental impact assessment
ETC	Employment and Training Corporation
EU ETS	European Union Greenhouse Gas Emission Trading Scheme
EU	European Union
GHG	greenhouse gas
GWH	gigawatt hours
kJ	kilo Joule
kW	kilowatt
kWh	kilowatt hours
kWp	kilowatt peak
LM	Maltese Liri
LN	legal notice
m <sup>3</sup> /h	cubic metre per hour
MCAST	Malta College for Arts, Science and Technology
MCST	Malta Council for Science and Technology
MEPA	Malta Environment and Planning Authority
MJ/kg	mega Joule/kilogramme
MRA	Malta Resources Authority
MW	megawatt
Nm <sup>3</sup> /day	normal cubic metre per day
PPP	public private partnership
PV	photovoltaic
RDF	refuse derived fuel
RE	renewable energy
RES	renewable energy sources
RES-E	electricity generated from renewable energy sources
RTD	research and technology development
TEN-E	Trans-European Networks



