Ministry for Resources
and Rural Affairs
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The National Energy Policy for the Maltese Islands

2012

NATIONAL
ENERGY POLICY

Energy for your home, job, health and children.

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ACRONYMS

ARMS Ltd	Automated Revenue Management Systems Ltd
BRO	Building Regulations Office
BRU	Better Regulation Unit
CCGT	Combined Cycle Gas Turbine
CCS	Carbon Sector and Storage
CEER	Council of European Energy Regulators
CEF	Connecting Europe Facility
CPI	European common interest
CSE	Central Stockholding Entity
CVA	Controlled Vehicle Access
DPS	Delimara Power Station
EE	Energy Efficiency
EEPR	European Energy Programme for Recovery
EN 590	Diesel
ENTSOs	European Networks of Transmission System Operators
ERS	European Registration Scheme
ETS	Emissions Trading Scheme
EU	European Union
EV	Electric Vehicles
FAME	Biodiesel
FP	EU Research Framework Programme
FSRU	Floating LNG Storage and Re-gasification Unit
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GTP	Green Travel Plan

GWh	Gigawatt Hour
HFO	Heavy Fuel Oil
HVAC	High Voltage and Alternating Current
IEA	International Energy Agency
IED	Directive on industrial emissions
IPPC	Integrated Pollution Prevention and Control
IPPs	Independent Power Producers
IRENA	International Renewable Energy Agency
ISE	Institute for Sustainable Energy
ITS	Intelligent Transport Systems
kV	Kilovolts
kWh	Kilowatt Hour
LCPD	Large Combustion Plant Directive
LCPD	Large Combustion Plant Directive
LEDs	Light Emitting Diodes
LNG	Liquefied Natural Gas
LPG	Liquid Petrolium Gas
LRP	Lead replacement petrol
MBT	Mechanical Biological Treatment
MBT	Mechanical Biological Treatment Plant
MCAST	Malta College of the Arts, Science and Technology
MCCAA	Malta Competition and Consumer Affairs Authority
MCST	Malta Council for Science and Technology
MEPA	Malta Environment and Planning Authority
MEU	Management Efficiency Unit
MEU	Management Efficiency Unit

MFA	Ministry for Foreign Affairs
MFEI	Ministry for Finance, the Economy and Investment
MIEMA	Malta Intelligent Energy Management Agency
MIEMA	Malta Intelligent Energy Management Agency
MIP	Malta Industrial Park
MOBC	Mediterranean Offshore Bunkering Corporation
MoU	Memorandum of Understanding
MPS	Marsa Power Station
MRA	Malta Resources Authority
MRRA	Ministry for Resources and Rural Affairs
MTCE	Ministry for Tourism, Culture and the Environment
MW	Megawatts
MWp	Megawatt Peak
NEEAP	National Energy Efficiency Action Plan
NG	Natural Gas
NGOs	Non-Governmental Organisations
NH3	Ammonia
NMVOC	Non-methane Volatile Organic Compounds
NO_x	Nitrogen Oxides
NRAs	National Energy Regulatory Authorities
NREAP	National Renewable Energy Action Plan
NSO	National Statistics Office
O_3	Ozone
OCGT	Open Cycle and Combined Cycle Gas Turbine
OECD	Organisation for Economic Cooperation and Development
OPM	Office of the Prime Minister

PCI	Project of Common Interest
PFS	Petroleum filling station
PM	Microscopic Particulate Matter
POPs	Heavy metals, Persistent Organic Pollutants
PV	Photovoltaic
R&D&I	Research and Development and Innovation
RDF	Refuse Derived Fuel
RDI	Research Development and Innovation
RES	Renewable Energy Supply
RTDI	Research and Technical Development Infrastructure
SCADA	Supervisory Control and Data Acquisition Systems
SEA	Strategic Environmental Assessment
SES	Single European Sky
SET	Strategic Energy Technology Plan
SO_2	Sulphur Dioxide
SPS	Strategic Policy Secretariat
SWH	Solar Water Heaters
TOE	Tonnes of Oil Equivalent
UNFCCC	United Nations Framework Convention on Climate Change
UOM	Union of the Mediterranean
UoM	University of Malta







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ELECTRIC!


FOREWORD

Energy for Your Home, Your Job, Your Health and Your Children

The overarching goal of the Government is to ensure growth and prosperity for the Maltese islands whilst ensuring a secure reliable and efficient energy supply with an environmental conscience.

