Report by Malta to the European Commission on the Implementation of Directive 2001/77/EC on the Promotion of Electricity from Renewable Energy Sources

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MINISTRY FOR RESOURCES AND INFRASTRUCTURE
MALTA, OCTOBER 2005

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Table of Contents

1. INTRODUCTION

1.1 Background

EU Directive 2001/77/EC on the promotion of electricity from renewable energy sources was adopted by the European Parliament and the Council on 27 September 2001. The purpose of this Directive is to promote an increase in the contribution of renewable energy sources to electricity production in the internal market for electricity and to create a basis for a future Community framework thereof.[1]

During Malta's accession process to the EU, a reference value of 5% for electricity produced from renewable energy sources by 2010 was agreed by Government with the European Commission. This indicative reference value was agreed subject to further studies for the development of a national indicative target on a more scientific basis and which studies had to be completed by 2005.

EU Directive 2001/77/EC also establishes reporting obligations on Member States. Article 3 (3) of the Directive requires that Member States publish a report by not later than 27 October 2003 and every two years thereafter, which includes an analysis of the success in meeting the national indicative targets taking into account in particular climatic factors likely to affect the achievement of those targets and which indicates to what extent the measures taken are consistent with national climate change commitment.

This report is being submitted in line with these reporting obligations for the publication period ending 27 October 2005 and will include a report on the work done to establish the national indicative target on a more scientific basis.

1.2 Basis of the Report

This report has been based upon detailed study being conducted by the Malta Resources Authority as part of the development of a strategy for the exploitation of renewable energy Sources in Malta.

The determination of a feasible national indicative target for 2010 is primarily based on three reports so far completed namely:

1. Report of Phase 1 of the work by Mott MacDonald Ltd on Renewable Electricity Target and which includes:
   i. Volume 1: Renewable Electricity Target. This volume describes the objectives, methodology adopted, results, and conclusions and sets recommendations for a target for the electricity produced from wind and solar for 2010.
   ii. Annex A: Analysis of the Alternatives. This Annex outlines the alternatives available for RES generation and includes a high level screening exercise of resource potential of RES in Malta. It further outlines the development opportunities, the status of technology and environmental issues associated with each alternative.
   iii. Annex B: Wind Resource Characterisation. This Annex examines in detail the maximum available wind potential based upon unconstrained resource

[1] EU Directive 2001/77/EC was transposed into Maltese legislation in 2004 through Legal Notice 184 of 2004.

availability and then further estimate the maximum potential constrained to account for technical, environmental, planning and legislative barriers.

iv. Annex C: Solar Resource Characterisation. This Annex examines in detail the maximum available solar photovoltaic potential based upon unconstrained resource availability and then further estimate the maximum potential constrained to account for technical, environmental, planning and legislative barriers.
v. Annex D: Environmental and Planning Barriers. This Annex reviews the existing planning framework in Malta and considers the main environmental impacts associated with the proposed development options for wind and solar.
vi. Annex E: Legislative Review. This Annex reviews the legislative framework in Malta and identifies gaps that need to be addressed relating to exploitation of renewable energy sources.
vii. Annex F: Technology Costs. This Annex reviews wind and solar (photovoltaic) technologies and discusses project development costs that need to be borne in development of RES strategy.
viii. Annex G: System Costs. This Annex considers the costs that will accrue to the Maltese electricity system as a result of integrating renewable energy sources – specifically the impact of the system of adding large, medium and micro-scale wind and PV.

2. A report by WasteServ Malta Ltd. *Waste to Energy; Scenarios for Waste Management and Treatment in Malta* which is attached in Appendix 3. This Report analyses the possibility of attaining a target of 3% for electricity produced from waste by 2010 and considers a second scenario for waste to energy option by 2013

3. Interim findings by Sustech Consulting and International Biogas and Bioenergy Competence Centre IBBK on behalf of the Ministry for Rural Affairs and the Environment on *Agricultural Waste Management Plan for the Maltese Islands*. No report has yet been published.

