Performance Audit

Renewable Energy Sources and Energy Efficiency in Malta

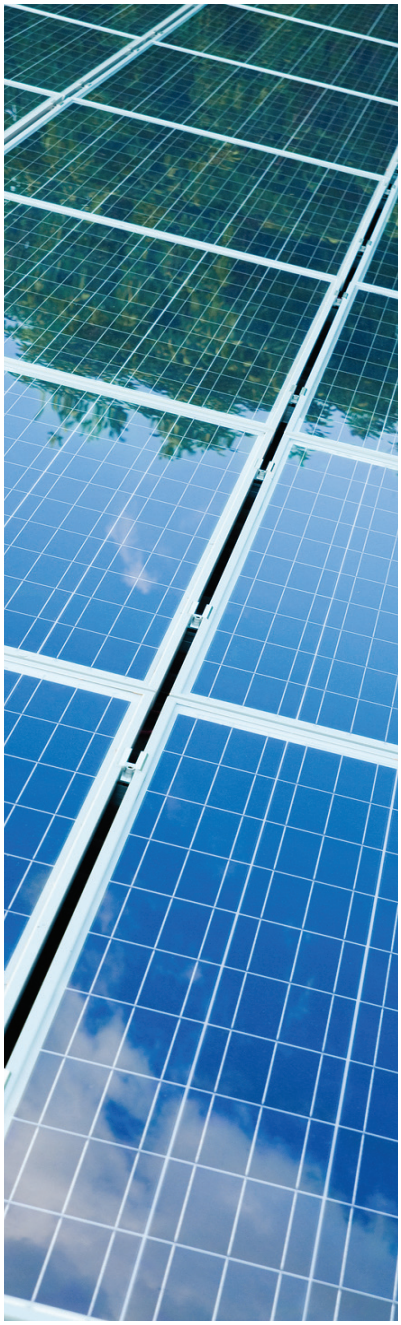
Table of Contents

Tables

Figures

List of Abbreviations

CFL	Compact Flourescent Lamps
CoWE	Committee for Wind Energy
ERDF	European Regional Development Fund
EU	European Union
GC	Green Certificates
GWh	Gigawatt Hour
KW	Kilowatt
KWh	Kilowatt Hour
KWp	Kilowatt Peak
MBT	Mechanical Biological Treatment
MEPA	Malta Environment and Planning Authority
MRA	Malta Resources Authority
MRRA	Ministry for Resources and Rural Affairs
MW	Megawatt
MWh	Megawatt Hour
NAO	National Audit Office
NAP	National Action Plan
NEEAP	National Energy Efficiency Action Plan
PV	Photovoltaic
RDF	Refuse Derive Fuel
RES	Renewable Energy Sources
RTO	Regenerative Thermal Oxidizer
SEA	Strategic Environmental Assessment
SME	Small and Medium Enterprises
VAT	Value Added Tax



Executive Summary, Conclusions and Recommendations

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The National Audit Office (NAO) carried out the Performance Audit "Renewable Energy Sources and Energy Efficiency in Malta". This report seeks to explore the extent to which Malta is minimising its dependence on fossil fuels by increasingly exploiting renewable energy sources (RES) and adopting energy efficient measures. This report also assesses the progress registered with regards to the RES and energy efficiency targets that Malta is obliged to attain as a Member State of the European Union (EU). All information and conclusions presented in this report are as at March 2009. However, where possible, the report has been updated to reflect developments up to the time of publication.

Energy utilisation in Malta is nearly entirely dependent on imported fossil fuels prompting the economy to be highly vulnerable to the international instability in the price of oil. Such a situation necessitates that the exploitation of RES and the adoption of energy efficient practices be given further impetus.

In view of the foregoing, this audit sought to:

1. evaluate the process adopted in the development of Malta's energy policy;

2. determine Malta's progress with regards to the renewable energy program, the energy efficiency action plan and the implementation of biofuel; and

3. assess the effectiveness of the energy efficiency incentives provided by the Government.

Malta's Energy Policy Framework

The Government of Malta developed its first draft energy policy for Malta, entitled the National Energy Policy for Malta, and published it for public consultation in June 2006. In April 2009, the the National Energy Policy for Malta was revised and presented for public consultation. In addition, the Government of Malta published another draft policy in August 2006 entitled the Renewable Energy Policy for Malta. Both policies remained draft documents as they were not formally approved by Government. Up to the time of publication of this report, these documents were in the 'Strategic Environmental Assessment' (SEA) phase.

Malta's energy policy framework also comprises the National Energy Efficiency Action Plan (NEEAP). This plan was published in 2008. The Ministry for Resources and Rural Affairs (MRRA) is responsible for the development and overseeing of Malta's renewable energy policies.

Membership to the EU in 2004 implied that Malta's renewable energy and energy efficiency obligations came into effect. However, the policies referred to above were drawn some years after membership. The conclusion of the policy process, that is its formal approval, was therefore overdue. Moreover, there were no documented plans indicating how, when and by whom actions related to the formal conclusion of the policy framework were to be undertaken.

The delays in the policy drafting process can be partly attributed to the lack of human resources at the Malta Resources Authority (MRA), which for some time was responsible for policy drafting on behalf of the Government. Additionally, the public consultation process of these two policies yielded significant response that further lengthened the conclusion and approval of the policy framework. The decision making process in policy development and implementation was further complicated as the new RES directive of the EU became effective in January 2009.

In order to consolidate and relate the information accumulated to date to current circumstances and technological developments, the MRRA established the advisory committee on wind energy - the Committee for Wind Energy (CoWE). The role of this committee is to advise on issues related to renewable energy policy.

The Implementation of Renewable Energy Policies

The implementation of the renewable energy policy in Malta does not fall under the responsibility of one particular entity or body. Various Government Ministries and entities as well as the general public are all actively involved in the implementation process. Malta's (draft) energy framework envisages the development of renewable energy sources, namely, wind, solar and biomass energy.

To date, the exploitation of RES is marginal. If this state of affairs prevails the risk exists that Malta will not be able to attain the relative renewable energy obligatory EU targets – even though such targets come into effect in 2020. Such risks are amplified by the fact that local renewable energy policies are still in their consolidation stage and the appropriate infrastructure still has to be put in place.

Malta's physical constraints, namely deep coastal waters and limited land availability, have complicated the policy-making and administrative processes with regards to the exploitation of wind energy. Subsequently, these issues have hindered and delayed the development of the required infrastructure.

Due to the relatively high capital outlay involved, solar energy is being marginally exploited within the various economic sectors. The uptake of the relevant Government incentive measures to encourage the market penetration of photovoltaic (PV) systems picked up following the upward revision of the relative rebate grant, both in the domestic as well as in the industrial and SME sectors. The penetration of PV systems by governmental entities increased substantially through the Green Leader initiative. However, the total electricity generated is still considered as marginal. Despite the recent substantial uptake in the installation of PVs by the domestic, industrial and public service, the opportunity exists for increasing the market penetration of PVs on a nationwide scale.

The development of an infrastructure to generate energy from waste is still in its early phases. Unless the related projects implementation are stepped up, it would be very difficult for energy generated through biomass to contribute significantly to Malta's EU energy target.

Biofuels in Malta

Up to 2008, the utilisation of biofuels reached the point where projections showed that it was likely that Malta would attain its 2010 indicative target. However, in 2008, the sales of biofuels decreased sharply and declined to 2005 levels. This decline is mainly evident in the transport sector. In such circumstances reliable projections as to whether Malta is on track to achieve its biofuel target cannot be drawn up.

Such a situation can be attributed to various factors, in particular the lack of comprehensive planning to encourage market penetration of biofuels. Despite the increase in the number of fuel stations retailing biofuels, it appears that consumers consider the price differentiation – mainly emanating through fiscal incentives - between biofuel and fossil fuels as marginal. Moreover, there were restricted awareness campaigns on the potential benefits of biofuels.

This performance audit revealed that the opportunity exists for more robust monitoring of the biofuel industry by the Regulator, the MRA. The MRA does not carry out audits to verify the figures submitted by the biofuel producers. Moreover, biofuel quality checks, necessary to ensure that the quality retailed on the market is of the right class and standard, are not carried out by the MRA. These tests are carried out by the biofuel producers, who forward the results to Enemalta Corporation, but not to the MRA.

According to Legal Notice 528/2004, Use of Biofuels or other Renewable Fuels for Transport Regulations, the MRA is only responsible to monitor the effects of utilising mixes of biofuels in diesel blends above five percent by non-adapted vehicles.

Encouraging Energy Efficient Practices

The efficient use of energy is a key objective in Government's energy policy. The National Energy Efficiency Action Plan (NEEAP), published in 2008, recognises the existing potential opportunities for increased efficiency in the use of energy. The Plan incorporates the national energy efficiency target, in accordance with the EU regulatory framework. Malta is encouraged to attain an indicative target of nine percent of average annual energy consumption (based on the period October 2001 to September 2006) by 2016.

Although the EU energy efficiency targets are not mandatory, their realisation will significantly contribute towards the attainment of Malta's obligatory renewable energy target. For this purpose, Government has introduced various legal notices to address and promote energy efficiency. In addition, the NEEAP 2008 identifies 26 energy efficiency measures and an additional seven measures to be considered in 2009.[1] Most of these measures are intended to further encourage energy efficiency throughout various sectors.

[1] A detailed list of the specific measures within the various sectors is included in Appendix 1.

Fourteen out of the 26 energy efficiency measures are expected to yield energy savings ranging from 116 to 137 GWh and 198 to 240 GWh by 2010 and 2016 respectively. The foregoing implies that energy saving emanating from these measures will range from 2.77 to 3.29 percent of final energy consumption and 4.72 to 5.70 percent of total energy consumption. The expected energy savings related to the remaining 12 measures have not yet been estimated by the MRA. The Authority, however, contends that it estimates the total savings from all of the 26 measures will be quite close to the target for 2010.

The MRA has not yet embarked on monitoring the implementation of the energy efficiency measures proposed in the NEEAP 2008. To date, the Authority is only collecting data related to the rebate applications of the energy efficient measures related to the domestic sector. However, the data collected was not analysed to determine the extent to which the implemented measures were yielding the expected results in terms of energy savings. The MRA remarked that the situation prevails since discussions regarding the methodologies to be adopted to evaluate energy savings emanating from the various initiatives undertaken are still ongoing at EU level.

In view of the situation discussed in the preceding paragraph, the NAO analysed the measures introduced by Government aimed at the Domestic Sector and the Green Leader initiative within the public service. The NAO case studies indicated that the opportunity exists to improve on results to date.

Domestic measures

The four energy efficient measures targeted at the Domestic Sector involved encouraging consumers to purchase energy saving appliances (such as air conditioners, refrigerators, and solar water heaters) through financial rebates schemes. Additionally, the measures also sought to encourage energy savings through the use of solar water heaters, micro-wind systems, PVs, roof insulation as well as other actions to reduce heating and cooling load, such as double glazing. In addition to these four schemes, recently, the scheme promoting the use of Compact Fluorescent Lamps (CFLs) in households was implemented.

Steady progress was registered in the implementation of the 'Domestic' measures. The measure (*Rebates on energy efficient domestic appliances)* has generated significant public response, and it is likely that the 2010 predetermined target regarding the number of applications submitted will be attained. As at mid-March 2009, with the exception of applications relating to tumble driers, applications to all other appliances ranged from 79 to 90 percent of their predetermined target.

As at mid-March 2009, the uptake of the Promotion of Solar Water Heaters measure stood at 45 percent of the 2010 estimated target. Such a circumstance can be directly attributed to the fact that, initially, the maximum rebate rate was not considered attractive by consumers. Nonetheless, the uptake of this scheme increased as the rebate rate was revised a number of times from the original €116.48 in 2005 to the current €460.

Since 2006, there were no applications for rebates through the micro-wind systems measures. Since this date, there were 279 applications regarding the measure relating to the 'Insulation on Buildings'. It is pertinent to note that predetermined targets for this measure were not established. The applications for PV systems picked up following the upward revision of the grant. The scheme launched in the last budget for PVs for 200 household was over subscribed. This situation contrasts with the 10 applications received prior the implementation of the 2009 scheme.

As at mid-March 2009, the expenditure incurred with regards to rebates relating to the 'Domestic' energy efficient measures amounted to €3.9 million. It is calculated that the estimated cost of one KWh of energy saved throughout the lifetime of an appliance significantly exceeds the amount of electricity that can be purchased for €1 at the current domestic tariffs charged by Enemalta Corporation. The foregoing suggests that the cost effectiveness and the social benefits derived from the scheme are appropriately balanced.

Green Leader measure

The Green Leader measure relates to an initiative implemented within each ministry aimed towards promoting energy efficiency and environmental awareness within Governmental entities. In January 2005, Government appointed 14 Green Leaders within all ministries. The importance of the 'Green Leader' measure stems from the fact that their primary role is to create environment awareness within their ministries while acting as catalysts for action to promote energy efficiency and environmentally friendly measures. The MRRA is the main body responsible for the coordination of the Green Leaders' initiatives.

Since 2005, Green Leaders have implemented numerous renewable energy and energy efficient initiatives in several governmental departments and entities. Such actions, which were undertaken in all ministries, ranged from the installation of photovoltaic system on various Government buildings, installation of energy efficient lighting and the raising of environmental awareness – including the adoption of energy efficient practices by employees of Governmental entities.

Strategic and operational plans related to this measure are still being prepared. The lack of strategic and operational planning has resulted in a lack of coordinated action within the various Governmental entities and specific targets for Green Leaders to strive for. For a short period, this situation led to the postponement of Green Leader meetings, training sessions and parallel initiatives.

Most of the expenditure incurred for the Green Leader measure related to parallel initiatives to install energy efficient and generating equipment within Government entities. However, during the period 2006 – 2008, Green Leader expenditure across all ministries was lower than the allocated budget. Moreover, as funds remained unutilised, revised budgetary allocations led to the Green Leader fund being further depleted.

Overall Conclusions

The consequences of climate change, increasing dependence on fossil fuels, and instability in energy prices have rendered the exploitation of renewable energy sources and the increasing adoption of energy efficient practices as a vital element of the energy policy framework. Additionally, Malta is also obliged to attain challenging EU renewable energy and indicative energy efficient targets. This report, however, has pointed out that the exploitation of renewable energy sources is still minimal. Moreover, this report remarked that, unless policy development and project implementation are stepped up, it would be very difficult for Malta to reach all its renewable energy and energy efficiency targets.

The policy making process initiated following Malta's accession to EU membership. In view of the ensuing obligations which became applicable on EU membership, it can be considered that at that stage, the policy making process was already overdue. To date, Malta still lacks formally approved energy and renewable energy polices. Such a situation is considered as hindering progress in developing the appropriate infrastructure and, consequently, the significant exploitation of renewable energy sources.

Strategic and operational planning related to the various renewable energy and energy efficient initiatives was not always appropriate. Budgets, scheduling and targets to be attained through specific initiatives were, at times, undocumented. Additionally, initiatives within various Government entities tended to develop and be implemented through a piecemeal approach. The foregoing suggests that the opportunity for more effective coordination existed.

The monitoring of the implementation of the various projects and measures was not robust. Such a situation is not tantamount to safeguarding the public's and Government's interests. Despite its best efforts, the regulatory body is not appropriately resourced to enable it to execute the functions and responsibilities emanating from its legal mandate.

Efforts to date have yielded some encouraging results. However, robust mechanisms must be in place to ensure that the appropriate infrastructure exists to exploit renewable energy sources and to further adopt energy efficient practices.