Malta's geographical position on the periphery of Europe and surrounded by very deep waters, coupled with its small size and lack of natural resources places Malta at a natural disadvantage when looking at energy supply. Up until recently, the Maltese Islands have been totally dependent on oil imports for its energy supply, making us reliant on the volatility of the oil markets and thus limiting our possibilities for long-term planning and security of energy supply.

This Government has, over the past years, worked consistently to bring about a cultural but also practical shift away from total dependence on oil to a more diversified and thus more secure energy market in Malta. Our emphasis on renewable energy for a more sustainable environment as well as our investments in a new power generating plant and an interconnector have paved the way for a serious and forward looking energy policy document which is presented herewith.

The recent global economic crisis which has pushed up oil prices to a record high in the last two decades has only evidenced further our vulnerability in the sector and the importance of ensuring a diversified and flexible mix of energy sources for our country. Long-term planning is therefore of essence. Our link with mainland Europe through the investment in the interconnector with Sicily will allow us the possibility of being connected to the European energy grid thus providing us with peace of mind in case of emergency on our islands. It also offers us the possibility to become a Mediterranean hub in the future linking North Africa to the rest of Europe and thus enabling us to export energy as well as import.

This National Energy Policy is based on five main principles:

1) Efficiency and Affordability;
2) Security of Supply;
3) Diversification;
4) Flexibility;
5) Sustainability.

These principles bring about a robust energy policy which is good for your home, your job, your health as well as your children. This is the vision that we would like to map out for our islands.

Energy for Your Home - Our aim is to implement our policy objectives that will provide a secure energy supply in your homes whilst ensuring, to the extent possible, that efficient systems are provided at the most affordable price for the consumer. The production costs of energy are what they are which is why this policy looks at alternative ways of bringing about a reduction in the cost of energy to the consumer through more efficiency throughout the system as well as in the use of efficient appliances and renewable energy use in the home.

Energy for Your Job – Securing your jobs and creating new jobs has always been a mainstay of this Government even during the harshest economic climates. This policy looks at ensuring a steady and reliable supply of energy to local industry and commercial entities, thus ensuring the stability of the Maltese economy and investors providing you with your jobs. This Government is committed to seek ways in which to further assist and incentivise business to generate their own energy needs, thus easing the burden of the costs of energy.

Energy for Your Health – A cleaner environment translates into a healthier lifestyle for you and your family. The aim of this Policy document is to place Malta more firmly than ever before on the path of renewable energy as part of our plan not only to diversify our energy sources but also to provide cleaner energy for the general population. Fewer emissions from vehicles, better transport infrastructures as well as less polluting means for the generation of electricity for our daily needs and quality of life.

Energy for Your Children – An Energy Policy by definition is a flexible document that is able to respond to fluctuations in energy markets and advances in technology. Each year brings about new developments in the energy sector providing policy makers with new challenges as to the best and most cost-effective solutions to adopt for the country. This policy creates a firm basis upon which policy makers can assess the various options available today and in the future, thus providing a secure future for your children.

This document brings together a series of other initiatives being undertaken by Government. The National Energy Efficiency Action Plan, adopted towards the end of 2008 and updated in 2011, the Climate Change Strategies, and the revised Solid Waste Management Strategy are clear examples of a Government that is pushing on a number of fronts to make Malta greener and more competitive, in spite of world economic activity slowing down following successive financial crises. This Government will continue to push the energy sector to maintain the pace of its transformation to become more competitive, reliable, secure and environmentally sustainable. It will then be well positioned to meet more stringent future challenges, such as those emerging from the EU 2050 Energy Roadmap.

The Government will continue to develop all the necessary infrastructural and regulatory measures to encourage competition in electricity generation despite a monopolistic distribution network. It will persist in seeking to implement tariff structures that reflect the “polluter pays” principle, and encourage energy efficiency and the adoption of renewable energy technologies while promoting social well-being.

Malta will also carry on working closely with the EU in relation to the on-going debate and activity in the energy sector. It will seek to reap the benefits of an Energy Policy that is based on solidarity, co-

ordination and common action. All this will provide our country with a continuous spur to higher levels of energy governance, coupled with support to achieve the required standards.

I am confident that this Policy document lays the foundations for a secure, clean and efficient energy sector for the Maltese Islands and the Maltese people.