An analysis of success in meeting the indicative reference value taking into account climatic factors likely to affect the achievement of the targets is reported in Section 4 with further details also described in Annexes D and E of Mott MacDonald's Report for Phase 1. In these Annexes the Environmental and Planning Barriers are analysed and a Legislative Review is carried out.

2. A NATIONAL INDICATIVE TARGET FOR ELECTRICITY FROM RES FOR 2010

2.1 Potential of Renewable Energy Sources

EU Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal market establishes reference values for Member States' national indicative targets for the contribution of electricity produced from renewable energy sources to gross electricity consumption by 2010. The Directive defines the following sources as potential renewable energy sources for meeting the Directive's requirements namely: wind, solar, geothermal, wave, tidal, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.

A high level screening exercise on the resource availability of the sources specified in the EU Directive and consideration of available renewable energy technologies was carried out by the Malta Resources Authority and its consultants (Mott MacDonald Ltd).

In this screening exercise it was concluded that the technologies which may be suitable for Malta and warrant further investigation are wind, solar photovoltaic (PV), biomass wastes, landfill gases and sewage treatment plant gas.

The following renewable energy sources are not considered suitable for Malta given existing technologies and resource potential:

1. Tidal flow;
2. Geothermal;
3. Hydropower;
4. Biomass energy crops;
5. Wave.

2.2 Scenarios and Targets for Electricity Generation from Wind and Solar

The methodology adopted (including assumptions and the basis for the estimates made) in determining different target levels for wind and solar is outlined in Section 2, Volume 1 – Renewable Electricity Target Mott MacDonald, 2005a).

This methodology consisted in an optimisation model which was based upon the following:

1. Model Inputs namely:
    a. screening exercise identifying renewable technologies in Malta;
    b. characterisation of the available resource for the selected technologies to identify the maximum potential renewable capacity;
    c. analysis of environmental and planning barriers to the exploitation of the available resource to ascertain how much renewable capacity may be installed in Malta;
    d. legislative review to identify any potential legislative barriers to the implementation of renewables in Malta;
    e. analysis of the project and systems costs that may stem for the integration of renewables into the Maltese electricity system to allow the calculation of the costs associated with different renewable technology mixes.

2. Constraints to development namely:

a. Analysis of technical, environmental, legislative and planning constraints.

3. Development of three scenarios built up by incorporating the specific realistic contribution of various sources namely:
    a. Scenario A – reaching 5% of demand by 2010;
    b. Scenario B : Feasible Technology penetration rates;
    c. Scenario C: Windfarm Installation post 2010.

4. Sensitivities to handle different sets of constraints including:
    a. three capital expenditure scenarios for both the wind and PV alternatives;
    b. sensitivities to operational expenditure;
    c. electricity demand projections: 'Low', 'Medium' and 'High' demand patterns;
    d. different turbine sizes for medium wind farms (20kW and 60kW considered);
    e. different turbine sizes for large wind farms (850kW and 2MW considered).

Details of the results of the model are given in Section 3, Volume 1 – Renewable Electricity Target (Mott MacDonald, 2005) and conclude that:

1. For Scenario A (Reaching 5% demand by 2010):

a. It is not possible to meet 4.5% of electricity generation by onshore wind constrained to 40 MW and solar by 2010;
b. A 4.5% target to 2020 from wind and solar is only possible if onshore and offshore wind farms are developed.

2. For Scenario B (Feasible technology penetration rates):

a. Without large onshore wind development, the level of electricity that may be generated from RES in Malta by 2010, excluding waste-derived renewable projects, is very low, 0.09% of demand. This figure is well below the levels indicated by in the indicative reference value.

b. Even if planning restrictions were to be relaxed in favour of medium scale wind and PV, supporting a renewable target solely based on medium scale wind and PV would be very costly for Malta.

c. It is unlikely that more than one large onshore windfarm would be approved in Malta due to expected high visual impact and environmental restrictions. With the construction of one windfarm the feasible target is expected to be between 1 – 1.13%.