Recommendations

In view of the foregoing, the NAO proposes the recommendations listed hereunder. Apart from addressing the issues raised in the various Chapters of this report, Malta's EU obligations are also considered. Such considerations mainly relate to the attainment of renewable energy, biofuel, and energy efficiency targets.

The Policy Process

i. Efforts are to be sustained to ensure that Malta's energy efficiency and renewable energy policies are updated to reflect current circumstances and envisaged future developments. The timely conclusion, approval and adoption of these policies is considered critical to further encourage the exploitation of renewable energy sources and energy efficient practices.

ii. The appropriate strategic and operational plans to enable the implementation of the relevant policies are to be drafted and communicated to all stakeholders. This approach will not only contribute towards the effective implementation of policy, but will provide further guidance to implementing bodies. Moreover, such plans will facilitate the coordination of policy implementation by clearly allocating responsibilities, indicating the targets to be attained and strengthening accountability.

The Implementation of Renewable Energy Policies

iii. In view of the continuous technological advancements, sustained research on the effectiveness and environmental impacts associated with the development of large-scale renewable energy farms, particularly wind energy farms, is to be made. Moreover, the results of such research are to be utilised towards the formulation and implementation of the relative policies.

iv. Additionally, research studies should increasingly focus on emerging technologies related to the exploitation of renewable energy sources. Such

research will, in the long run, serve to provide other RES opportunities to those currently being considered.

v. Efforts towards the implementation of projects related to energy recovery from waste are to be intensified. The availability of the relative infrastructure will not only lead to significant environmental and social benefits but will also potentially make a significant contribution towards the attainment of the renewable energy target.

Biofuels in Malta

vi. A register indicating the producers of biofuels is to be compiled and duly updated. Such a document would facilitate the monitoring of related activities by the Regulator and other Governmental entities. Moreover, efforts and the relative enforcement actions are to be intensified to ensure that all biofuel producers submit production details as required.

vii. The monitoring of biofuel producers is to be strengthened. The Regulator of this sector is encouraged to verify documentation submitted regarding production figures. Moreover, quality control certificates related to the standard of biofuel produced and retailed are to be requested for monitoring purposes by the Regulator.

viii. Consideration is to be given to evaluating the feasibility of increasing the market penetration of biodiesel within the transport and industry sectors through pre-mixes of biodiesel, such as B5, B10, B80, B100, as is already available in various EU member states.

Encouraging Energy Efficiency Practices

ix. The monitoring of progress in the implementation of measures relating to energy efficiency is to be intensified. For this purpose, however, the MRA needs to be appropriately resourced.

x. Financial incentives and other forms of encouraging consumer investment in renewable energy technologies are to be revised and inclined towards technologies necessitating a relatively high initial capital outlay.

Chapter 1

The Provision of Sustainable Energy

Chapter 1 – The Provision of Sustainable Energy

1.1 Introduction

The National Audit Office (NAO) carried out the Performance Audit "Renewable Energy Sources and Energy Efficiency in Malta". All data and conclusions presented in this report reflect information available up to March 2009. However, where possible, the report has been updated to reflect recent developments. Such instances are clearly indicated in the report.

This report sought to explore the extent to which Malta is minimising its dependence on fossil fuels by increasingly exploiting renewable energy sources (RES) and adopting energy efficient measures. This study also sought to assess the progress registered with regards to the RES and energy efficiency targets that Malta is obliged to attain as a Member State of the European Union (EU).

Energy takes various forms, which when transformed allows for the generation of heating, motion and electricity amongst others. With some minor exceptions, Malta's energy utilisation is currently dependent on imported fossil fuels. Since 2004, Malta and Cyprus have been the only EU Member States with a negligible proportion of RES in their total electricity consumption.[2]

1.2 Minimising the dependency on fossil fuels

Human activity is considered to be a major contributor for the changes in world climate. The challenges of climate change caused by the anthropogenic emission of greenhouse gases, mainly from the use of energy derived from fossil fuels, need to be tackled effectively and urgently on the global level. The negative effects of conventional energy on the world climate change have prompted the EU to adopt an integrated approach.

The consequences of climate change, increasing dependence on fossil fuels, and instability in energy prices have made it more pressing for the EU to put in place a comprehensive and ambitious energy policy which combines action at the EU level and Member States' level. In this framework, the renewable energy sources, together with the encouragement for the adoption of energy efficient practices, stand out in their ability to reduce greenhouse emissions and pollution, and to exploit local RES.

Renewable energy sources provide an alternative to the limited supply of conventional energy sources as non-fossil fuel sources can be generated from wind, sunlight, water, geothermal heat and biomass. The 'local' availability of RES makes economies less vulnerable to volatile energy supply. Consequently RES, which can be utilised for electricity generation, heating and cooling as well as for transport, contribute a key element in the sustainable provision of energy.

Energy efficiency entails the reduction of energy consumption without decreasing the use of energy-consuming plants and equipment. The ultimate aim of energy efficient measures is to make better use of energy. This entails promoting behaviour, working methods and manufacturing techniques which are less energy intensive. Energy efficiency will also contribute towards the attainment of the renewable energy target by reducing the total volume of energy consumption against which this share is calculated.

1.2.1 EU initiatives

In its quest to increasingly minimise its dependence on fossil fuels by utilising RES and adopting energy efficient practices, the EU aspires, through the participation of all Member States, to attain an overall binding target of a 20 percent share of RES in energy consumption. Each member

[2] Source: Eurostat.

state negotiated percentage targets of renewable energy for 2020 – Malta's share is 10 percent. The EU intends that Member States retain discretions as to how to reach the agreed targets. However, Member States must present National Action Plans (NAPs) outlining their strategies to the Commission by end June 2010, where the plans will need to be defined along three sectors: electricity, heating and cooling, as well as transport.

As part of the overall RES target, each member state must at least achieve a binding minimum target of 10 percent of their transport fuel consumption from biofuels by 2020. Member States are also encouraged to attain a nine percent energy efficiency target by 2016.

1.3 Exploiting RES and adopting energy efficient practices in Malta

1.3.1 Audit concerns

The exploitation of RES and the adoption of energy efficient practices are still in their infancy in Malta. This state of affairs raises a number of concerns.

Energy utilisation in Malta is nearly entirely dependent on imported fossil fuels prompting the economy to be highly vulnerable to the international instability in the price of oil. Figure 1 refers.

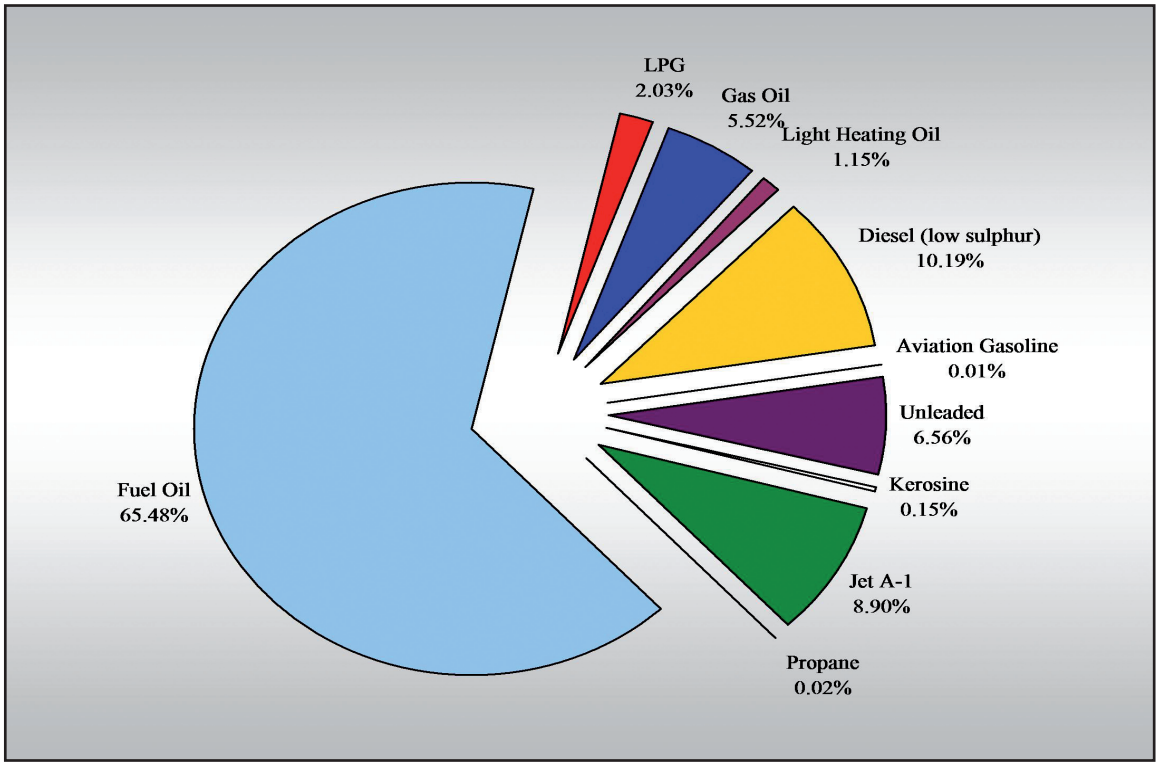
Environment protection considerations necessitate the increasing use of renewable energy. Moreover, such considerations are in line with the EU agenda of establishing a common energy policy that reduces the effects of climate change.

Despite that Malta has significant potential for solar and wind energy generation, there are still no significant infrastructures in place to exploit these RES. Malta's limited availability of land and deep costal waters further compund such circumstances. Efforts are currently being directed towards the identification and utilisation of appropriate alternative sources of energy, in particular to the building of wind energy farms.

1.3.2 Malta's energy policy framework

The Government of Malta developed its first draft energy policy for Malta, entitled the National Energy Policy for Malta, and published it for public consultation in June 2006. In addition, the Government of Malta published another draft policy in August 2006 entitled the Renewable Energy Policy for Malta. Both policies remained draft documents, as they were not formally approved by Government. Malta's energy policy framework also comprises the National Energy Efficiency Action Plan (NEEAP). This plan was published in 2008.

Figure 1 : Fossil fuel imports in Malta (2007)



Source: Eurostat.

The draft National Energy Policy for Malta (2006)

The National Energy Policy for Malta focuses on three main objectives, namely:

1. Security of supply – Any threat or type of interruption to the energy supply may have serious consequences on the economy. Consequently, better security of energy supply needs to be achieved through the utilisation of reliable energy sources, appropriately designed and regulated energy markets, diversified and more flexible energy systems.

2. Competitively priced high quality energy services– Instability of energy prices, particularly high energy prices, may create insecurities among all sectors of the economy, mostly the industrial and services sectors. It will make it more difficult to attain the Lisbon Strategy objectives, while negatively affecting the quality of life of the society.

3. Environmental responsibility – The energy sources must be sustainable to reduce the environmental impact of energy production and consumption.

The National Energy Policy for Malta was revised and put for public consultation in April 2009. At the time of publication, this policy is undergoing a Strategic Environmental Assessment (SEA) process.

The draft Renewable Energy Policy for Malta (2006)

The Renewable Energy Policy for Malta draws on the main principles of the National Energy Policy for Malta and sets three key objectives, namely:

1. Promotion of RES – Promotion of renewable energy will transpire through the setting up of ambitious objectives and targets by Government, appropriate regulatory measures and support schemes to encourage the penetration of renewable energy in the market.

2. Quality of life – Government will make sure that the penetration of renewable energy sources will not have any form of negative impacts on the quality of life of the society.

3. Support facilities and services – Government will make sure that the support services and development facilities are in place. These include accessibility and availability of information, promotion of public participation, acceptance of RES projects, and the setting up of an appropriate human resources structure to participate and assist in the penetration and development of RES.

The National Energy Efficiency Action Plan (2008)

In line with Directive 2006/32/EC on energy end-use efficiency and energy services, the Malta Resources Authority (MRA) compiled a National Energy Efficiency Action Plan 2007 (NEEAP 2007). The plan was submitted to the EU Commission in October 2007. The NEEAP 2007 was revised and a final version of the plan (NEEAP 2008) was published in November 2008, namely in accordance with the feedback received from the EU Commission following the submission of the NEEAP 2007 and the various recent developments in the field both nationally and internationally.

The general objectives of the latest version of the NEEAP are to identify cost-effective measures that will generate energy efficiency and to chart a plan whereby these measures are implemented in a structured holistic manner. Through the adoption of this plan, it is envisaged that Malta will attain the energy savings indicated in Table 1.

Table 1 : Energy efficiency targets for 2010 and 2016

Year	Sub-target/ Target (%)	Estimated energy saved per year (GWh)
2010	3	126
2016	9	378

Source: NEEAP, 2008.

The estimated energy saved by 2010 and 2016 are based on Malta's average final energy consumption over the period 2001-2006, that is, 4,195 GWh.

1.4 Targets and the potential of RES and energy efficiency in Malta

In line with policy objectives, a number of initiatives aimed at minimising Malta's dependence on fossil fuels have been or are in the process of being implemented.

1.4.1 Renewable energy sources

As an EU Member State, 10 percent of Malta's energy consumption must emanate from renewable sources by 2020 through a series of agreed sub-targets.[3] Wind, solar and biomass are considered as the renewable energy sources which are the most appropriate for Malta.[4] A brief

[3] Source: Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources, pp. 46-47.

[4] Source: Strategy for Renewable Electricity Exploitation in Malta – Volume 1: Renewable Electricity Target, Mott MacDonald, July 2005.

overview of these sources of renewable energy is presented hereunder:

- Wind energy allows for the generation of electricity through wind-driven turbines. Wind turbines can be based both on-shore and off-shore, while micro-wind turbines can be mounted on roof-tops for domestic purposes. Following various considerations, in April 2009, Government proposed further studies with regards to the construction of two on-shore and one off-shore wind farm sites.

- Solar energy works on the principle of converting sunlight to electricity through PV. Malta's favourable climate provides the opportunity for exploiting this RES. A number of PV systems have been installed in various Government entities, private households, and the industry.

- Biomass relates to organic material, which is derived directly from plants or secondary products or waste. Energy will be recovered and utilised to generate electricity from the Maghtab Complex landfills gasses, sewage treatment plant gasses, solid waste treatment plants, and Refuse Derive Fuel (RDF).

1.4.2 Biofuel

Biofuel, such as biodiesel, is a clean burning liquid fuel, produced from domestic, renewable resources like soya beans, sunflowers, and even from recycled cooking oils or animal fats. Biodiesel contains no petroleum, but it can be blended at any level with petroleum diesel to create a biodiesel blend. Biodiesel can be used as a cleaner-burning vehicle fuel and a source for residential or commercial heating.[5]

EU Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport requires that EU Member States set national indicative targets based upon reference values of two percent for 2005 and 5.75 percent for 2010. In line with this Directive, Malta had established a national indicative target of 0.3 percent use of biofuels by 2005 and 1.25 percent by 2010 of all fuel sold for transport. EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources establishes a minimum 10 percent obligatory target for biofuels in transport by 2020.

A report compiled out by the MRA explains that Malta's potential for growing crops for producing biofuels is insignificant due to several difficulties, specifically the limited land availability, high population density, poor soil fertility and limited freshwater resources (especially when considering that 50 percent of potable water is supplied from desalination). Consequently, the only source of producing biofuel is that remaining from industrial and domestic waste, such as the production of biofuels from waste cooking oil.