George Pullicino

Minister for Resources and Rural Affairs

1. INTRODUCTION TO THE NATIONAL ENERGY POLICY

1.1. Introduction

Energy is essential to the way people in Malta live. Energy is the life blood of any country's social and economic development. Malta's small land area, lack of natural resources and location on the southern periphery of Europe characterise the performance of its energy sector. Despite these disadvantages, Malta's energy sector has served the country's needs well over the past years, albeit not without presenting concerns in terms of lack of diversification, dependence on single imported fuel sources, relatively high costs associated with small-scale production, and possible risks to security of supply.

Future challenges may furthermore accentuate the effects of Malta's inherent vulnerabilities in the energy sector. Malta is already striving to address these challenges through a number of initiatives, which include the electricity interconnector to Sicily and an increased penetration of energy generation through Renewable Energy Sources (RES).

The last few years have proven to be economically challenging at best given the significant rise in oil prices and the global recession. At the same time, regulatory and social pressures towards the production of energy through more environmentally sustainable sources have been building up. These conditions have set the stage for a radical rethink in the way the energy sector functions in the Maltese Islands.

The challenges that Malta faces are factual. The EU's 2050 targets that seek to reduce the importance of fossil fuels within Europe's energy landscape are, at least at high level, established. On the other hand, it is not possible to forecast what the international financial and economic state of play will be, what technology innovations will emerge, how the prices of energy commodities will fluctuate or whether the predictions relating to climate change will materialise, and if so to what extent.

The transition of Malta's energy system to one that is de-carbonised to the extent envisaged in the EU2050 Roadmap demands that the National Energy Policy is based on environmental and climate change as much as it is based on cost effectiveness and economic growth. For this reason the strategic choices that Malta will make in the energy sector should be energy source and technology neutral and a National Energy Policy should be flexible so as to be able to adapt and adopt technological developments as they emerge.

The key criterion that should drive the selection of a policy instrument is whether a particular policy choice, irrespective of whether it is technology or non-technology based or the constituent energy source on which it depends, will result in the optimal economic, health and environmental (including climate change) return for every €1 invested.

To this aim, the National Energy Policy takes into account Malta's economic and social development by encouraging a proactive and flexible approach aimed at overcoming the challenges that define the energy sector whilst seeking to exploit the opportunities that may arise through technological advancement. This Policy document is based on five fundamental principles:

1) Efficiency and Affordability;
2) Security of Supply;
3) Diversification;
4) Flexibility;
5) Sustainability.

The energy sector is by definition dynamic. In this environment, Malta needs to be adaptable and flexible to maximise on the benefits arising from ever changing technological advancements. This, together with the relatively small scale of production required presents a particular challenge. Any prospective technological advancement needs to take into consideration the Maltese reality as a small island State thus requiring security of supply, price stability, adequate diversification and flexibility in choice of sources.

1.2. Designing the Energy Policy

The first draft of the National Energy Policy was launched for consultation in 2006. This process ended with the launching of the European Commission 3rd Energy Package, which included the revision of the Inland Electricity Market Directive.

The updated draft of the Energy Policy was re-launched for public consultation on 16th April 2009. It was then subject to a Strategic Environmental Assessment (SEA) which ensured that this Policy is in line with national environmental priorities and obligations. The National Energy Policy document takes into account the following:

- The consultation responses to the draft Energy Policy document and the SEA process;
- National and international legislation;
- On-going developments in the sector;
- The recommendations following the SEA process.

The policy measures and projects described in this document are based on the best available knowledge to date and hence will require a pre-determined process of regular review.

1.3. Coherence with Relevant National Policies and Strategies

The National Energy Policy is coherent with other national policies and strategies. These include:

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

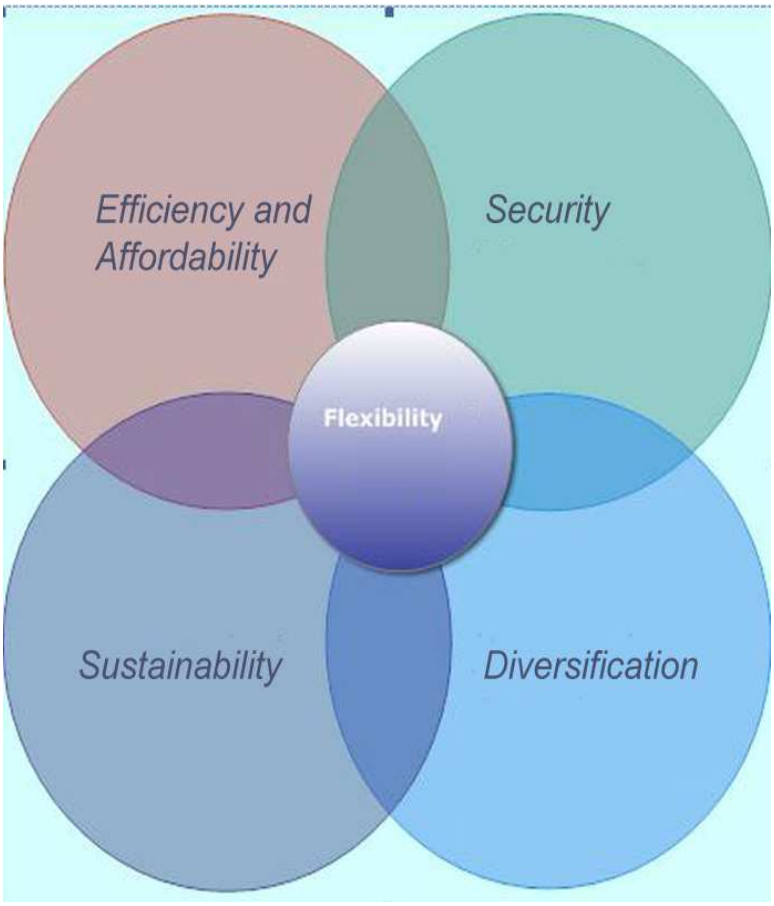
- Climate change strategy and adaptation strategies;
- National Energy Efficiency Action Plan: June 2011;
- National Renewable Energy Action Plan: July 2010;
- Green economy document, draft version for consultation;
- A Solid Waste Management Strategy for the Maltese Islands, First Update, December 2010.

1.4. Objectives of the Energy Policy

As a member of the European Union, Malta is part of the Single European Energy Market committing itself to an energy roadmap which stipulates energy-related targets for 2020 and 2050. Therefore, the Energy Policy must address complex, shifting, and multiple objectives, the most important being (Figure 1.4.1):

a. Energy efficiency and affordability;
b. Sustainability;
c. Energy security;
d. Diversification of sources;
e. Flexibility.

Figure 1.4.1: Thrusts of the Strategic Energy Framework



a. Promulgating efficiency and affordability

Energy Efficiency, also known as wise energy use, attained through the minimisation of costs is key to promoting energy affordability. Energy efficiency involves enabling economic and social growth and development through the minimum use of energy possible. This is in turn obtained in the most cost-effective manner allowed by the available technologies. Energy efficiency strongly involves behavioural elements within a culture of energy conservation. This includes governance and management approaches which focus on the elimination of waste and unnecessary costs, in energy production as well as consumption. It also involves technological issues relating to sourcing the most cost-effective solutions to meet the country's needs.

Energy efficiency therefore does not only depend on decisions taken by Government but of all players in the sector – domestic, commercial and industrial consumers should invest in more energy efficient technologies for the production and use of energy. Furthermore, the attainment of energy efficiency within the specificities of our country needs to be supported by a Research and Technical Development Infrastructure (RTDI) function.

Wise energy use is enhanced through the continued promulgation of education, knowledge and communication across all strata of society incorporating not only citizens but industry and enterprise. This will ensure that all sectors in society will use energy more efficiently which would result in a more economic use of energy at an industrial, commercial and domestic level.

b. Ensuring environmental sustainability

A key principle for any modern energy policy is that of ensuring environmental sustainability or using clean energy. Malta has committed itself to supply 10% of its final energy consumption in 2020 from RES. This Policy aims at outlining the most feasible economic and environmental friendly way forward with regard to meeting these targets and beyond.

The main challenge under this heading is the fact that the capital investment required for RES technology electricity generating plant may still be higher than that of conventional electricity generating plant although the costs are rapidly reducing to levels where certain RES technologies are becoming competitive with conventional generation. This is especially relevant in a country where the possibilities for large scale production are limited by territorial size and characteristics, the extent of the market itself and possibly climatic considerations.

Moreover, with the coming into effect of the EU Emissions Trading Scheme (ETS) on the 1st January 2013, another external factor will affect the cost of energy, as CO_2 emissions will have to be paid for with allowances (EUA's) purchased through auction or the open market. The Climate Change Committee on Mitigation in its work with the Economic Planning Division had estimated that the total allocation to Malta for the whole 2013-2020 period will be 16.9 million tonnes of CO_2 which the Government may auction to generate revenue which will be partly used for climate change related projects and initiatives. The operator, Enemalta Corporation, would have to purchase allowances to cover its CO_2 emissions, which will be an additional cost input to the cost of electricity.