There are however also constraints to the development of a large onshore windfarm which at the outset have been identified to include:

i. public opposition to large scale windfarm development;
ii. high visual impacts associated with this type of development particularly when considering the Maltese landscape characteristics, generally low rise urban context and the proximity of potential sites to the built environment;
iii. limited land availability and high competition for and pressures on available land resources;
iv. other negative environmental impacts including light flicker and shadowing effects; impacts on bird migratory routes, noise and vibration.

The environmental impact assessments that are required prior to the authorisation and planning permission of this type of development may in fact seriously constrain its realisation. Furthermore this target, if set, cannot and should not be interpreted as an indication that such planning permission would eventually be granted.

Without large scale developments such as offshore wind, and by promoting medium support for PV and medium scale wind, the percentage of demand met by renewables, excluding waste-derived projects, is likely to be around 0.1%.

3. For Scenario C (Windfarm installation post-2010):

a. Allowing time for cultivating public understanding and support for RES gives an opportunity to raise the renewable target from 0.09 to 2%, depending on the options chosen in 2020.

b. The most cost effective means of raising the contribution of renewables, excluding waste-derived projects, is by developing two onshore windfarms during 2005 to 2020. If this option is not feasible due to the likely cumulative impact that two wind farms would have, developing an offshore windfarm has been proposed as a second best alternative.

Further detailed studies on offshore windfarm development have been carried out by the Malta Resources Authority and these have further highlighted that offshore windfarms are not considered a realistic option for development by 2010.[2] There are severe limitations with the potential of offshore sites given the status of foundation technology and the marginality of the resource potential of the sites.

2.3 Assessment of the RES Potential and Further Investigations on Potential Offshore Windfarm Sites

The Report (Volume 1 and Annexes) on the Strategy for Renewable Electricity Exploitation in Malta includes a detailed investigation on the wind and resource potential in Malta. In addition various presentations were made by the Malta Resources Authority to Government during the first half of 2005 on the renewable energy resource potential and how this may be exploited.

The conclusions of the first phase of the study carried out to determine the best RES utilisation strategy for Malta indicate that:

- Large onshore wind is the most cost-effective technology; visual impact and cumulative effects are likely to be serious obstacles to large onshore wind farm construction in Malta and Gozo.
- Offshore wind is the second best technology option in terms of costs. There is one marginal site identified in Malta. Developing it would require resolving technical issues as well as issues relating to the conflicting use of the site. Even if a developer was prepared to develop this marginal site, it is unlikely that the windfarm would be installed and functional before 2011.

[2] Malta Resources Authority, 2005. *Offshore Wind Resource Potential*. Draft Report. Unpublished.

- Micro-wind has not been considered a feasible option for Malta because of the planning constraints that are likely to originate due to visual impacts on the Maltese townscape.
- The current Maltese planning framework is more favourable to medium scale wind exploitation but this comes at an economic cost.
- The PV resource potential in Malta is enormous, but the cost implications of supporting PV are likely to be very high.

On the basis of the above and cognisant of the high visual and landscape impacts (as well as other environmental considerations) associated with onshore wind farms, the Malta Resources Authority carried out detailed investigations on the potential of offshore wind development. This study was developed through consultation with key stakeholders and government entities. This study was based on investigations of potential offshore windfarm sites[3] where seabed depths were less than 20 metres and this was later further extended to investigate a site with depth between 20-50m.

In summary this study (Malta Resources Authority, 2005) found and concluded that for sites at less than 20 m depth:

1. All the sites are considered as unsuitable by the Malta Tourism Authority for wind farm development due to impact on tourism and diving in particular.

2. Sikka il-Bajda has been identified as the main potential site for wind farm development from a resource and economic point of view although it is still considered a marginal site in comparison to other international offshore sites. Other local sites have lower capacity factors leading to higher average costs of power.