1.4.3 Energy efficiency

A number of incentive measures and awareness campaigns targeting various sectors of the Maltese population and economy have been or are being implemented. Such initiatives include fiscal-incentive measures to promote the use of energy efficient classified appliances in households and solar water heaters, free vouchers of energy efficient lamps to every household, promotion and support of energy audits in small and medium sized enterprises and the 'Green Leader' initiative, which is intended to promote energy efficient practices within the public sector. As depicted in Table 1, Malta has an EU energy efficiency indicative target of nine percent to be attained by 2016.

1.4.4 Other options

In accordance with the Directive 2001/77/EC, Member States can also consider the procurement of Green Certificates (GC) to bridge the gap between the actual amount of energy generated through renewable sources and the EU targets. GCs are tradable environment commodities whereby energy produced from renewable sources is retailed to either producers or consumers at a price determined by the market.

Given that failure to reach EU targets will potentially imply infringements procedures leading to the imposition of the relative penalties as stipulated in the EU directives, Member States will be reluctant to default. Accordingly, if for any reason RES targets will not be attained through energy generated from renewable sources, Malta can opt to purchase the required amount of GC – at the prevailing trading market prices – to be able to comply with the EU directives. However, a feasibility study concluded in January 2009 highlighted certain restrictions and uncertainties with importing green credentials from abroad.[6] Additionally, for the purpose of reaching its EU targets, Malta may consider embarking on green energy generation projects abroad.

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[5] Source: http://www.biodieselresource.com/glossary (accessed on 30 June 2009).

[6] Mott MacDonald Feasibility Study (January 2009), available at www.windfarms.gov.mt.

1.5 Audit objectives

This performance audit sought to determine the extent to which Malta is minimising its dependence on fossil fuels by increasingly exploiting RES and adopting energy efficient measures. This audit also sought to benchmark Malta's progress in this regard against EU set targets. Against this backdrop, the audit objectives aimed to:

1. evaluate the process adopted in the development of Malta's energy policy;

2. determine Malta's progress with regards to the renewable energy program, the energy efficiency action plan and the use of biofuel; and

3. evaluate the effectiveness of the energy efficiency incentives provided by the government.

1.6 Structure of the report

This report comprises five Chapters and an Executive Summary. Following this Chapter, the issues dealt with through this audit are presented as follows:

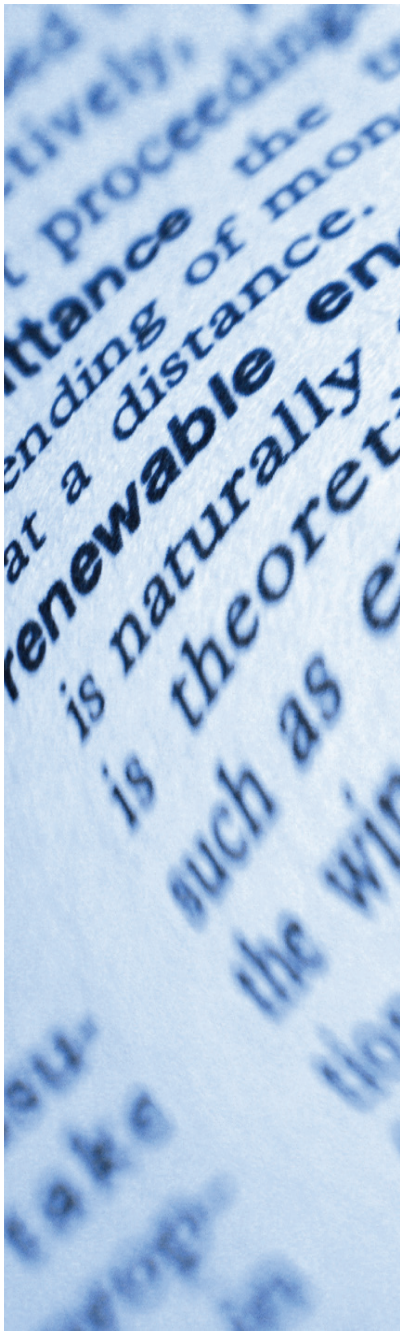
- Chapter 2 discusses the process adopted to develop and integrate Malta's RES and energy efficient policies.

- Chapter 3 relates to the implementation and monitoring of RES programmes, namely those related to wind, solar and biomass energy.

- Chapter 4 discusses the progress achieved towards increasingly penetrating the biofuel market.

- Chapter 5 presents the issues related to the implementation and monitoring of energy efficient measures. This Chapter also presents two case studies undertaken by the NAO, namely a case study related to the effectiveness of the 'Green Leader' initiative within the public sector, and another case study concerning the energy efficient schemes targeted at the Domestic Sector.

The overall conclusion and recommendations emanating from this study are included in the Report's Executive Summary (pp. 11-12).



Chapter 2

The Policy Process

Chapter 2 – The Policy Process

2.1 Introduction

This Chapter seeks to evaluate the processes adopted in the development of Malta's renewable energy and energy efficiency policies. However, this Chapter does not attempt to comment on any policy decisions since this is beyond the National Audit Office's (NAO) mandate.

The development of policy is considered as fundamental to enable the introduction of renewable energy and energy efficient practices in Malta. Policy defines the overall objectives to be achieved, as well as lays out the general principles to be adhered to in its implementation. Effective policy is considered as one providing vision and the general direction which is to be undertaken in the short, medium and long-term. Moreover, effective policy has to be such that it transmits the policy-maker's vision clearly, which in turn inspires leadership through top-down guidance. Policies and procedures help to align the actions of all the implementers and stakeholders.

In this context, the quality of policy is greatly dependant on the inputs involved in the policy-generation process. Thus policy ownership, the availability of the latest research and information as well as stakeholder involvement are amongst the most critical variables which the policy process should consider.

Other inputs in the policy process include external considerations, namely Malta's European Union (EU) obligations and targets to be attained with regards renewable energy and energy efficient practices.

2.1.1 Responsibility for policy vests with the MRRA

The Ministry for Resources and Rural Affairs (MRRA) is responsible for the development and overseeing of Malta's renewable energy policies. The MRRA's responsibilities include the development of alternative energy sources and climate change policy. However, neither the Ministry's Mission Statement nor the Ministry's mandate make any direct reference to these responsibilities.

The Malta Resources Authority (MRA), which falls under the MRRA, is the main body responsible for the regulation and monitoring of the energy[7] sector in Malta. It was set up in the year 2000 under the Malta Resources Authority Act XXV (as amended by Act XII of 2007), of which the functions and responsibilities of the authority are listed under Part II - Establishment, Functions and Conduct of Affairs of the Authority – Article 4.

2.2 National Energy Efficiency Action Plan published in 2008

The NEEAP outlines Government policy regarding energy efficiency, as well as lays out the critical milestones and targets to be attained as required by Directive 2006/32/EC on energy end-use efficiency and energy services. In October 2007, the MRA compiled a draft NEEAP following consultation with various governmental entities. The NEEAP was not published for public consultation, however, the draft Plan considered the input of various stakeholders.

[7] The term 'energy' includes electrical energy, fuels, heat when transmitted as a commercial activity, and energy derived from renewable sources: Source: MRA Act, p. 2.

In November 2008, Government published the NEEAP. The published version of the NEEAP incorporated the feedback received from the EU Commission following submission of the NEEAP 2007, the recent developments in the field, and other assessments and initiatives by the EU.

2.3 Malta lacks an approved energy and renewable energy policy

To date, Malta lacks an approved energy and renewable energy policy. The National Energy Policy for Malta was published for public consultation in June 2006. In August, 2006, another draft policy, the Renewable Energy Policy for Malta was also published. Both of these draft policies were compiled on behalf of the former Ministry for Resources and Infrastructure by the MRA – the responsibilities for these policies are now assumed by the MRRA.

However, both policies were not approved by Government, and consequently were never formally adopted. In April 2009, the National Energy Policy for Malta was revised and presented for public consultation. Until public consultation and the ensuing actions are concluded, the lack of an approved energy and renewable energy policy framework will prevail.

The decision making process in policy development and implementation was further complicated as the new RES directive became effective in January 2009. There are still a number of uncertainties about the new directive implementation, mainly with regards to green credential transfers across Member States. The MRRA contends that, in anticipation of the new directive coming into effect, Government kick started various projects intended to enable Malta to meet a significant proportion of the 10 percent RES target from local sources.

2.3.1 The policy process commenced following Malta's EU membership in 2004

Membership to the EU in 2004 implied that Malta's renewable energy and energy efficiency obligations come into effect. Malta's obligations included that five percent of electricity generation must emanate from renewable energy sources (RES) by 2010. This reference value was agreed by the Government of Malta and the European Commission[8] in line with EU Directive 2001/77/EC. The target was, however, still subject to further scientific studies.[9]

In addition, Malta's obligations also related to the use of biofuels or other renewable fuels for transport as indicated in EU Directive 2003/30/EC. EU Member States were required to set national indicative targets based upon reference values of two percent for 2005 and 5.75 percent for 2010. In line with this Directive, Malta had established a target of 0.3 percent use of biofuels in 2005 and 1.25 percent by 2010 of all fuel sold for transport. Directive 2009/28/EC regarding the use of energy from renewable sources establishes a minimum 10 percent obligatory target for biofuels in transport by 2020.

Given Malta's EU obligations, the publication of the draft policies the National Energy Policy for Malta and the Renewable Energy Policy for Malta in 2006 suggests that the conclusion of the policy process, that is its formal approval, was overdue. Moreover, there were no documented plans indicating how, when and by whom actions related to the formal conclusion of the policy framework were to be undertaken.

The delays in the policy drafting process can be partly attributed to the lack of human resources at the MRA, which at the time was responsible for policy drafting on behalf of Government. Besides, the public consultation process of these two policies yielded significant response that further lengthened the conclusion and approval of the policy framework.

2.4 Continuous progress and evolution of EU policies

The renewable energy targets as set by the EU have been continuously under review[10], primarily due to the continuous development of the subject and the EU enlargement phases. On January 2008, a proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources was put forward by the EU Commission[11] to replace EU Directive 2001/77/EC. On April 2009, Directive 2009/28/EC regarding use of energy from renewable sources was approved and thus the new renewable energy and biofuel targets were confirmed.

The EU's energy and renewable energy regulatory framework constitutes a critical input towards the relative national policies. The situation discussed in the preceding paragraph was constantly being monitored by the MRRA, with a view to ensure that Malta's national interests are appropriately safeguarded during any negotiation with the EU, and to incorporate any developments in national policies.

[8] Source: Draft report (October 2005) by MRA to the EC on the Implementation of Directive 2001/77/EC on the Promotion of Electricity from Renewable Energy Sources p. 2.

[9] Source: Ibid.

[10] COM(2004) 366 - Communication from COM to the Council and the European Parliament - The share of renewable energy in the EU.

[11] Source: http://ec.europa.eu/energy/climate_actions/doc/2008_res_directive_en.pdf.

2.4.1 Energy and renewable energy policies are in their consolidation stage

The policy process adopted, which led to the publication of the 2006 draft policies and the adoption of the NEEAP, was based on studies which were undertaken by various Governmental entities. Government also commissioned background studies to supplement the work carried out by specialists employed within Governmental entities.

The Strategy for Renewable Electricity Exploitation in Malta (2005) consultancy report carried out by Mott MacDonald covered topics related to renewable energy, in particular, various possibilities of installing wind farms (offshore and onshore) and PV systems. Recently, Mott MacDonald was also commissioned various wind farm related studies. One of these studies investigated the potential of onshore and offshore sites for wind power harvesting. Additionally, a Mesoscale Wind Map Study was also commissioned to the same consultant to plot the national wind at various heights, thus identifying the most appropriate areas for wind farms. In line with large scale wind farms developments, Mott MacDonald was also commissioned the Grid Stability Study to investigate the maximum permissible capacity of such farms.

Both draft documents, the National Energy Policy for Malta and the Renewable Energy Policy for Malta, were published and presented for public consultation. These documents generated substantial stakeholder feedback, particularly with regards the proposed wind farm sites. However, neither document was approved and formally adopted. The MRRA attributed this situation to the constant technological developments in the field of RES and Malta's specific physical limitations which critically influence any policy decisions, particularly those involving significant infrastructural works.

In order to consolidate and relate the information accumulated to date to current circumstances and technological developments, the MRRA established the advisory committee on wind energy - the Committee for Wind Energy (CoWE). The role of this Committee is to advise on issues related to renewable energy policy. This Committee assisted in the drafting of the reports in lieu of the previous practices whereby the MRA was drafting policies on behalf of the Ministry.

The CoWE was also to reconsider the potential of an offshore wind farm at Is-Sikka l-Bajda while appraising any concerns emanating from various stakeholders regarding the offshore wind farm at the mentioned site.[12]

2.5 Conclusion

The non-approval of policies is considered as a potential barrier to reaching EU targets. The lack of formal policies implies a lack of top-down guidelines, which in turn may impinge on the implementation of initiatives relating to energy and renewable energy. Additionally, the lack of approved policies may hinder potential private investment in the field.

Up to the publication of this report various initiatives were being taken to consolidate the policy making process. Energy and RES related policies have gone through a public consultation process and are in an advanced stage in the approval process.

The next Chapter discusses the exploitation of renewable energy, particularly with regards to wind, solar and biomass energy.

[12] Source: An Offshore Wind Farm at Is-Sikka L-Bajda - An Evaluation of Concerns from Government Stakeholders compiled by the CoWE – July 2008.

Chapter 3

The Exploitation of Renewable Energy

Chapter 3 – The Exploitation of Renewable Energy

3.1 Introduction

This Chapter aims to evaluate the extent to which Government's renewable energy framework has been implemented, in particular the progress made in attaining the renewable energy target for Malta set by the European Union (EU). This Chapter primarily focuses on:

- the renewable energy framework endorsed by Government to create and support renewable energy sources (RES) measures;
- Malta's physical limitation and potential environment impact with regards to wind-energy;
- the marginal exploitation of solar energy in the generation of electricity due to various constraints; and
- the development of the required infrastructure to generate energy from waste management.

Various stakeholders are responsible for the implementation of the renewable energy policy in Malta. Government Ministries and entities, the local industry and the general public are all actively involved in the implementation process.

3.2 The renewable energy framework

Malta's accession to the EU, in May 2004, necessitated the implementation of an appropriate platform to encourage greater consumption of electricity from renewable energy sources. In particular, COM (2004)366 the Share of Renewable Energy in the EU – Overview of Renewable Energy Sources in the Enlarged European Union recommended to Government an indicative target of five percent of electricity consumption to be produced from renewable energy sources by 2010.

In 2007, the Commission put forward the Renewable Energy Roadmap that designated the EU's long-term vision with respect to renewable energy. Specifically, this policy document recommended the establishment of a legally binding 20 percent target by 2020 derived from renewable sources. A year later, the Commission put forward a proposal for a new directive on the use of energy from RES that fully sustained the latter proposal, and thereby replacing Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market. As part of the overall binding target, Malta must produce 10 percent of its energy consumption from renewable energy sources by 2020 – the minimum binding target that each Member State is expected to attain.