The primary challenge is using clean energy to the extent that it is economic and climate change feasible across all sectors of the economy. In this regard, Malta will contribute to the climate change challenge as agreed in Copenhagen in 2009, in Cancun in 2010, in Durban in 2011 under the auspices of the United Nations Framework Convention on Climate Change . In Doha 2012 Malta, together with the other 26 Member States and the European Union, adopted an amendment to the Kyoto Protocol which operationalized a second commitment period under the Kyoto Protocol beginning on 1 January 2013.– as well as international agreements that may arise following the Doha discussion underway. Additionally, the National Energy Policy will also position Malta in a manner that will allow it to design and implement future action that will enable Malta to contribute to meeting the targets established in EU Energy 2050 roadmap which seeks to decarbonise the EU energy sector between 80% to 95% on 1990 levels. Additionally, Malta will seek to secure, within its geographical and territorial constraints, a degree of energy independence through the promulgation of clean energy by renewable energy sources.

c. Energy Security

It is important for the Energy Policy to address the critical issue of security of supply. This is further compounded by the reality that Malta is a small Island State on the southern perimeter of the European Union. Considerations need to be taken within such a policy to ensure a sufficient security of supply framework directed to meet with emergencies and unexpected events.

In addition, energy security is strongly related to the establishment of strong international linkages with the EU states as well as our Mediterranean neighbours. This would secure better control over the security of energy supply and minimise the exposure to the volatility of world energy prices. In this regard, Malta will continue to ensure stable, affordable energy supply in a state of play where security of supply can be a key challenge in the medium and long term given the continued economic growth of countries such as China and India.

d. Diversification of sources

It is important for Malta to look at diversifying its energy mix so as to minimise the risks attendant with excessive reliance on any one particular source or type of energy and technology, including those emanating from the possibility of future changes in costs. Diversification could require, for example, complementing mainstream electricity sources with smaller scale facilities relying on alternative primary sources and technologies which can be developed in a gradual manner over time. In the energy sector, alternative fuels and modes of transport could also be envisaged.

The pursuit of diversification could also require that Malta would consider on its own or in tandem with other Island states to invest in research, development, and commercialisation of new technology that can exploit the vast sea resources available to it – such as the use of deep offshore wind technology, the application of sea based concentrated solar power or the application of sea based PV solar farms. The exploitation of the sea for solar based energy production as against deep sea wind farm energy production or other emerging technologies is more likely to arise through indigenous based research, development and innovation (RDI) that is tailored towards the innovative design of technologies that overcome the peculiar geographic challenges that Malta, and other small islands and island states, face.

Whilst diversification is important, it is important to ensure that policy measures adopted balance the economic, social, health, environment and climate change needs.

e. Flexibility

Decisions regarding investments in the energy sector necessarily have to take into consideration the technological advancements that characterise the sector. Flexibility is key to be able to reap the benefits of such developments, which may often be restricted to countries which are relatively small and at the periphery of mainstream energy markets.

Thus, the choice of investment should take into consideration the possibility for future adaptation to reap the potential benefits of technological advancement. Indeed, the choice of the technology options selected to support an Energy Policy objective is, too often, a decision with long term impacts – whether this is conventional power plant technology, solar based technology, waste to energy technology, or wind based technology – spanning a minimum economic life of over 20 years. The decision making with regard to the technology option to be selected, therefore, must assess not only the capital cost of such a technology but, rather, the total cost of ownership of the selected technology over its life time – with regard to economic, financial, health, environmental as well as climate change impacts.

Such decisions are also taken within the context of constant innovation leading to, at times, exponential decreases in the respective capital and operational expenditure of energy related technologies. PV technology, for example, is today mainstreamed and mass produced and in some jurisdictions has reached grid parity (i.e. energy produced by PVs has reached the same cost of energy produced from fossil fuels). It is on this basis, therefore, that the National Energy Policy, must provide a direction with regard to the optimal combinations amongst the diverse technologies that are suitable for Malta.

1.5. Objectives of the Energy Policy

The following tables summarise the proposals presented in the National Energy Policy.