3. Bengħajsa Patch and Sikka l-Munxar have been recommended by the Malta Environment and Planning Authority (MEPA) as the preferred sites for further investigation from an environmental impact perspective. MEPA have also acknowledged that Sikka l-Bajda may merit further study. Sikka l-Bajda is a potentially important site from a marine conservation point of view according to MEPA.

4. Sikka il-Bajda is used for bunkering purposes in adverse weather conditions.

5. All sites are important from a fishing perspective although development at Sikka l-Bajda may be accepted by the Fisheries Conservation and Control Division (FCCD) within the Ministry for Rural Affairs and the Environment if impacts of development are limited and less than existing damage from bunkering activity.

6. Sites adjacent to the coast are namely: Ras il-Griebeġ, Il-Ponta tal-Qawra, Għallis Rocks, Marku Shoals, Madliena Shoals, St. George's Shoals, Sikka l-Munxar and Ħamrija Bank are considered sensitive from tourism and other perspectives and would be highly vulnerable to visual and landscape impacts. Tourism accounts for 30% of the economy and 25 % employment.

7. The development of the sites on the east coast i.e.: Il-Ponta tal-Qawra, Għallis Rocks, Marku Shoals, Madliena Shoals, St. George's Shoals, could lead to impacts associated with loss of TV reception.

8. Bengħajsa Patch is considered highly sensitive in view of its proximity to the airport and impacts on air traffic and is categorically to be excluded from consideration.

[3] The sites investigated included: Sikka l-Bajda, Ras il-Griebeġ, Il-Ponta tal-Qawra, Għallis Rocks, Marku Shoal, Madliena Shoals, St. George's Shoals, Sikka l-Munxar, Bengħajsa Patch, Ħamrija Bank

9. Ħamrija Bank is sited near a highly environmentally sensitive area (ecology, impacts on birds and visual impact) and should be excluded due to this factor.

Furthermore considering a deepwater site lying north of Sikka l-Bajda at depth varying between 20-50m, it has been concluded that:

1. Currently there are no windfarms in the world located at the depths indicated for the proposed site. There appears to be significant technical limitations to construct offshore wind turbines at the suggested depths.

   The wind resource at the proposed site should not be very different from Sikka l-Bajda which has been noted to be marginal and which is much less than offshore wind farm sites constructed elsewhere in Europe. It would not appear that this site would benefit from the advantages associated with offshore wind farms sites i.e. higher long-term annual wind speeds, lower wind turbulence, lower wind shear, increased inter-turbine spacing and corresponding reduction in wake losses and wake loads, reduced visual impact, increased noise emissions allowing higher rotor speeds and therefore smaller rotors.

2. The above limitations could have significant effects on the economic viability of the windfarm project and resultant average cost of power. By way of comparison the average cost of power for Sikka l-Bajda has been estimated at approximately 7.75 € cents /kWh (3.33 Malta cents/kWh). Preliminary estimates for the deepwater site indicate that the average cost of power would be in the region of between €cents 8.49 – 10.74 /kWh although this does not take into account that commercial windfarms at these depths are as yet unproven. On the other hand, electricity generated from commercial offshore wind farms in Europe (120-150MW at 5-15m depths) have been estimated at around 4-5 € cents /kWh.

3. Subject to further studies there appears to be limited impacts from the site's development on telecommunications and aviation.

4. The development of the proposed site will have an impact on maritime traffic entering the harbour and on bunkering activity in the area similar to the impact expected at Sikka l-Bajda.

5. The site may be in conflict with the proposed site for aquaculture.

6. The proposed site may be within the flight path of migratory birds that land at Ghadira wetland and this requires further detailed study within an EIA.