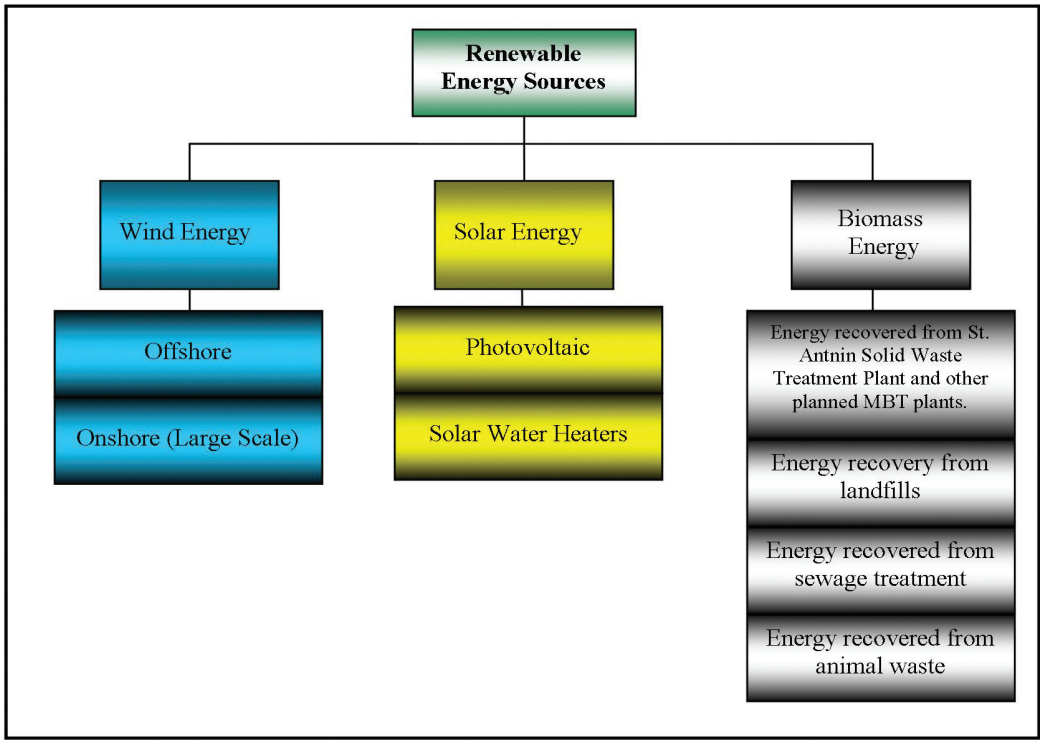
The new directive requires each Member State to adopt a National Action Plan (NAP) that outlines the targets for the shares of energy from RES in transport, electricity as well as heating and cooling in 2020.[13] The NAP is to be submitted to the Commission by March 2010. In addition, Member States are to respect the indicative trajectory targets referred to in the proposed Directive. Consequently, Member States whose share of energy from renewable energy fell below the indicative target are required to re-submit a new national action plan to the Commission.[14]

As referred to in Chapter 1, Malta's energy framework is based on the development of the Energy Policy for Malta (2006) and the Renewable Energy Policy for Malta (2006). Both policies stage the same RES, namely, wind, solar and biomass energy. Wind energy primarily relates to off-shore and on-shore large scale wind farms; solar energy

[13] Source: Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources: Article 4, p. 22.

[14] Ibid.

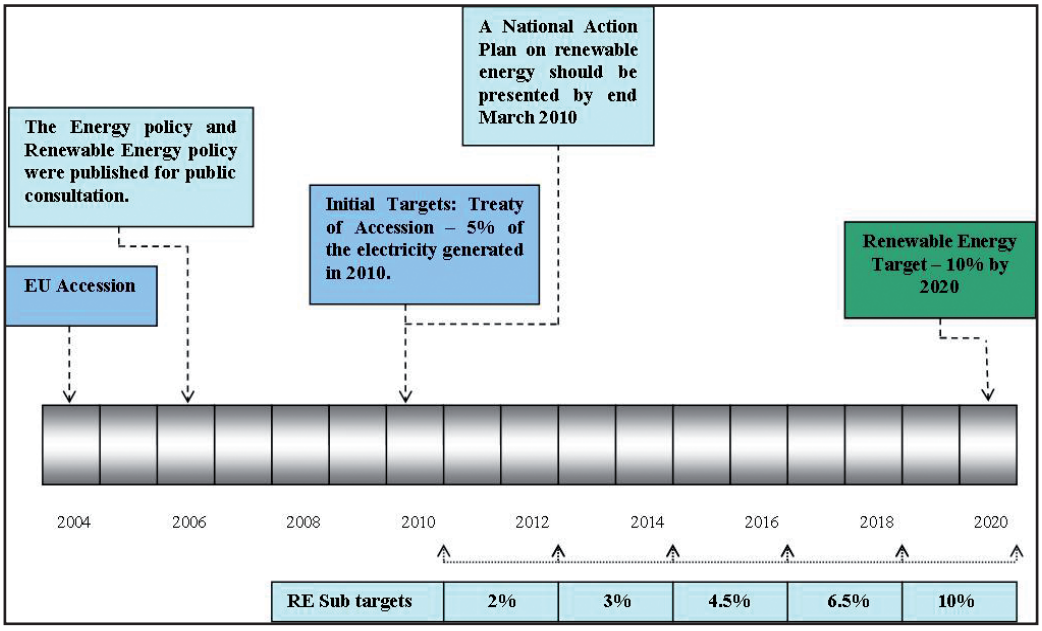
Figure 2 : Feasible renewable energy sources for Malta



consist of photovoltaic (PV) installations and solar water heaters; while biomass refers to the energy generated from solid waste (particularly energy recovered from Sant Antnin Solid Waste Treatment Plant and other planned MBT plants[15] as well as landfills), energy recovered from the sewage treatment plants, and energy recovered from animal waste.[16] Figure 2 refers.

Figure 3 summarises Malta's renewable energy blueprint as a member of the EU and Government's commitment towards the promotion and development of renewable energy sources.

Figure 3 : Renewable energy framework timeline



[15] Moreover, the Solid Waste Management Strategy for the Maltese Islands (2001), which is currently undergoing a SEA refers to planned Mechanical Biological Treatment (MBT) plants in the north of Malta and Gozo.

[16] Source: Draft Renewable Energy Policy for Malta, p. 11.

The approval of the EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources, in 2009, implied that Malta is obliged to attain a 10 percent share of energy consumption from RES by 2020. Indicative trajectory sub-targets, established by the aforementioned Directive, are to act as guidelines in achieving and possibly exceeding the overall target. To date, the progress with regards to the generation of energy from renewable sources, namely, wind, solar and biomass, is marginal.

3.3 Malta's physical limitation and potential environmental impact delayed the implementation of wind farms

Currently, wind-energy is potentially the most cost-effective source of generating energy from non-fossil fuel.[17] Government supports the development of both offshore and onshore large wind farms provided that the planning and environmental impacts are acceptable.[18] However, the limitations encountered during the implementation process hindered the development of wind farms. As at end-October 2007, the only wind energy generated emanated from micro-wind turbines. This was estimated at 8 MWh per annum with an installation capacity of 4 KW.[19]

3.3.1 Limited availability of land and deep waters around Malta constrained the development of wind farms

Despite the benefits associated with wind energy, the potential to exploit such clean non-fossil energy is constrained by the limited availability of land and deep coastal waters around Malta. Onshore wind farms are restricted through planning and environmental constraints, visual and natural impacts, lack of road access as well as possible obstructions with airport operations. Meanwhile, the potential for offshore wind farms is at present only possible in shallow waters as technology for the exploitation of deep waters wind farms is still under-developed. As the Maltese waters are generally deep, the installation of shallow water wind farm is restricted.

3.3.2 Uncertainty in the decision-making process about the scale of onshore and offshore wind farms

A study commissioned by the Malta Resources Authority (MRA) in 2005 suggested the development of one large onshore wind farm on main land Malta as the most cost-effective technology. However, at the time, Government regarded the development of large onshore wind farms as unjustified, and thereby provided no authorisation for further progress in this regard.[20] Barriers relating to visual, environment and landscape impacts, as well as lack of road access considerably hindered the development of such farms.[21]

The second most feasible wind-energy generation relates to large offshore wind farms, though technology with regards to floating and large offshore wind farms having sea depths greater than 50 meters is still under-developed and significantly expensive.[22] The draft Renewable Energy Policy for Malta (2006), which is currently being updated, proposed the building of a large offshore wind farm at depths greater than 20 metres (in addition to the energy generation from waste management), thereby significantly contrasting with the recommendations proposed by the aforementioned study.

In April 2009, Government announced plans for further in-depth suitability studies with respect to two onshore and one offshore wind farms sites. The sites proposed include Is-Sikka l-Bajda, located around two kilometres from Malta, Wied Rini (limits of Baħrija), and Ħal-Far Industrial Estate. The onshore wind farms are expected to cost between €18.8 million and €25.4 million while the offshore wind farm is projected to cost between €280 million and €335 million. In all, the onshore and offshore wind farms are estimated to have a capacity of up to 109.45MW, generating a total nominal annual energy of 238 GWh/year. Table 2 refers.

[17] Mott MacDonald: Strategy for Renewable Exploitation in Malta Vol. 1: Renewable Energy Target, July 2005.

[18] A Proposal for an Energy Policy for Malta (2009), p. 16.

[19] Electricity Report on 'The Implementation of Directive 2001/77/EC on the promotion of electricity from renewable energy sources in the internal electricity market', 2008.

[20] A Draft Renewable Energy Policy for Malta, p. 12.

[21] A Proposal for an Energy Policy for Malta, p. 16.

[22] Mott MacDonald; Strategy for Renewable Exploitation in Malta Vol. 1; Renewable Energy Target, July 2005.

Table 2 : Wind farms - indicative fact box

Site	Sikka l-Bajda	Wied Rini	Hal Far
Maximum number of Turbines	19	12	5
Installed Capacity (MW)	95	10.2	4.25
Nominal Annual Energy (GWh/year)	200	28	10
Estimated number of household served	45,000	5,900	2,100
Capital cost	€280m - €335m	€13.3m - €17.9m	€5.5m - €7.5m

Source: Project Description Statements (MRRA).

3.3.3 Significant stakeholders' resistance to proposed wind farm site

The proposed large offshore wind farm at Is-Sikka l-Bajda prompted significant stakeholders' resistance, primarily from Government entities, related authorities and organisations.[23] Resistance towards the policy drive for a large offshore wind farm hindered the implementation process to the extent that Government wind-energy proposals were reconsidered.

The majority of the concerns related to the visual and landscape impacts, adverse effects on coastal activities, land reclamation and possible disturbances of marine and seabed environment due to construction. Other specific concerns were related to the loss of fishing grounds and fishing from impacts on fish breeding, the impact on diving and sport fishing activities, and barriers concerning marine traffic navigation.

Stakeholders also proclaimed negative response with respect to the installation of onshore wind farms. Constraints related to noise and ecological impacts, visual and landscape barriers, radar interferences and lack of road access. Stakeholders' resistance to the proposed wind farm sites was partly responsible for stalling the development of onshore and offshore wind farms.

3.3.4 Weak public response to government rebates measures related to micro-wind energy

The financial incentives provided by Government yielded no eligible applicants, thereby stressing the need for a substantial review to increase the uptake. Advancement with regards to the development of micro-wind generation in urban areas is constrained by the visual impacts on the local neighbourhood and noise pollution. Although technological progress led to the development of more effective micro-wind turbines in terms of superior aesthetic qualities and lower noise emission, public response was weak. The micro-wind scheme uptake may have been limited due to the lack of set criteria for Malta Environment and Planning Authority (MEPA) to approve such installations. In this regard, MEPA has launched the Planning Guidance for Micro Wind Turbines for public consultation which closed on 8 September 2009.

3.4 There has been marginal exploitation of solar energy

The Renewable Energy Policy for Malta (2006) estimated that the potential of solar energy in Malta is considerably limited in part due to the prolonged payback period as a result of the associated high costs. It is estimated that the favourable weather conditions allow for an annual generation of 168-336 MWh per annum.[24] As at end-October 2007 the estimated electricity generated amounted to 120 MWh per annum. It is to be noted that in a recent report sent to the EU Commission as regards to Malta's status, with respect to Directive 2009/29/EC, it has been estimated that the PV capacity will increase to 1,688kWp (2,532 MWh/annum). This amounts to a contribution of 0.09 percent of the electricity consumption in 2010. Such an estimate considers only the capacity being installed as a result of the residential grant scheme and the first call of the European Regional Development Fund (ERDF) scheme (Section 3.4.1 refers).

Although the contribution of solar energy generation systems is negligible to the overall renewable energy target as established under the EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources, indirectly, the generation of solar energy will reduce the demand for final energy consumption in 2020.[25] However, the penetration of solar energy generation systems is still marginally exploited as the nation-wide demand for solar system is low.

[23] Committee on Wind Energy Report - Sikka l-Bajda, July 2008.

[24] A Draft Renewable Energy Policy for Malta, p. 10.

[25] As the demand for financial energy consumption decreases, the renewable energy intensity on final consumption falls.

Table 3 : Promotion of solar energy

Renewable Energy or Energy Efficient Product (Domestic Use)	Grant as a percentage of the purchasing price (%)	Maximum Grant Allowed €	Start Date
Solar water heaters	20	232.94	January 2005
PV systems (Domestic Sector)	20	3,901.32	January 2006
PV systems (Industry Sector) ERDF 2004/06: Eco-Innovation Grant Scheme ERDF 2007/13: ERDF Energy Grant Scheme	 60 30	 60,000 100,000	 October 2007 March 2009

Source: MRA, Malta Enterprise.

3.4.1 High initial costs may discourage public response and thus government improved rebates related to purchasing of photovoltaic systems

Government provided financial incentives through capped grants and the waiving of the network connection fee, in case of new households, to support the purchases of solar water heaters and PV systems. Moreover, through Malta Enterprise, a rebate scheme aimed at motivating the installation of PVs by commercial entities was also recently introduced.[26] Table 3 refers.

As at mid-March 2009, in total, 5,559 applications for solar water heaters rebates and 10 applications for PV systems were approved. All approved applications translated into a Government outlay of €1.2 million in terms of financial rebates. The uptake of PV systems and solar water heaters picked up following the upward revision of the rebate scheme. The maximum rebate increased to €3,000 per PV installation and €460 for solar water heaters. Prior to the increase in the rebate scheme, the number of applications for the PV system initiative remained marginal in spite of the financial rebates offered; possibly due to the high up-front costs associated with installing a solar energy system. Table 4 refers.

Up to the time of publication, the latest PV systems rebates schemes were fully subscribed within a few weeks from launching. Such a situation resulted since the relative rebates were revised upwards. Moreover, such a situation may also have resulted due to the increase in the tariffs charged by Enemalta Corporation.

It is to be noted that, since March 2009, the number of applicants increased to 2,203 and 161 for the installation of solar water heaters and PV systems respectively.

Table 4 : Approved applications (solar energy) as at mid-March 2009

Sector	Renewable Energy or Energy Efficient Product (Domestic Use)	Number of Approved Applications					
		2005	2006	2007	2008	Mid-March 2009	Total
Domestic	**Solar water heaters**	346	1,176	1,453	2,091	493	**5,559**
	PV systems	-	0	4	1	5	**10**
Industry	**Solar water heaters and PV systems**	-	6	-	-	42	**48**
	Total	346	1,182	1,457	2,092	540	**5,617**

Source: MRA, Malta Enterprise.

[26] Malta Enterprise has now issued a second call which closed in September 2009.

3.4.2 Drawbacks related to the net metering system may have discouraged public response

The net metering system motivates consumers towards greater investment in solar energy systems as the excess electricity generated is fed into the national electricity grid. Consumers that feed-in electricity into the national grid generated through solar systems are reimbursed at a rate of €0.0698 cents/KWh.[27] The spillover rate is, however, relatively low when compared to first 2,000 KWh of electricity consumption at a rate of €0.1610.[28]

3.4.3 Consumers are not adequately convinced of solar energy benefits, particularly due to the long payback period of the investment

The Ministry for Rural Affairs and the Environment (MRRA) and MRA contend that the initial capital outlay associated with the installation of a solar energy system is one of the principal drawbacks that discourage consumers from further exploiting solar energy. In comparison to non-renewable energy sources, solar energy is relatively costly albeit technological advancements continuously promote more competitive pricing. Solar systems also require a considerable large surface area in order to achieve a degree of efficiency that is worthy, and thereby, a reasonable payback period. In addition, solar energy systems are entirely dependent on the forces of nature such that cloudy days and highly polluted air may well influence the generation of solar energy.