Table 1.5.1: Recommendations related to the Primary Energy Sector

	Recommendation	Owner	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
F1	Optimal flexibility to maximise diversification of energy imports and maximise exploitation of indigenous sources of energy.	Lead: MRA MRRA																			
F2	Require separate and unbundled regulatory accounts for the fuel infrastructure and by fuel type to ensure the new operator operates in a transparent manner, following commercialisation of Enemalta fuels assets.	Lead: MRA Privatisation Unit Enemalta MRRA																			
F3	Investigate the possible solutions to encourage new entrants in petrol market.	Lead: MRA																			
F4	Vigilance and investigation on prices of automotive fuel sold from Petroleum Filling Stations.	MCCAA																			
F5	Finalise the remaining aspects of the policy regarding security stock holding and its implementation.	Lead: MRA MRRA																			
F6	Continue to monitor and enforce compliance with quality standards and fair competition in the fuels markets.	Lead: MRA - Monitoring Lead MCCAA - Competition																			
F7	Carry out a holistic study on all available sources of energy to be used as a basis for creating incentives for their rational use, depending on their characteristics and in line with general Energy Policy objectives.	Lead: MRA MRRA																			
F8	Assess market incentives designed to influence consumer behaviour towards a more efficient use of energy and use of cleaner energy sources.	Lead -M FEI MRA																			
F9	Comply with the fuel ground handling Directive	Lead - MRA MCCAA MFEI Enemalta MITC																			
F10	Analyse the potential for future expansion of storage facilities with due regard to the need to enhance security of supply for local consumption, efficient use of existing facilities to foster competition with due regard to the environment.	Lead - MFEI MRRA MTCE MEPA MRA																			
F11	Carry out feasibility studies on the potential for a natural gas infrastructure. Pursue the implementation of the natural gas infrastructure if feasible and subject to EU financing.	Lead - MFEI MRA MRRA																			

Table 1.5.2: Recommendations related to the Electricity Sector

	Recommendation	Owner
E1	Commission and put into service the Delimara Power Station extension.	Lead - Enemalta
E2	Shut down Marsa Power Station.	Lead - Enemalta
E3	Construct the Malta-Sicily interconnection.	Lead - Enemalta
E4	Determine the best on-island generation mix and operational and market strategies in the event of full integration with European and other energy grids.	Lead - Enemalta
E5	Negotiating a power purchase agreement for the purchase of electricity over the submarine interconnector that is economically strategic to Malta's requirement	Lead - MFEI MRA MRRA Enemalta
E6	Determine a strategy to replace the Delimara plant that is flexible and that diversifies Malta from the use of oil as an energy source whilst at the same time ascertaining security of supply	Lead - MRA Enemalta MFEI
E7	Switch island generation plant to natural gas.	Lead - MRA MRRA MFEI Enemalta
E8	Continue the Smart meter programme. Launch a multi tariffs policy to shift demand to non peak hours across all consumer sectors Introduce demand side management measures.	Lead -ARMS Ltd Lead - Enemalta Lead - MRA
E9	Reinforce the distribution system.	Lead - Enemalta
E10	Ensure that the procurement of fuels is done through transparent and robust procedures, and regulated by financial instruments, with the backing of the best expert advice.	Lead - Enemalta MFEI MRA
E11	Continuing to take the necessary measures to combat energy poverty.	Lead - MJDF MFEI