7. There also appeared to be some conflicting suggestions as follows:
   a. Fisheries Conservation and Control Division have suggested relocation towards a more north westerly direction just below the 50m bathymetric level in view of proposed aquaculture site;
   b. The Malta Tourism Authority has recommended that the site is shifted to the northeast or restrict the northernmost sector to increase the distance between the cliffs (Rdum tal-Madonna) and the turbines;
   c. The Malta Environment and Planning Authority has noted that the cliffs along Ponta ta' l-Ahrax together with a 4km buffer were identified by Birdlife Malta as an International Bird Area for Cory's Shearwater. Assuming this buffer would entail halving the area indicated for the windfarm (Malta Resources Authority, 2005).

2.4 Scenarios for Electricity Generation from Waste

A Report has been carried out by WasteServ Malta Ltd to assess the targets for electricity generation from waste included 2 scenarios (one for 2010 and one for 2013) as follows:

1. Scenario A:
   a. Quantities for combustion in 2010 assumed at 134,596 t/annum for an estimated annual electricity generation of 91.13 GWh/annum from a waste combustion plant with a waste capacity of 150,000 t/annum.
   b. Quantities for mechanical biological treatment plant estimated at 71,000 t/annum for an estimated electricity generation of 6.8 GWh/annum from the MBT plant.
   c. On the basis of the figure of electricity consumption in 2010 (2.837 TWh)[4], this works out at 3.5 % of gross electricity consumption in 2010.
   d. The total investment cost for the waste combustion plant is estimated in the region of € 70 million.
   e. Without the waste combustion plant the % of electricity generated from waste in 2010 is estimated at around 0.24%.

2. Scenario B:
   a. Quantities for combustion in 2013 assumed at 60,337 t/annum for an estimated annual electricity generation of 61.13 GWh/annum from a waste combustion plant with a waste capacity of 71,000 t/annum.
   b. Construction and operation of two mechanical biological treatment plants with input capacities of 71,000 t/annum and 100,000 t/annum and a electricity generation of 6.8 GWH/annum and 12.78 GWh/annum respectively.
   c. The total electricity generated from waste in 2013 would be in the region of 2.6% of the 2010 electricity consumption figure.
   d. The total investment cost for the waste combustion plant is estimated in the region € 50-55 million.

This analysis was based on a number of assumptions and conditions namely:

1. A decrease in landfilling;
2. Contribution to energy generation from waste;
3. High grade utilisation of the energy content of waste;
4. Certain increases in waste generation during the next 5-10 years.

It has also been noted that a waste combustion plant generally takes between 5-8 years for starting of operation following decision taken to construct the plant.

In Government's published waste strategy (Ministry for the Environment, 2001, p.13) it has been noted that:

> "*The results of computer modeling work carried out by consultants have indicated that even after introducing source segregation and separate collection of MSW and similar wastes and upgrading the Sant Antnin Composting Plant, there will come a day when we would require to establish another treatment facility in order to reduce the amount of biodegradable waste going to landfill and thus to treat such waste. This date has been estimated to be that of 2013. This is not far from the scenario depicted in the Solid Waste Management Plan for Malta (2000-2009) that had indicated such a date to be that of 2011*.

[4] This figure was assumed by Mott MacDonald Report and based upon Enemalta estimates.

The consultants have indicated that this new facility is likely to incorporate some form of thermal treatment with energy recovery and would be required to treat and process non-recyclable, non-hazardous combustible wastes and process residues and for reducing the amount of biodegradable waste going to landfill. Work on the construction of such a facility will need to commence by no later than the end of 2011, or possibly sooner depending on future changes in the quantities and/or composition of MSW and the actual performance of the planned waste recycling and composting facilities. This also depends on the performance of the targets set."

Furthermore it was also noted that:

"*The Government intends to defer the final decision on the construction of such a facility for as long as possible, both in order to monitor and assess the performance and impact of the planned waste recycling and composting facilities on the volume of biodegradable wastes going to landfill, and to be able to benefit from further advances in waste treatment technologies during the next ten years or s*o."

A waste to energy treatment plant is therefore not forecasted before 2012. (Ministry for the Environment, 2001: Table 15, pp 94-95) and given the tight timeframes involved it is very unlikely that a waste combustion facility would be completed by 2010.