3.4.4 Space, legal, and planning constraints do not appropriately consider the utilisation of solar energy

The space required for the generation of electricity through solar energy is large such that the utilisation by residential, commercial and industrial users is restricted, particularly in urban communities. Furthermore, given the limited availability of land, large land-based solar farms are not considered.[29] Legal and planning barriers also tend to pose restrictions that hinder further exploitation of solar energy. For example, the increase in permits for the development of high-rise constructions tends to limit the solar energy generation opportunities presented within the surrounding area. However, it is pertinent to note that related regulations and measures which promote energy savings in buildings are taken into account by MEPA.[30] Indeed, the policies endorsed by MEPA specifically encourage the provision of PV systems and solar-water heaters. Nonetheless, additional reforms and measures that safeguard the solar energy related opportunities presented within residential areas need to be further developed in order to encourage a higher demand level with respect to PV and solar water heaters.

3.4.5 A number of Government departments installed PV systems

Government is also promoting the generation of electricity by solar energy system through the installation of PV systems within a number of Government departments. A total of 115 KWp is generated from the PV panels installed. However, since information regarding electricity consumption by all the Government is unavailable, NAO is not in a position to measure the percentage of electricity generated by the photovoltaic cells installed as a ratio of the total electricity consumed by Government.

3.5 The infrastructure is still being developed to exploit waste energy

Biomass is also expected to contribute towards Malta's renewable energy target of 10 percent from final energy consumption in 2020. The Energy Policy for Malta (2006) projects that around 60 GWh would be produced from solid waste through landfill gases, Mechanical Biological Treatment (MBT) plants and Residue Derived Fuel (RDF). The waste management facilities required to generate energy from organic waste are still being developed.

3.5.1 Facilities for waste management with the possibility of electricity generation are still being developed

The Magħtab Environmental Complex, which consists of a number of waste management facilities, namely, the Civic Amenity Site, the Għallis Non-Hazardous Engineered Waste Landfill, the closed Ta' Zwejra Engineered Landfill, and the uncontrolled dump site at Magħtab, is still in the development phase. The Magħtab landfill has been closed (capped) and gas extraction wells fitted for gas emissions control through an Regeneration Thermal Oxidizer plant (RTO). The energy required for the RTO is being generated from the same gas which is being extracted and treated. Gas extraction and treatment from the Ta' Zwejra Engineered Landfill and the Għallis Non-Hazardous Engineered Waste Landfill are to commence in 2010 and 2011 respectively.

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[27] A Proposal for an Energy Policy for Malta, p. 18.

[28] Source: http://www.enemalta.com.mt/page.asp?p=995&l=1 (as retrieved on July 17, 2009).

[29] Source: Draft Renewable Energy Policy for Malta, p. 10.

[30] MEPA Policy, Part 13 – Energy and Infrastructure.

MBT plants are also being developed by WasteServ to mechanically process the municipal solid waste received and prepare the organic fraction for further processing. The Sant' Antnin MBT plant is currently being developed and is expected to commence operations early in 2010. An additional two MBT plants are planned to be build in the North of Malta and Gozo. Up to the time of publication the planned MBT plants were in the site selection and design phase.

WasteServ is also planning to install a steam turbine at the Marsa Thermal Treatment Facility. The incineration plant is to generate energy from animal waste, clinical waste and other hazardous as well as non-hazardous waste.

3.5.2 Plans regarding the development of a waste management infrastructure that generates electricity through RES are still in the approval phase

WasteServ is primarily committed to organize, supervise and control the management of waste facilities throughout the Maltese Islands. In addition, sites and facilities that sustain waste management are to be developed in accordance to local and international legislation. In cases of electricity generation opportunities presented through the waste management process, WasteServ has committed itself to capture such energy and produce electricity.

Strategic plans concerning the generation of electricity from waste energy are currently in the approval phase.[31] However, with regards to EU funded projects, WasteServ prepared plans and feasibility studies of all waste projects, including projections regarding the resultant potential of electricity generation.

In accordance with the direction given to it by the MRRA, WasteServ has submitted initial estimates of the potential of generating electricity through waste energy. Such energy generation will also contribute towards attaining the renewable energy target.

3.5.3 Solid Waste Management Strategy for the Maltese Islands

The Solid Waste Management Strategy for the Maltese Islands was initially carried out by an independent private consultancy firm and published by the then Ministry for Environment in September 2001. The Strategy represents a complete overview of the principles, legal basis and changes that succeeded or needed to be established so as to deliver the required amendments in this sector and thereby attain the European levels in this regard. The framework for the solid waste management strategy primarily consisted of five main categories, namely, policy and legislative, institutional and organisational, economic and financial, technical and operational, and others.

Due to the number of updates and changes in the field of environment, the Strategy document was subject to a revision in order to be in line with the stakeholders' direction. In early 2005, the then MRRA, appointed the 'Strategy Team' to carry out the necessary revision and amendments. The Ministry also commissioned a Working Group to study the feasibility of various waste management technologies. The final version of the revised Strategy, as published in January 2009, builds on the reviews and updates carried out by the aforementioned submissions.

3.6 Conclusion

To date, the exploitation of RES is marginal. If this state of affairs prevails the risk exists that Malta will not be able to attain the relative renewable energy obligatory EU targets – even though such targets come into effect in 2020. Such risks are amplified by the fact that local renewable energy policies are still in their consolidation stage and substantial infrastructural development is also required.

Malta's physical constraints, namely, deep coastal waters and limited land availability, have complicated the policy-making and administrative processes with regards to the exploitation of wind energy. Subsequently, these issues have hindered and delayed the development of the required infrastructure.

Due to the relatively high capital outlay involved, solar energy is being marginally exploited within the various economic sectors. The uptake of the relevant Government incentive measures to encourage the market penetration of PV systems picked up following the upward revision of the relative rebate grant. Nevertheless, the opportunity exists for increasing the market penetration of PVs on a nationwide scale. Although the penetration of PV systems by governmental entities increased substantially through the Green Leader initiative, the total electricity generated is still considered as marginal.

The development of an infrastructure to generate energy from waste is still in its early phases. Unless policy development and project implementation are stepped up, it would be very difficult for energy generated through biomass to contribute significantly to Malta's EU energy target

The next Chapter discusses the use of biofuels as another renewable energy source.

[31] Source: MRRA, September 2009.

Chapter 4

Biofuels in Malta

Chapter 4 –Biofuels in Malta

4.1 Introduction

The exploitation of biofuels will diminish Malta's overwhelming dependence on the importation of fossil fuel. Moreover, the use of biofuels will also provide the opportunity for better security of energy supply. However, Malta has negligible potential for growing crops to produce biofuels. The only remaining feasible sources for producing biofuels are waste oil and imported material. Such a situation necessitates a clear and sustainable strategy to further exploit, promote and encourage the production and consumption of biofuel in Malta. In turn, the increased utilisation of biofuels will reduce the use of fossil fuels, diminish the emissions of greenhouse gases, and contribute towards the attainment of the European Union (EU) biofuel targets of 2010 and 2020.

This Chapter examines the implementation and monitoring of the biofuel programme and whether Malta is on track to achieve the biofuel EU targets.

4.2 The recent drop in biofuel sales raises concerns about reaching the indicative target for 2010

EU Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport requires that EU Member States set national indicative biofuel targets based upon reference values of two percent for 2005 and 5.75 percent for 2010.[32] In line with this Directive, Malta had established a national indicative biofuel targets of 0.3 percent by 2005 and 1.25 percent by 2010 of all fuel sold for transport use. Directive 2009/28/EC on the promotion of the use of energy from renewable sources establishes a minimum obligatory 10 percent target of biofuels use in the transport sector for each Member State by 2020.

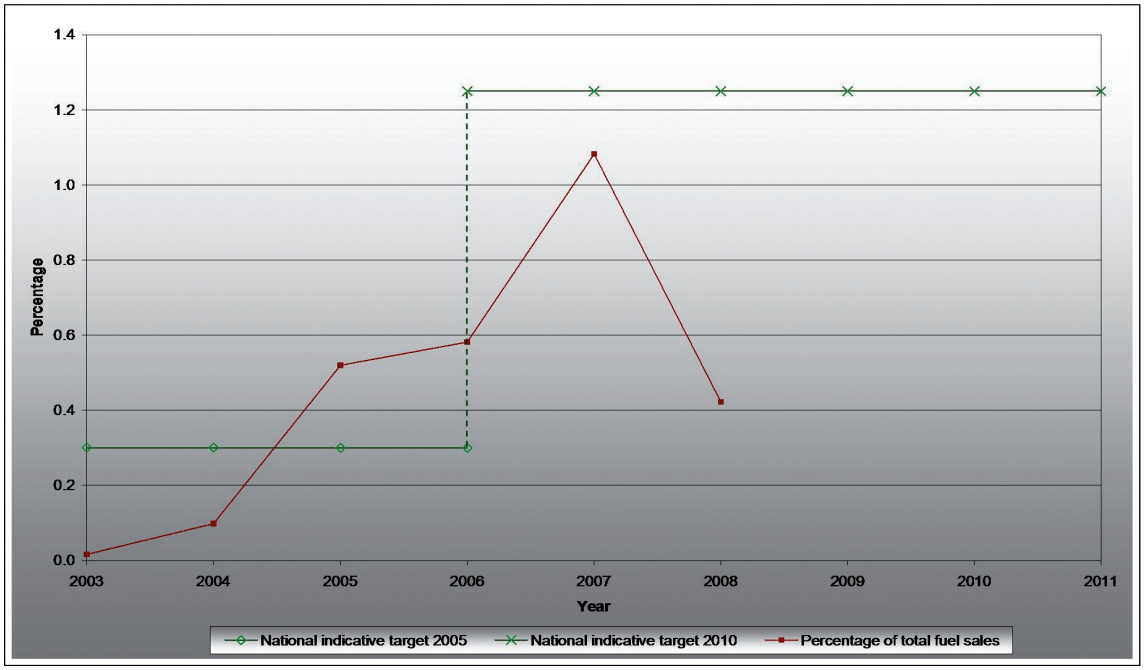
Since 2003, the utilisation of biofuel in Malta increased from 0.02 percent to 1.08 percent of the total fuel sales in 2007. Figure 4 depicts the progress achieved against the pre-determined national indicative targets and EU reference value for the national indicative targets of 2005 and 2010. Malta has already exceeded the 2005 pre-determined national biofuel target by 0.22 percent of the total fuel sales in the transport sector.

However, if biofuel sales figures for 2008 prevail, then it is questionable whether Malta will attain its 2010 indicative target. Figure 4 refers.

EU Directive 2003/30/EC obliges Member States to measure the use of biofuel on the basis of the energy content of all petrol and diesel consumed in the transport sector. Figure 5 shows the market share of biofuel over the period 2003 – 2007. Up to the time of publication, the relative share of biofuel for 2008 was not available to the NAO.

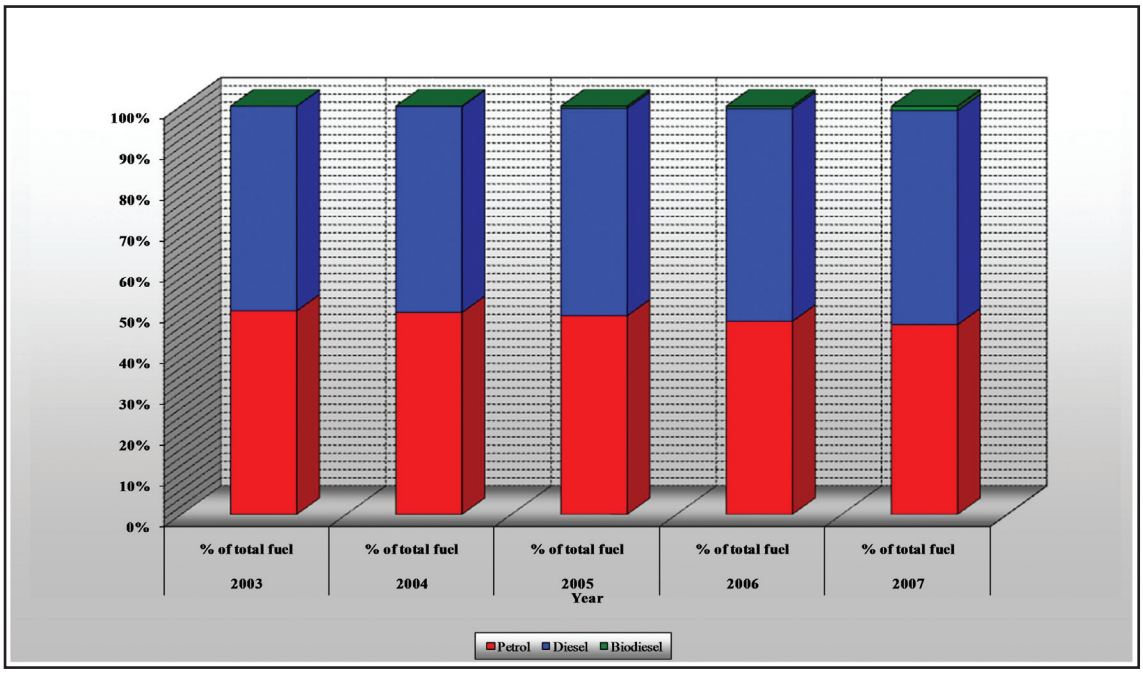
[32] A reference value denotes the particular value, pre-determined by the EU, upon which Member States base and agree their national targets with the EU. In the case of biofuels, these national targets are referred to as 'indicative' targets. Although it is desirable that indicative targets are attained, these are not obligatory.

Figure 4 : Progress achieved in biofuel sales over the period 2003 – 2008 against pre-determined targets



Source: Information was extracted from EU Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport, Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources, Malta's Annual Reports for 2003, 2004, 2005, 2006, 2007 submitted to fulfill requirements of Article 4 of Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport.

Figure 5 : Share of biofuel over the period 2003 – 2007



Source: Malta's Annual Reports for 2003, 2004, 2005, 2006, 2007 submitted to fulfill requirements of Article 4 of Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport.

4.2.1 There was increased usage of biofuel in the transport sector over the period 2003-2007 but a sharp decrease in 2008

The total sales of biofuel increased from 0.03 million litres in 2003 to 2.26 million litres in 2007. The increasing trend, however, does not persist as in 2008 biofuel sales declined by 46 percent to 1.23 million litres. This shows that in 2008, biofuel levels were below those attained in 2005.

Biodiesel in the transport sector increased over the period 2003-2007, specifically from 0.03 million litres to 2.06 million litres. However, in 2008, biofuel sales in the transport sector decreased by 142 percent. Table 5 refers.

Within the industrial sector, an increase of 182 percent was registered during the period 2004-2006. However, during the period 2006-2007, consumption of biofuel in the industrial sector decreased from 0.62 million litres to 0.2 million litres, a decrease of 67.7 percent. According to the Malta Resources Authority (MRA), the industrial sector did not experience similar increases to the transport sector during the period 2003-2007 because of the higher competition with other cheaper fuel-oil being retailed in the market. There was a slight increase in 2008, from 0.20 million litres in 2007 to 0.38 million litres in 2008. Table 5 refers.