In the meantime attempts are underway to recover landfill gas from the Ta' Zwejra Engineered Landfill.[5] At this time it is not possible to determine the contribution of electricity generated from this source since tests are still being carried out to determine the quantities of gas that may be recovered and possibly used for electricity generation.

2.5 Electricity Generation from Agricultural Waste

The draft report by Sustech Consulting on an Agricultural Waste Management Plan for the Maltese Islands recommends that the digestion of cattle, poultry and rabbit manure may be carried out in 3-4 centralised anaerobic digestion (CAD) plants for the stablilisation of the manure and the production of electricity from biogas. It has been suggested that the plants would provide 24 GWh of electricity every year.

Electricity generated from these plants requires financial support and it has been further estimated that the feed-in tariff for this electricity should be set around Lm 0.0541/kWh. The capital cost for the plants was estimated at around Lm 5.4 million and total capital expenditure (including vehicles, slurry pits etc) is estimated at Lm 9.7 million.

No timeframes or decisions for the construction of these plants have yet been set or taken and the Waste Management Plan is still being reviewed by the competent Ministry. It is however highly unlikely that the plants if constructed would be operational by 2010.

2.6 Conclusions on the National Indicative Target from RES for 2010

On the basis of the above and of the details outlined in the Reports referred to in Section 1.2, it is concluded that:

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5 Ta' Zwejra is an engineered non hazardous waste management facility which started operating in May 2004.

1. Setting an indicative target of 1.93 % electricity consumption from wind is considered exceedingly ambitious and would be difficult to attain. The studies that have been carried out indicate lower capacity factors for electricity generation from large scale wind farms and a higher gross electricity consumption in 2010 than the corresponding figures that were used as a basis for this indicative reference value.

   A target of electricity generation from RES (wind and solar) of 1% of demand by 2010 (assuming 2.8 TWh demand in 2010) can only be realistically possible with the development of a large onshore windfarm in Malta. This figure may also be unrealistic given that there are still various uncertainties regarding the development of a large scale windfarm in Malta.

   The construction of offshore windfarms is not considered a realistic option by 2010.

2. Without the construction of at least one large scale onshore wind farm, the target for generation of electricity from RES (wind and solar) by 2010 would be very low and estimated at 0.07 – 0.09% of gross electricity consumption.

3. Policies also need to be developed to remove existing barriers and encourage medium scale wind and PV to levels commensurate with the rates assumed in the Mott MacDonald report (2005a): i.e. 40-80 rooftops/year for PV and 5x60kW wind turbines a year. This would require developing incentives aimed at commercial users in particular.

4. The EU Commission's indicative figure of 3 % of electricity generated from waste by 2010 can only be achieved through the construction of a waste combustion plant at significant investment costs. Construction of this facility will require detailed environmental impact studies.

   It appears unlikely that this facility will be constructed by 2010. Without this plant the national indicative target for electricity generation from waste in 2010 would realistically be around 0.24 %.

In view of the above it is considered that the national indicative target for electricity generated from renewable energy sources by 2010 is set at 0.31% of gross electricity consumption by 2010 excluding large windfarms and waste combustion plants. The national indicative target may be increased to 1.37% of gross electricity consumption by 2010 if a land-based windfarm were to be approved and constructed.

Table 1: Breakdown of National Indicative Target - 2010

Contribution	**% Contribution of Electricity Consumption in 2010**	**Electricity generated in 2010 – GWh/annum**	**Installations**	**Main Constraints**
Large scale wind	**1.06**	30.2	15 MW wind farm	Environmental impacts and planning approval. Public acceptance and awareness
Solar Photovoltaic	**0.02-0.04**	0.54 – 1.08	Penetration rate of 40-80 installations / year between 2008-2010 (3kWp)	Financial support
Medium Scale wind	**0.05**	1.45	A penetration rate of 5 wind turbines / year (60 kW nominal capacity) for the period 2008-2010	Financial support Environmental impacts and planning approval. Public acceptance and awareness
Solid waste	**0.24**	6.80	Mechanical Biological Treatment Plant with input capacity of 71,000 t/annum	
National Indicative Target (RES-E % 2010)			**1.37 % ***	

* ***Without the construction of a large scale wind farm a more realistic figure for the national indicative target would be 0.31%***

After 2010 it is expected that electricity from other renewable energy sources may be generated as indicated in Table 2 and given resolving the main constraints indicated in the Table.