4.2.2 Retail prices of biofuel are closely related to fossil fuels despite excise duty exemption

In 2005, Government introduced the exemption from the payment of the excise duty on the biomass content in biodiesel to promote biofuel and to make the relative prices more competitive.[33] Such an initiative is in line with EU Directive 2003/96/EC on the restructuring the Community framework for the taxation of energy products and electricity and EU Directive 2004/74/EC on amending Directive 2003/96/EC as regards the possibility for certain Member States to apply, in respect of energy products and electricity, temporary exemptions or reductions in the levels of taxation.

Table 6 summarises and compares the excise duty and Value Added Tax (VAT), due tax exemptions for the major types of fuels used in the transport sector. With regards biofuel, Government has exempted the payment of €796,424 in excise duty in 2007 and €433,452 in 2008 to promote biofuel and make prices more competitive in respect to the other fossil fuels on the market.

Table 5 : Biodiesel sales by transport and industry over the period 2003-2008

Year	Transport	Industry	Total	Percentage increase / decrease over the previous year
	Mlitres	Mlitres	Mlitres	
2003	0.03	-	0.03	-
2004	0.18	0.22	0.40	1,233.33
2005	0.90	0.60	1.50	273.00
2006	1.07	0.62	1.69	87.93
2007	2.06	0.20	2.26	34.33
2008	0.85	0.38	1.23	-45.56

Source: Information extracted from Malta's Annual Reports for 2003, 2004, 2005, 2006, 2007 submitted to fulfill requirements of Article 4 of Directive 2003/30/EC on the promotion of biofuels and other renewable fuels for transport.

[33] Source: Malta's Annual Reports for 2004 submitted to fulfil requirements of Article 4 of Directive 2003/30/EC on the promotion of biofuels and other renewable fuels for transport.

Table 6 : Taxes on fossil and non fossil fuels in Malta

Taxes	Fossil Fuel			Non Fossil Fuel
	LRP	Unleaded	Diesel	Biodiesel
VAT (%)	18	18	18	18
Excise Duty €/litre	0.5582	0.4394	0.3524	Exempt

Source: Excise Duty Act: Chapter 382.

As at August 2009, the exemption on excise duty on biofuels constitutes 39.6 percent of the retail price.[34] Although such an exemption is considered as substantial, it did not impact significantly the retail price of biofuel. In fact, the price of biofuel showed the same tendencies as the price of conventional fuels. When consulted, the MRA contended that to date it has not carried out any reviews with regards the retail price of biofuels. Consequently, the Authority is not in a position to determine whether this fiscal incentive is bearing the desired results.

Moreover, it may be contended that the marginal difference that prevails between the prices of biofuel and fossil fuels (for transport use) may not be considered as economically viable for consumers to utilise biofuels instead of conventional fossil fuels.

4.2.3 More petroleum filling stations are selling biofuel

Until mid-2006, biofuel was retailed directly from the biofuel producers and was not available from the petroleum filling stations. Since then, a number of petroleum filling stations are retailing biofuel and accordingly it has become much easier for consumers to purchase biofuel. The widespread availability of biofuels may be considered one of the major reasons contributing to the significant increase in sales, particularly in 2007.

In 2006, there were 14 petroleum filling stations, all in Malta, retailing biodiesel. In 2007, the number of petroleum filling stations retailing biofuel increased to 29 (32 percent of the total fuel stations), 28 in Malta and one in Gozo. In 2008, the number of petroleum filling stations retailing biodiesel increased to 30. Table 7 refers.

Table 7 : Number of petroleum filling stations retailing biofuel

	2006	2007	2008
Total petroleum filling stations retailing biofuel	14	29	30
Total petroleum filling stations	91	91	91
Percentage total petroleum filling stations retailing biofuel of total petroleum filling stations	15	32	33

Source: MRA.

The substantial increase in the number of petroleum filling stations retailing biofuels during 2007 may have in part artificially inflated the percentage share of biofuel to total fuel sales. Such a situation may have arisen due to the initial purchase of biofuel stock by the additional 15 petroleum filling stations which started retailing biofuel in 2007.

4.2.4 There is private sector involvement in the production of biofuel

Currently, all biofuel is being locally manufactured by privately owned companies.[35] According to the MRA and Malta's Annual Report for 2007 - submitted to fulfill the requirements of Article 4 of EU Directive 2003/30/EC - there were two private active companies manufacturing biofuel in Malta in 2006 which increased to three manufactures in 2007.

According to the MRA, two of these companies ceased operations in 2008. The MRA stated that increased costs in raw materials and additives made the biofuel project unprofitable for one of the companies. The MRA, however, was not in a position to offer any justification for the reasons why another manufacturer failed to report any biofuel sales.

4.3 Potential for further penetration of biofuel not fully exploited

On the basis of biofuel sales for 2008, one questions whether Malta would be in a position to attain its 2010 target. However, there exists the potential for further penetration in the biofuel market in order that Malta attains its 2020 EU biofuel obligatory target of 10 percent of final consumption of energy in transport.

[34] The retail price of biofuel as at August 2009 was €0.89.

[35] Source: Draft revised National Energy Policy 2009: p. 19.

4.3.1 There exists a lack of comprehensive planning to further encourage market penetration of biofuels

The revised draft National Energy Policy for Malta (2009) sets a biofuel target of 1.25 percent by 2010 of all fuel sold for transport use while proposing measures to stimulate the biofuel market. Such measures include that Government will continue promoting the production of biofuel from local sources while monitoring the use of biofuel and amending the targets accordingly. Additionally, the national strategy for policy and abatement measures relating to the reduction of greenhouse gas emissions, compiled by the Climate Change Committee, also recommends that the biofuel market should be further expanded, particularly through secondary biofuel sources.

Malta, however, still lacks a comprehensive biofuel strategy to further stimulate biofuel production and consumption in accordance with the objectives and recommendations outlined in the preceding paragraph. Such a situation will diminish the ability to effectively achieve the biofuel targets, particularly the 10 percent biofuel obligatory target, by 2020.

4.3.2 Biofuels market regulations are being drafted by the MRA

The main legislative instruments regulating the production of biofuels in Malta are Legal Notice 528/2004 on the use of biofuels or other renewable fuels for transport regulations and the Excise Duty Act (Chapter 382).

Legal Notice 528/2004 transposes EU Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport and it establishes regulations and reporting requirements to promote and report the utilisation of biofuels and other renewable fuels in the transport sector. The Excise Duty Act (Chapter 382) imposes the exemption of the payment of the excise duty on the biomass content in biodiesel while obliging producers of biofuel to register their operations with the Customs Department and report the production and source of biofuel produced.

In 2007, a draft subsidiary legislation and draft biofuel licence were prepared to regulate the biofuel market on a wider perspective.[36] However, these have not been followed up. Progress has however been recently registered as the MRA is currently drafting biofuel market regulations. These will incorporate Legal Notice 528/2004 while establishing specific regulations to better regulate the biofuel market in Malta, including the quality of biofuel retailed on the market and the fines for non-compliance.

4.3.3 A restricted awareness/educational campaign limited further penetration of biofuel

There were limited awareness and educational campaigns, regarding the benefits of using biofuels as a substitute of fossil fuels. Awareness campaigns to date were limited to the following:

- Brochures concerning biofuel information are available on the website of the MRA.
- In December 2007, a one-day workshop was organised by the MRA to inform all relevant stakeholders in Malta regarding the use of biofuels and other relevant information, particularly the use of biodiesel as a sustainable and efficient transport fuel, biodiesel production, legal and regulatory issues, policies, environmental impacts, and the various types of biofuels.[37]
- Awareness campaign from one of the private companies involved in the production of biofuels was not sustained.

4.3.4 Lack of pre-blended biofuel mixes may negatively impact the demand for biofuel

Biodiesel can be either blended with petroleum diesel in different mixes or else used in its pure form.[38] Though various petroleum filling stations are retailing biodiesel, it is however being only retailed in mixes of B100. A mix of B100 means pure biodiesel without any mix of petroleum diesel.

Consequently, consumers are required to make the mix themselves at the petroleum filling stations rather than purchasing the already mixed fuel. This situation is considered as hindering more vehicle owners from utilising biofuel. Vehicle owners may consider the process of filling up their tanks with biodiesel as laborious and time consuming since owners must calculate the proportion of

[36] Source: Malta's Annual Reports for 2004 submitted to fulfil requirements of Article 4 of Directive 2003/30/EC on the promotion of biofuels and other renewable fuels for transport.

[37] Source: Malta's Annual Report for 2007 submitted to fulfil requirements of Article 4 of Directive 2003/30/EC on the promotion of biofuels and other renewable fuels for transport dated 28 August 2008.

[38] An internationally standard, known as the 'B' factor, is utilised to state the amount of biodiesel in any fuel mix. Namely, fuel labelled B10 implies that 10 percent of the fuel mix is biodiesel while 90 percent is petroleum diesel. In case of B100, no petroleum diesel is added and thus the fuel is 100 percent pure biodiesel.

biofuel to petroleum diesel and then proceed to fill up the fuel tank from two pumps.

It is to be noted that various pre-mixes of biodiesel is already available in various EU Member States. In these countries, generally, biodiesel is retailed in different mixes, namely B5, B10, B80 and B100.

4.4 The opportunity exists for more robust monitoring by the regulator

EU Member States are required to annually report on the initiatives undertaken to encourage the use of renewable fuels, including biofuel, the national resources channeled to biomass as well as the sales and market share of biofuel.

4.4.1 Regulator monitoring and reporting is dependant on the data submitted by the biofuel producers

The MRA is only monitoring biofuels through the collection of data regarding the sales of biofuels from the biofuel producers and the reporting requirements as stipulated in EU Directive 2003/30/EC.

Data regarding the biofuel sales is being collected on a yearly basis through e-mails from the biofuel producers. However, the MRA does not carry out audits to verify the figures submitted by the biofuel producers.

4.4.2 Biofuel quality assurance is carried out by the biofuel producers

Biofuel quality checks are necessary to ensure that the quality of biofuels retailed on the market is of the right class and standard. These quality checks are not carried out by the MRA since the Authority is not obliged to perform this function. However, these tests are carried out by the biofuel producers themselves[39] and the results emanating from these tests are then forwarded to Enemalta Corporation but not the MRA. According to Legal Notice 528/2004, the MRA is only responsible to monitor the effects of utilising mixes of biofuels in diesel blends above five percent by non-adapted vehicles.

4.5 Conclusion

Up to 2008, the utilisation of biofuels reached the point where projections showed that it was likely that Malta would attain its 2010 indicative target. However, in 2008, the sales of biofuels decreased sharply and declined to 2005 levels. This decline is mainly evident in the 'transport' sector. In such circumstances reliable projections as to whether Malta is on track to achieve its biofuel target cannot be established.

This Chapter has shown that such a situation could be attributed to various factors, particularly the lack of comprehensive planning to encourage market penetration of biofuels. Despite the increase in the number of fuel stations retailing biofuels, it appears that consumers consider the price differentiation – mainly emanating through fiscal incentives - between biofuel and fossil fuels as marginal. Moreover, there has been a restricted awareness campaign on the potential benefits of biofuels.

The next Chapter discusses the efforts to encourage energy efficient behaviour, through the measures and initiatives indicated in the NEEAP.

[39] The biofuel producers tender these checks to foreign licensed laboratories.

Chapter 5

Encouraging Energy Efficient Practices

Chapter 5 –Encouraging Energy Efficient Practices

5.1 Introduction

The European Union (EU) energy policies focus on four major areas, namely, the competitive internal energy market, the development of renewable energy sources (RES), the reduction of dependence on imported fuels, and the reduction in consumption of energy.[40] Accordingly, the EU developed a framework for energy end-use efficiency and energy services whereby Member States "shall adopt and aim to achieve an overall national indicative energy savings target of nine percent" [41] by 2015. The adoption of a national energy efficiency target, referred to in Directive 2006/32/EC, ensures continued growth and viability of the market for energy services, and thus contribute to the implementation of the Lisbon strategy. Member States are encouraged to take cost-effective, practicable and reasonable measures in order to contribute towards the achieving of this target.

The efficient use of energy is a key objective in Government's energy policy. The National Energy Efficiency Action Plan (NEEAP) outlines that energy efficiency can have a significant impact on the demand for energy, which will result in decreasing the use of fossil fuels, and consequently diminishes harmful carbon emissions into the environment. The NEEAP, published in 2008, recognises the existing potential opportunities for increased efficiency in the use of energy. The Plan incorporates the national energy efficiency target in accordance with EU Directive 2006/32/EC.

Additionally, potential for energy efficiency will also emanate through the advantages of the planned cable interconnector with Sicily. The interconnector will enable Malta to tap electricity from larger generation plants abroad which have higher efficiency levels resulting from economies of scale. It also provides the opportunity to handle peak demands more efficiently.

This Chapter aims to evaluate the extent to which measures undertaken locally to encourage further energy efficiency are in line with the expectations expressed in the NEEAP. For this purpose the following issues will be discussed:

- the implementation of energy efficient measures; and
- the monitoring undertaken by the Malta Resources Authority (MRA) with regards to the implementation of such measures.

The National Audit Office (NAO) sought to evaluate the effectiveness of energy efficient measures implemented in the Domestic Sector and within the public sector through case studies. The main objectives of this exercise were to establish whether the measures would generate the projected energy savings.

A case study approach was adopted since the MRA has not yet initiated monitoring and measuring the impact of the measures listed in the NEEAP 2008 on energy consumption. According to the MRA, such a process will initiate later in 2009 since at the time the required resources to perform such duties were not available.

For this purpose, the NAO's case studies focused on all incentives targeted at the Domestic sector. Additionally, the effectiveness of energy efficient measures within the public sector was evaluated through the Green Leader Initiative.

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[40] Energy policy for a competitive Europe, http://ec.europa.eu/energy/index_en.htm.

[41] Directive 2006/32/EC on energy end-use efficiency and energy services, p. 6.

5.2 The NEEAP's main objective is to encourage energy savings

The NEEAP was prepared by the MRA and forwarded to the EU Commission in October 2007. An updated version of the NEEAP was tabled in Parliament during the 2009 Budget Speech. The Authority conferred with the related stakeholders for any advice and recommendations concerning the energy efficiency initiatives being undertaken.

The energy efficiency targets specified in Directive 2006/32/EC, and adopted by the NEEAP, are based on the average final consumption over the period 2001/02 and 2005/06. The following are the targets for energy efficiency for Malta:

Table 8 : Energy efficiency targets

National indicative energy savings targets	
Average annual energy consumption (Oct 2001 to Sep 2006)	4,195 GWh
2010 target - Three percent of average annual energy consumption	126 GWh
2016 target - Nine percent of average annual energy consumption	378 GWh

Source: National Energy Efficiency Action Plan (2008), p. 13.

Although the energy efficiency targets outlined in Table 8 are indicative, that is they are not obligatory, their realisation will significantly contribute towards the attainment of Malta's obligatory renewable energy target.

In order to attain the target of nine percent of average annual energy consumption, Government has introduced various legal notices to address and promote energy efficiency in line with harmonisation and transposition requirements associated with Malta's accession to the European Union. These include:

- Efficiency Requirements for New Hot-Water Boilers Fired with Liquid or Gaseous Fuels Regulations, 2002. (Legal Notice 62 of 2002 and 348 of 2007).
- Energy Efficiency of Buildings Regulations that introduce the Energy Performance Certificate for buildings which shall be required for transferring property ownership / lease. (Legal Notice. 261 of 2008).
- Energy Efficiency Requirements for Ballasts for Fluorescent Lighting Regulations, 2002. (Legal Notice 100 of 2002 and 350 of 2007).
- Energy Efficiency Requirements for Household Electric Refrigerators, Freezers and Combinations, 2002. (Legal Notice 63 of 2002 and 349 of 2007).
- Energy End-Use Efficiency and Energy Services Regulations, 2008. (Legal Notice 289 of 2008).
- Indication by Labelling and Standard Product Information of the Consumption of Energy and other Resources by Household Appliances (Amendment) Regulations. (Legal Notices 99 of 2002, 27 of 2003 and 235 of 2003).

5.3 Measures to encourage energy efficiency are being implemented but are not being evaluated against EU targets

In addition to the Legal Notices, a number of energy efficiency measures have also been implemented. However, monitoring by the competent authorities to determine the effectiveness of such measures in relation to EU targets is marginal.

5.3.1 The National Energy Efficiency Action Plan identifies 26 energy-efficient measures

The NEEAP (2008) identifies 26 energy efficiency measures and an additional seven measures to be considered in 2009.[42] Although most of the proposed measures are horizontal and cross-sectoral, the NEEAP's prime focus concerns the transport and domestic sectors. The tertiary and industry sectors are also considered.

Fourteen out of the 26 energy efficiency measures are expected to yield energy savings ranging from 116 to 137 GWh and 198 to 240 GWh by 2010 and 2016 respectively. The foregoing implies that energy saving emanating from these measures will range from 2.77 to 3.29 percent of final energy consumption and 4.72 to 5.70 percent of total energy consumption. The expected energy savings related to the remaining 12 measures have not yet been estimated by the MRA. The Authority, however, contends that it estimates the total savings from all of the 26 measures will be quite close to the target for 2010. The MRA is basing its assertion on emerging trends related to the outcome of similar energy efficient measures in other EU Member States.

[42] A detailed list of the specific measures within the various sectors is included in Appendix 1.

5.4 NAO case studies relating to measures undertaken within the 'Domestic' and 'Green Leader' initiatives indicate that the opportunity exists to improve on results to date

The NAO analysed in detail, through a case study approach, four[43] of the 26 measures introduced by Government aimed at the Domestic Sector and the Green Leader initiative within the public service. The Domestic Sector measure was primarily a financial instrument aimed at encouraging consumers to purchase energy efficient appliances (such as air conditioners, refrigerators, and solar water heaters). The Domestic Sector measures also encompassed encouraging consumers to install electricity generating systems, such as photovoltaic and micro-wind generation systems.[44] These measures are being discussed in this Chapter due to their reference in the NEEAP. The Green Leader measure was an initiative implemented within each ministry aimed towards promoting energy efficiency and environmental awareness within Governmental entities.

5.5 There was steady progress in the implementation of the 'Domestic' measures

The energy efficient measures targeted at the Domestic Sector involved encouraging consumers to purchase energy saving appliances through financial rebates. Additionally, the measures also sought to encourage energy savings through the use of solar water heaters, micro-wind systems, photovoltaic (PV) systems, roof insulation and other actions that reduce heating and cooling load, such as double glazing. The four measures under review are indicated in Table 9.

Table 9 : The energy efficient schemes targeted at the Domestic Sector

Measures	Renewable Energy or Energy Efficient Product (Domestic Use)	Percentage of selling price with a maximum grant of (€)	Period	Estimated number of applications by 2010	Number of approved application as at mid-March 2009	Percentage progress of approved applications against targets
Rebates on energy efficient domestic appliances	*Dishwashers*	58.23	Nov-06 – Jul-08	2,000	1,578	79
	Refrigerators, Freezers or Combinations	116.47	Nov-06 – Jul-08	12,000	10,372	86
		116.47	Nov-06 – Jul-08	-	-	-
		58.23	Nov-06 – Jul-08	-	-	-
	Washing Machines	58.23	Nov-06 – Jul-08	22,000	19,834	90
	Tumble Dryers	58.23	Nov-06 – Jul-08	50	25	50
	Air Conditioning Units	58.23	Nov-06 – Jul-08	7,000	6,087	87
Promotion of solar water heaters	*Solar water heaters*	232.94	Jan-05 – Feb-09	12,350	5,559	45
Promotion of micro-generation of electricity from RES	*Micro wind systems*	232.94	Jan-06 – Feb-09	N/A	0	-
	PV systems	3,901.32	Jan-06 – Feb-09	N/A	10	-
Subsidy schemes for insulation for buildings	*Insulation for buildings*	232.94	Jan-06 – Feb-09	N/A	279	-

Source: NEEAP, MRA.

[43] In addition to these four schemes, recently, the scheme promoting the use of Compact Fluorescent Lamps (CFLs) in households was implemented. However, due to its recent implementation this scheme did not form part of the scope of the audit.

[44] As the NAO review focused on the 'Domestic Sector Initiatives', the Support Schemes for Industry and SME initiative managed by the Malta Enterprise, did not fall within the scope of this audit. However, it is to be noted that this scheme, aimed at encouraging commercial entities to install PVs proved successful. In fact the Malt Enterprise recently issued a second call for applications.

5.5.1 Uptake of 'Rebates on energy efficient domestic appliances' measure was significant

The measure has generated significant public response, and it is likely that the 2010 predetermined target for the number of applications will be attained. Table 9 illustrates that as at mid-March 2009, with the exception of applications relating to tumble driers, applications to all other appliances ranged from 79 to 90 percent of their predetermined target.

As at mid-March 2009, the uptake of the 'Promotion of solar water heaters' measure stood at 45 percent of the 2010 estimated target. Initially, when the measure was introduced in 2005, there were only 346 applications. At this time, the rebate due with regards this measure amounted to €116.48. However, the uptake of applications increased to 1,176 in 2006. Such a circumstance can be directly attributed to the fact that the maximum rebate doubled to €232.94. The number of applications for this measure continued to increase and amounted to 1,453 and 2,091 in 2007 and 2008 respectively. The rebate within this scheme was again revised in 2009. As at mid-March 2009, 493 had already been submitted.

For the period under review, predetermined targets for the "Promotion of micro-generation of electricity from RES" initiative with respect to micro-wind and PV systems were not established. Since 2006, there were no applications for rebates through the micro-wind systems measures. Only 10 applications were submitted for rebates through the PV systems measure. However, following the upward revision of the rebate grant, the scheme launched in the last budget for PVs for around 200 households was oversubscribed within a short period.

Since 2006, there were 279 applications regarding the measure relating to the 'Insulation on Buildings'. It is pertinent to note that predetermined targets for this measure were not established.

5.5.2 Cost per unit of energy saved indicates that measures consider cost effectiveness and social benefit

As at mid-March 2009, the expenditure incurred with regards to 'Domestic' energy efficient measures totalled €3.9 million. The NAO sought to determine the cost to Government per one KWh of electricity saved through the measures under review throughout the life time of the appliance. For this purpose, the NAO utilised estimated energy savings rates of the various domestic appliances as referred to in the NEEAP. This exercise is based on the number of approved applications submitted to the MRA by mid-March 2009.

Table 10 indicates that the estimated cost of one KWh of

Table 10 : Cost of energy savings through 'Domestic' energy efficient initiatives

Measure	Renewable Energy or Energy Efficient Product (Domestic Use)	Lifetime	Energy saved (KWh/year/unit)			Total Rebates €[45]	Energy (KWh/lifetime) saved per €1 rebate		
			Minimum	Average	Maximum		Minimum	Average	Maximum
1	Dishwashers	12	200	200	200	91,826	41.28	41.28	41.28
	Refrigerators, Freezers or Combinations	15	300	400	500	1,003,232	46.5	62.1	77.55
	Washing Machines	12	50	75	100	1,153,262	10.32	15.48	20.64
	Tumble Dryers	12	100	150	200	1,456	20.64	30.96	41.16
	Air Conditioning Units	10	200	400	600	354,192	34.4	68.7	103.1
2	Solar water heaters	20	1,050	1,050	1,050	1,193,120	97.8	97.8	97.8
3	Micro wind systems	N/A	1,500	1,500	1,500	0	/	/	/
	PV systems	23	1,500	1,500	1,500	17,166	20.01	20.01	20.01
4	Insulation for buildings	N/A	N/A	N/A	N/A	45,191	N/A	N/A	N/A

Source: NEEAP, VAT Department.

[45] The total amounts of rebates quoted in Table 10 are as at mid-March 2009.

energy saved throughout the lifetime of an appliance. Such savings exceed significantly the amount of electricity that can be purchased for €1 at the current domestic tariffs charged by Enemalta Corporation. Domestic electricity tariffs, effective from April 2009, ranged from €0.161 to €0.232 which implies that the amount of electricity purchased for €1 would range from 4.31 KW/h to 6.21 KW/h.

The scenario depicted in Table 10 indicates that these measures and their relative rebates take into consideration the cost effectives of the measure together with the potential social benefit derived.

The cost-effectiveness of the 'Domestic Sector' measures is apparent through:

- the significant uptake of most of the Domestic Sector measures - the rebate scheme has managed to motivate consumers to invest in energy efficient appliances; and
- the Government rebate over the lifetime of the energy efficient appliances constitute cost-effectiveness.

Moreover, the social benefit to be reaped through energy efficient practices would include:

- the financial savings through lower energy consumption for consumers;
- the addressing of various environmental concerns emanating from the use of fossil fuel; and
- the contribution of these measures towards the attainment of EU energy efficient targets.

5.6 Impact of 'Green Leaders' could increase through improved planning

The NEAAP listed the following energy efficient measures which were to be implemented within Governmental entities:

1. The appointment of Green leaders.
2. Compilation of energy audits in government departments.
3. Green public procurement.
4. New school/hospital construction policy.
5. Energy saving measures in Housing Authority schemes.
6. Implementation of renewable energy in all Government ministries.[46]

Due to audit scoping limitations, as well as the relative importance of the measure, the NAO opted to review, through a case-study approach, the 'Appointment of Green Leaders'. This case-study focused on the initiatives/ measures taken by the Green Leaders among Government ministries, departments and Units. The importance of the 'Green Leader' measure stems from the fact that their primary role is to create environment awareness within their ministries while acting as catalysts for action to promote energy efficiency and environmentally friendly measures.

5.6.1 Green Leaders' major roles are to create environmental awareness and to act as catalysts for promoting energy efficiency

In January 2005, Government appointed 14 Green Leaders. Specifically, the Green Leaders' responsibilities with respect to renewable energy and energy efficiency include the following:

- Participating in training sessions, discussion forums and period meetings organised for Green Leaders by the Office set up to coordinate corporate government environmental initiatives.
- Raising awareness of environmentally damaging practices and promoting alternative eco-friendly behaviour within their Ministry.
- Gathering data regarding environmentally-related practices such as paper and energy used within their Ministry.
- Developing a plan of action to reduce consumption and reuse or recycle materials within their Ministry with measurable goals and a feasible timetable.
- Implementing such plans and monitoring results to identify and resolve problems.
- Disseminating results to other Ministries and to the general public.[47]

The Ministry for Resources and Rural Affairs (MRRA) is the main body responsible for the coordination of the Green Leaders' initiatives. The Green Leaders report to the Director, Programme Implementation within their Ministry. In the absence of this body, Green Leaders report either to the Permanent Secretary, or the Director Corporate Services within their Ministry.

[46] Source: NEEAP 2008, p. 29.

[47] Source: OPM Circular No 41/2004 - Appointment of a Green Leader within each Ministry.

5.6.2 Various energy efficient measures and energy savings awareness within Government have been introduced by the Green Leaders

Since 2005, Green Leaders have implemented numerous renewable energy and energy efficient initiatives in several governmental departments and entities. Such actions which were undertaken in all ministries, ranged from the installation of PV systems on various government buildings, installation of energy efficient lighting and the raising of environmental awareness – including the adoption of energy efficient practices by employees of governmental entities.

A parallel initiative involving all Green Leaders in their respective ministries resulted in a number of PV panels being installed on a number of government buildings. These panels have the capacity to generate 115KWp of electricity. Although the proportion of the electricity generated cannot be determined since statistics related to electricity consumption by Governmental departments and entities is not readily available, and such an amount of electricity may be considered as marginal, such initiatives have the potential of stimulating behavioural shifts in favour of renewable energy sources and energy efficient practices. Table 11 refers.

Table 11 : Photovoltaic systems on Government buildings

Ministry	Department	KWp	KWp (By Ministry)
Office of the Prime Minister	Luqa Barracks	2.10	12.10
	Luqa Barracks	1.20	
	Government Press Marsa	1.20	
	MEPA	7.60	
Office of the Prime Minister – Parliamentary Secretary for Tourism	Auberge d'Italie, Valletta	3.20	3.20
Ministry of Foreign Affairs	Palazzo Parisio, Valletta	3.20	3.20
Ministry of Gozo	Ministry's Building, Victoria	10.00	10.00
Ministry for Infrastructure, Transport and Communications	Enemalta Sliema	3.00	17.20
	Enemalta Qawra	4.20	
	Enemalta Luqa	10.00	
Ministry for Resources and Rural Affairs	Ministry's Building	1.33	11.01
	CMD Building, Floriana	3.20	
	CA Site Imrieħel	2.28	
	CA Site Hal Far	4.20	
Ministry of Education, Youth, Sport & Culture	Casa Leone, St. Venera	3.20	32.04
	MCAST	6.40	
	Saint Benedict College, Kirkop	6.84	
	St. Margharet College, Verdala	7.80	
	St. Ignatius College, Qormi	7.80	
Ministry of Social Policy	Palazzo Ferreria, Valletta	7.80	7.80
Ministry for Social Policy – Parliamentary Secretary for Community Care and the Elderly	Mosta Government Home for the Elderly	3.20	3.20
Ministry of Finance, the Economy and Investment	VAT Department, B'Kara	1.20	7.60
	Consumer Division, St. Venera	3.20	
	Customs, Hal Far	3.20	
Ministry of Finance, the Economy and Investment – Revenue & Lands	House of Four Winds, Valletta	3.20	3.20
Ministry for Justice and Home Affairs	Civil Protection Department, Ta' Kandja	1.20	4.40
	Police HQ, Floriana	3.20	
	Total KWp	114.95	114.95

Source: Information extracted from https://opm.gov.mt/pvc_blgs on 25 February 2009.

The foregoing illustrates the added value of a coordinated Green Leader effort. However, there were few other coordinated and parallel efforts across all ministries. This review revealed a number of concerns which hindered this measure from fulfilling its full potential. Such concerns, discussed below, are generally related to the management of the Green Leader measure.

5.6.3 A lack of strategic planning impinges on the Green Leaders' initiatives

Policy documents, namely, OPM circulars (OPM 41/2004) and the NEAAP, establish the major objectives of this measure, as well as the Green Leaders' responsibilities. However, the relative strategic and operational plans which incorporate energy efficiency and renewable energy within all the Government ministries and departments are still being prepared.

The lack of strategic and operational planning has resulted in a lack of coordinated action within the various Governmental entities. Moreover, to a great extent, the lack of strategic and operational planning has resulted in actions undertaken being dependant on the personal initiative and knowledge of Green Leaders. For example, in 2005, the Ministry for Investment, Industry and Information Technology had, of its own accord, compiled guidelines on the corporate environmental policy. Although such initiatives are commendable, strategic and operational planning would have enabled a more coordinated and structured approach of Green Leaders' efforts, and consequently improving the effectiveness of the measure.

The absence of operational and strategic planning implies that Green Leaders do not have specific targets regarding energy efficiency, biofuel and renewable energy to aim for and attain. The NAO has been informed that targets will be determined when energy audits being undertaken in each ministry are concluded.