Table 2: Electricity Generated from RES after 2010

Contribution	**Electricity generated - GWh/annum**	**Installations**	**Main Constraints**
Large scale wind	60	Offshore wind farm at Sikka l-Bajda	Financial support Environmental impacts and planning approval. Public acceptance and awareness
	80	Offshore wind farm at a Deepwater site (>20 m depth)	Environmental impacts and planning approval. Public acceptance and awareness
Medium Scale wind	Rate of increase of 0.18 -0.36 GWh/ annum	A penetration rate of 5 wind turbines / year (60 kW nominal capacity)	Financial support Environmental impacts and planning approval. Public acceptance and awareness
Solar Photovoltaic	Rate of increase of 0.48 GWh/ annum	Penetration rate of 40-80 installations / year between 2008-2010 (3kWp)	Financial support
Solid waste	73.91	• RDF from 2 mechanical biological treatment plants with total input capacity 171,000 t/annum;	Environmental impacts and planning approval. Public acceptance and awareness
		• Waste combustion facility with input capacity 70,000 t/annum;	Environmental impacts and planning approval. Public acceptance and awareness
Animal waste (cattle, poultry and rabbit)	24	3- 4 Centralized anaerobic digestion plants as suggested by Sustech Consulting.	Financial support Environmental impacts and planning approval. Public acceptance and awareness

3. MEETING THE NATIONAL INDICATIVE TARGET

3.1 Analysis of the Barriers to Meeting the National Indicative Target

Annex D of the Report on the Strategy for Renewable Electricity Exploitation in Malta deals with environmental and planning barriers. It provides an analysis of how the current planning framework in Malta and consideration of the main environmental impacts associated with the proposed development options identified in Annex B (wind) and Annex C (PV). This analysis highlights environmental and planning issues that have the potential to restrict or halt development and suggests recommendations for reducing such potential issues.

Annex E of the Report on the Strategy for Renewable Electricity Exploitation in Malta reviews the current legislative framework in Malta and identifies gaps that need to be addressed relating to renewable energy sources.

3.2 Analysis of Transitory Measures Implemented

The strategy for exploitation RES is intended to provide the framework for establishing the measures to support renewable energies in Malta. Until the completion of this strategy, the Malta Resources Authority in conjunction with Enemalta Corporation has drawn up transitory arrangements for licensing small scale electricity generation from RES.

- The generation of electricity using PV panels with a peak installation capacity of 3.7kW is being permitted to connect to the electricity grid subject to established conditions. Permits issued by the Malta Resources Authority for connection to the grid have been simplified during 2004 and only a notification is now being required where the maximum capacity of the installation is less than 3.7kWp. Separate permits and authorisations may also be required by Enemalta Corporation and the Malta Environment and Planning Authority.

- As part of the transitory arrangements, the amount of electricity generated in such cases and supplied to the grid is purchased by Enemalta Corporation at the rate of 2 Malta cents/kWh (4.66 €cents/kWh). A final PV-support scheme will be issued shortly.

- During 2004, the Malta Resources Authority has also recommended to the Malta Environment and Planning Authority the review and amendments to the Policy and Design Guidance 2000 with respect to planning permits for photovoltaic installations and solar water heaters. This was done with the aim of reducing existing planning barriers. The Policy and Design Guidance 2005 was reviewed by the Malta Environment and Planning Authority in 2005 a number of the recommended amendments incorporated in these revised guidelines.

- Between September 2004 and June 2005, the Malta Resources Authority received 6 notifications for installation of photovoltaic installations with a capacity less than 3.7 kWp. The total installed capacity of these installations is estimated at approximately 10 kWp. The annual electricity generation is estimated to be 14 MWh.

- While the current transitory measures have facilitated the administrative aspects for licensing of small-scale solar energy installations and reduced bureaucracy in dealing with the administrative aspects, the uptake has up to now still been low. This may be expected since existing payback periods for PV installations with the current feed-in fees are very long. It is also expected that with the introduction of support

mechanisms which are anticipated to be included within the strategy being developed, the situation would be improved.

3.3 Proposals for Policy Options and Measures

Policy options and measures to support renewable energy sources in Malta have been drawn up and are reported in the Phase 2 report by Mott MacDonald Ltd.

The policy options are drawn from a review of existing measures and are assessed on a range of criteria examining their degree of success in different countries and their suitability for Malta. The key conclusions and recommendations from this report include the following:

(i) Small-scale generation, namely Solar PV, 60kW medium wind turbines and micro-wind

It is noted that:

(1) A combination of net metering and capital grants would be the most effective to support small scale generation in Malta.

(2) Incentives for individuals to invest in autogenerating RE equipment improve with rising electricity tariffs. Electricity tariffs in Malta now include a surcharge to cover fuel price increases.

(3) For a fifteen year support period assumed for the life-span of the equipment, and a spill tariff set to equal the buy tariff, the total subsidy value with net metering rises with the electricity price. An electricity price rise could cross-subsidise autogenerators supported by this arrangement at the expense of other electricity consumers. To minimise this effect, the net metering arrangement may be set at spill levels below the buy tariff.

(4) Grants and net metering will require monitoring (consistent with EU Guarantees of Origin) as long as the support measures are in place to combat scope for abuse.

(ii) Large-scale generation: onshore and offshore wind turbines

The main conclusions regarding support measures for large scale generation are as follows:

(1) Either a feed-in tariff (FIT) or tendered power-purchase agreement (PPA) would be most applicable measure to support large-scale generation in Malta.

(2) The level of the guaranteed tariff (either a FIT or a tendered-PPA) is very sensitive to the costs assumed for the large-scale development. In this context, a tendered-PPA has the advantage over a FIT that it can result in more competitive power prices since the bids submitted by project developers may reveal the commercial costs of construction more fully than the public review used to set a FIT rate.

(3) The costs (annual average) of supporting the key scenarios developed in Phase 1 over the period 2008-2020 are estimated as follows:

- € 448,100 – € 1,356,300 / annum for Scenario B1;
- € 1,550,200 – € 1,866,900 / annum for Scenario B2;
- € 1,749,600 – € 3,459,000 / annum for Scenario C3.

(4) For other large scale developments outside the scenarios considered in the study carried out (i.e. a large PV farm), applications should be considered on a case by case basis using criteria developed by the Malta Resources Authority with support provided if deemed appropriate via a feed-in-tariff set at a level suitable to the specific development.

(5) The Government of Malta will need to create a fund to support renewables.

It has also been recommended by Mott MacDonald Ltd. (2005b) for Malta to:

(1) Use of a combination of capital grants and net metering to support medium-small scale RES.

(2) Employ a tendered-PPA system to support the introduction of large scale wind developments, both onshore and offshore.

(3) Carry out a broader consultation than that undertaken in the RE Survey, including discussions with businesses, lobby groups and consumer associations, to assess the possibility of using the income tax system as a means to fund RES.

(4) Assess as part of the above consultation procedure the extent to which ongoing incentives would be required to successfully promote optimal generation from small-scale autogenerators.

(5) Undertake a programme of public awareness to ensure that RES support is welcomed within Malta.

(6) Cater for any developments not explicitly covered by the set of support measures chosen, to develop a reserve fund and to consider providing support via feed-in tariffs for large scale schemes and net metering and capital grants for small-scale schemes on a case-by-case basis.

These proposals and recommendations are being currently assessed.

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