Moreover, during the period March 2007 and August 2008, the Green Leader initiative registered a slowdown. During this period, Green Leader meetings, training sessions or parallel initiatives were not held.

5.6.4 Expenditure by Green Leaders declining since commencement of initiative

During the period 2006 – 2008, the expenditure related to the Green Leader measure has been declining. Most of the expenditure incurred related to parallel initiatives to install energy efficient and generating equipment within Government entities.

The funds allocated to Green leaders amounted to around €23,294 per ministry in 2006 and €5,000 in 2009. Since strategic and operational plans do not exist, there cannot be an objective assessment as to whether such an allocation was adequate to cater for Green Leader initiatives.

Table 12 shows that the Green Leader expenditure across all ministries was lower than the allocated budget. However, as funds remained unutilised, revised budgetary allocations led to the Green Leader fund being further depleted.

The declining fund allocation and expenditure by Green Leaders either implies that the measure was not considered as a priority by Government or that the planned Green Leader activities did not merit such a level of funding.

Table 12 : Budgets and expenditure by the Green Leaders'

Year	Budget	Revised budget	Change in budgeted figures over revised figures	Yearly change in revised budget	Actual expenditure	Actual expenditure over revised budget
	€	€	%	%	€	%
2006	-	312,221	-	-	254,461	81.5
2007	163,056	122,874	- 24.6	- 154.1	84,089	68.4
2008	160,000	51,183	- 68.0	- 140.1	36,343	71.0
Mar-09	45,000	45,000	-	- 13.7	7,994	-

Source: NAO calculations, Information extracted from Departmental Accounting System.

5.6.5 Green leaders' impact is not being quantified

The monitoring of the impact of the Green Leaders' initiatives has been limited to the collection and documentation of data by the MRRA regarding actions taken in the various ministries. Since the recent appointment of a Green Leader coordinator within the MRRA, the monitoring of initiatives intensified. However, a number of problems relating to the quantification of the impact of the Green Leader measure exist, namely:

- The impact of energy efficient measures are not being evaluated in terms of saved units of energy. Such a situation arises since the ministries do not readily have information available relating to the amount of units of electricity consumed. Moreover, statistics relating to electricity consumption by Government entities were not made available to ministries requesting such information. In fact, from 2009, each Green Leader is collating information about electricity consumption within the respective ministry.

- Surveys aimed at determining the extent to which Green Leaders have raised environmental awareness, such as the adoption of energy efficient practices, have not been undertaken.

- The lack of energy audits within ministries is also considered as a barrier to quantify the impact of initiatives undertaken by Green Leaders.

The issues highlighted above do not only hinder the quantification of the Green Leaders' initiatives but also negatively affect the management of the measure. Such circumstances may arise since any planning, follow-up action or implementation of new initiatives will not be based on robust information.

5.7 Monitoring of energy efficiency initiatives has not commenced

5.7.1 The evaluation methodology of energy efficiency measures is still being developed at EU level

The MRA has not yet embarked on the evaluation of the implementation of the energy efficiency measures proposed in the NEEAP 2008. In this respect the MRA is participating in the EU project ODYSSEE. To date, the MRA is only collecting data related to the rebate applications of the energy efficient appliances related to the Domestic Sector. However, the data collected was not analysed to determine the extent to which the implemented measures were yielding the expected results in terms of energy savings.

The MRA remarked that the situation prevails since discussions regarding the methodologies to be adopted to evaluate energy savings emanating from the various initiatives undertaken are still ongoing at EU level.

5.7.2 Limited data has been collected by the MRA to enable the assessment of energy efficient measures

It is pertinent to note that, with the exception of measures aimed at the Domestic Sector, the MRA has not yet commenced to collate the relative data relating to energy efficient measures.

Additionally, there are no internal documented procedures or standards regarding the energy efficiency monitoring procedures to be adopted by the MRA in accordance with EU Directive 2006/32/EC.

5.7.3 The MRA is not appropriately resourced to perform its monitoring function

In accordance with Legal Notice 289 of 2008, the MRA is the entity responsible for monitoring the implementation of energy efficient measures. In this context, the MRA's functions entail the monitoring of progress regarding the energy efficient measures being implemented within the various economic sectors. Moreover, the Authority is also responsible for the compilation of the relative reports, which it submits to the MRRA for onward transmission to the EU Commission.

However, this Chapter has already outlined various shortcomings related to the execution of the MRA's monitoring function (namely, the lack of data collation and analyses). Consequently, the risk exists that any problems related to the implementation of the various energy efficient measures may remain undetected. The consequence of such circumstances is that timely corrective action may not be taken, which in turn may impinge on the cost-effectiveness of the measures and the attainment of EU targets.

The MRA pointed out that it is not in a position to fully implement its responsibilities due to severe human resources constraints.

5.8 Conclusion

Energy efficiency is critical in Government's overall strategy to minimise the dependence on fossil fuels. The importance of energy efficiency is further reiterated by the

fact that, indirectly, it will contribute towards the attainment of Malta's Renewable energy target.

The NEEAP envisaged 'an indicative nine percent energy efficiency target'. A number of measures were introduced within the various sectors of the economy to encourage energy efficient practices. However, there has been no attempt to quantify the resultant energy savings from these measures. Consequently, there cannot be an accurate assessment as to the actual contribution of the measures with regards the indicative target. Such a situation prevails since the MRA has not yet embarked on monitoring the impact of these measures.

Through the case studies undertaken, this audit indicated that, despite encouraging results, the opportunity exists for further improvements in the Domestic and Green Leader measures reviewed.

The relatively heavy capital outlay necessary to implement energy saving and generating systems seemed to hinder the further uptake by consumers of 'rebate' schemes applicable to the Domestic Sector. On the other hand, a lack of strategic planning hindered the Green Leader measure from further exploiting the potential of this measure.

Appendix 1
Energy Efficiency Measures

Appendix 1 : Energy Efficiency Measures

Measure	Sector	Scheme	Type of Measure	Target Group	Description
1	Residential	Rebates on energy efficient domestic appliances	Financial Instrument	Domestic	In the 2007 Budget Speech Government announced a scheme whereby the purchase of energy efficient appliances is incentivised through payment of a rebate on the purchase price of the appliance.
2	Residential	Promotion of solar water heaters	Financial Instrument / Informative	Domestic	A rebate on solar water heaters of 20 percent with a maximum grant of €232.94 is granted by the government. Besides, Enemalta Corporation will not charge a connection fee (€163.06) when solar water heaters are installed in new buildings that were not previously supplied by electricity.
3	Residential	Promotion of micro-generation of electricity from RES	Financial Instrument	Domestic	(1) Microwind systems installed in residences are granted 25 percent on the purchase of the wind energy system subject to a maximum of €232.94. (2) In case of PV systems, applicants may apply for a once-only grant of 20 percent on the purchase price of a photovoltaic system with a minimum installed size of 1 KW peak, plus or minus 5 percent, up to a maximum grant of €2,329. Additional grants are also available for every additional KW installed.
4	Residential	Subsidy schemes for insulation for buildings	Financial Instrument	Domestic	Government is subsiding roof insulation up to 20 percent of the value up to a maximum of €232.94. A review of the scheme and its combination with the promotion of other actions to reduce heating and cooling load will be carried out during 2008.
5	Residential	Promotion of Compact Fluorescent Lamps	Financial Instrument	Domestic	Government will promote the introduction of low energy consuming compact fluorescent lamps (CFLs) by distributing around one million CFLs to domestic households.
6	Tertiary	(Energy Efficiency) Action in the public sector	Voluntary Measure	Government	Government started the process of promoting energy efficiency within its departments by appointing Green Leaders in each Ministry, in an initiative aimed towards meeting government's environment responsibilities.

Measure	Sector	Scheme	Type of Measure	Target Group	Description
					The Green Leaders (GL) have a duty to create environment awareness within their Ministries and act as catalysts for action to promote the environment. Government has also established a green public procurement policy to promote environmental elements when buying products, services or works. The MRA is discussing plans with the Foundation for Tomorrow's Schools while the Housing Authority is taking a pro-active approach to increase energy efficiency in its social housing projects. Government is also taking action to improve energy efficiency in ICT systems.
7	Tertiary	Energy efficiency promotion in the tourism industry	Financial Instrument	Tourism and Culture Operators	This scheme will build on the Grant Scheme for Tourism Enterprises which ran in 2004-2006. It aims at encouraging innovation and economic development of undertakings that apply for projects which will generate economic activity. Whilst contributing to the tourism industry this scheme will also contribute to initiatives that enhance the environmental performance of tourism related operations by reducing or improving the efficient of consumption of resources.
8	Tertiary	Improvements in street lighting	Voluntary Measure	Government	Street lighting is inefficient; further work is required to develop guidelines and standards, and possibly including legislation, that could be adopted by Enemalta Corporation and Local Councils.
9	Tertiary	Energy efficiency in the tertiary sector	Informative / Financial	SME	A variety of measures will be employed to inform SME on energy efficiency, including workshops, seminars, and other targeted campaigns. Subsidised energy audits will be provided.
10	Industrial	Modernisation of Agricultural Holdings	Financial / Informative	Farmers and enterprises engaged in agricultural production	This measure aims to provide support on farm investments, thus assisting the economic performance of agricultural holdings through the better use of the production factors, including the introduction of new technologies and innovation to target quality and on farm diversification.

Measure	Sector	Scheme	Type of Measure	Target Group	Description
11	Industrial	Targets for energy efficiency in government owned industry:	Financial Instrument / Voluntary	Government Owned Industries	Since 2007 the Ministry responsible for Investments has published a Corporate Environmental Policy which sets targets for energy efficiency in Government owned industry falling under its responsibility.
		(a) WSC investment in energy efficiency			The state-of-art equipment being acquired and installed by WSC in its Reverse Osmosis plants will decrease the energy utilised to desalinate each cubic mater of sea water. Since 1998, energy audits are regularly carried out to ensure that the plant operates at optimal operating efficiencies at all times. WSC also scans the market for any new technology that may be used to meet its environmental obligations and/or deliver economic advantage.
		(b) Investments in energy efficiency at Malta shipyards			Actions implemented aims at reducing the primary use of fuel in the process, thereby saving in energy necessary to be generated for the process to be completed whilst reducing greenhouse gases.
12	Industrial	Support schemes for industry and SME	Informative / Financial Instrument	Industry / SME	Malta Enterprise appointed a list of approved advisors in various areas related to industry and SME. These advisors would assist companies in the area in question (Energy Optimisation is included as one of these areas and can include the carrying out of an energy audit). The MRA will run this scheme which in turn will help Malta-based SME to achieve competitive advantage by providing financial assistance for adopting environmentally sensitive technologies, operating system and processes.
13	Transport	Promotion of modal shifts	Regulatory / Informative / Financial Instrument	General public / Industry / Commercial Users	The government implemented a white paper that envisages a number of measures that lead to improved energy efficiency in transport. Some of the measures proposed are: (a) the re-organisation of operations and upgrade of infrastructure of the public transport system, (b) increased accessibility for pedestrians and cyclists, and (c) commissioned feasibility studies on alternative mass transit systems for Malta.

Measure	Sector	Scheme	Type of Measure	Target Group	Description
14	Transport	Provision of advisory services on energy efficient driving	Informative	General public and industry / Commercial Users	This measure intends to change attitudes and influence behaviour in transport use.
15	Transport	Provision of energy efficient services at petrol stations	Voluntary Agreement	Providers of energy services	This measure will seek to investigate whether petrol stations, which are considered as small retail energy sales companies, can provide cost effective energy efficiency services, such as compressed air and/or engine checks.
16	Transport	Promotion of e-work or tele-working	Voluntary Agreement	General public / workers	Guidelines for public employees are in the final stages of drafting.
17	Transport	Green travel plans for the public sector	Voluntary Agreement	General public / workers	The aim behind the Green Travel Plans for government employees and large employers in the Valletta/ Floriana area is to achieve the following three objectives: (1) Reduction in car usage (and increase the use in alternative modes); (2) Reduction in traffic speeds and road safety as well as personal (pedestrians and cyclists) security improvement; (3) A more environmentally friendly modes of travel, to enhance healthier living environment.
18	Transport	Promotion of electric vehicles.	Financial Instrument	General Public	Promotion of electric vehicles includes: a grant of €1,164.68 (on purchasing), removal of registration fees, reduction of registration tax, elimination of road license, exemption from payment of congestion fees for entry into Valletta for electric cars.
19	Horizontal and Cross-Sectoral Measures	Review of administrative arrangements	Regulation	Government	This measure entails clarification of roles of entities involved in energy efficiency to ensure (a) continuous development, (b) refinement and implementation of energy efficiency measures, and (c) the collection of data and knowledge to support these actions.
20	Horizontal and Cross-Sectoral Measures	Publicity and information campaigns	Informative	Domestic Sector	National information campaign and information conservation tips by Enemalta Corporation in addition to information activities are encouraged through this measure.
21	Horizontal and Cross-Sectoral Measures	Provision of advisory services	Informative	All sectors	Provision of advisory services to consumers in the form of: help line services, information on websites, presentations and discussion with local councils are carried out through this measure.

Measure	Sector	Scheme	Type of Measure	Target Group	Description
22	Horizontal and Cross-Sectoral Measures	Creation of an energy fund	Financial	All sectors	Support Measure.
23	Horizontal and Cross-Sectoral Measures	Improvement in building efficiency	Informative	Architects, Building's service managers, building contractors	This measure entails new building regulations to minimise energy consumption in newly built buildings and others that undergo major renovations.
		(Sub-Measure) Energy Management Plans for Major Projects	Informative	Residential and Commercial Sector - Energy Efficiency in Buildings	The aim of this measure is to ensure that energy and water efficiency is taken into consideration at the start of, and throughout, the design process, in particular of large projects where the developer is not the final end-user and therefore does not have a direct interest in reducing the energy demand of the operational development (unlike industrial developments).
24	Horizontal and Cross-Sectoral Measures	Intelligent metering systems	Informative	All electricity consumers	Reduction in energy demand.
25	Horizontal and Cross-Sectoral Measures	Promotion of CHP for large industry and tourist complexes	N/A	Industry and tourist operators	Reduction in energy demand.
26	Horizontal and Cross-Sectoral Measures	Participation in research in energy saving measures	Generic	Government	Reduction in energy demand.
27	Additional Measures	Subsidised energy audits for non-domestic sectors	Financial	-	Develop a systematic approach for decision-making in the area of energy management.
28	Additional Measures	Inspection Services	Financial / Informative	-	Offer free or at reasonable prices inspections on the operation of solar water heaters, air conditioners and boilers.
29	Additional Measures	Labelling	Regulation	-	Labelling of all appliances and definition of standards.
30	Additional Measures	Creation of a "Top Runner" type programme	Informative	-	The creation of a list of products and their energy consumption together with the promotion of the top ten most efficient products.
31	Additional Measures	Registration of products / professionals	Informative / Regulation	-	Where required by EU legislation the registration of PV / solar water heaters, energy auditors and installers are encouraged.

Measure	Sector	Scheme	Type of Measure	Target Group	Description
32	Additional Measures	Facilitating the development of ESCO type services	Financial	-	The development of energy services companies that provide technical advice and financing for energy efficient equipment.
33	Additional Measures	Development of solar park	Financial	-	An alternative to individual PV systems.

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September 2008	Enquiry and Report on the Purchase of Air Tickets icw Official Travel Abroad
September 2008	Report on Travel Abroad on Official Government Business
October 2008	Performance Audit: Structural Funds - Environmental Programme
December 2008	Annual Audit Report on the Public Accounts 2007
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March 2009	Performance Audit: Water Loss Control Management by WSC
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