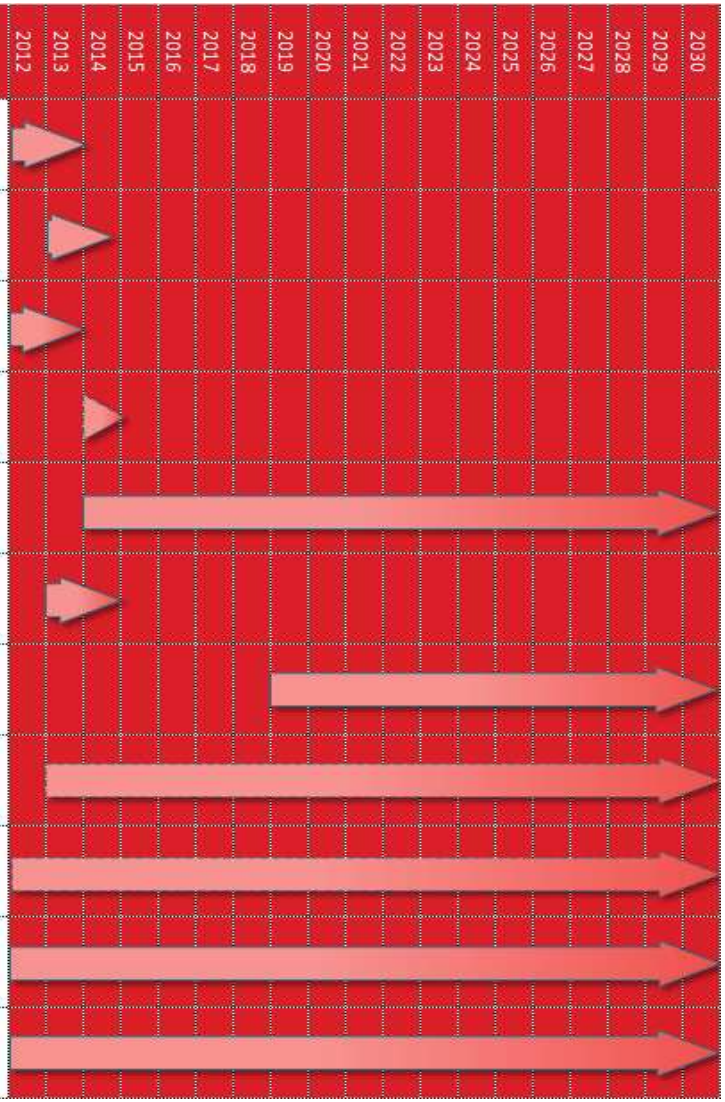
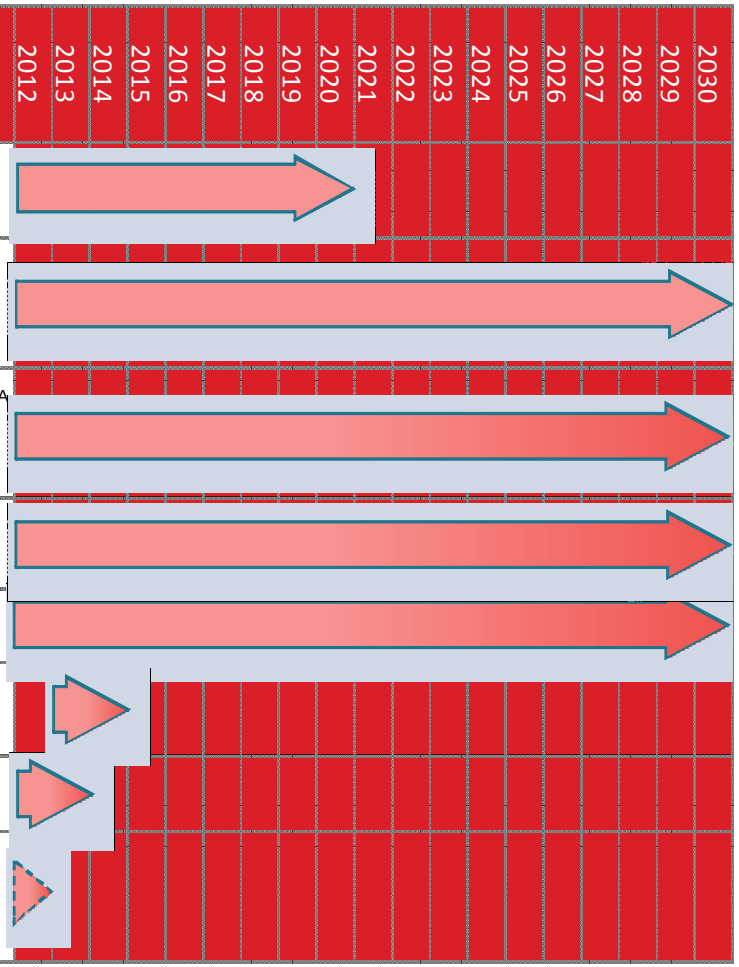


Table 1.5.3: Recommendations related to the Renewables Sector

	Recommendation	Owner
RES1	Ensure the timely implementation of the NREAP and take corrective actions where necessary to meet the biannual targets and the 10% target by 2020.	Lead - MRRA
RES2	Continue to review the cost-benefit assessment of the NREAP, which should include externalities and new technologies, which as they become available can provide better cost-benefits, including contingency options, such as a co-operative mechanism.	Lead - MFEI MRRA MRA
RES3	Public information programmes to raise citizens' appreciation of the implications of climate change and their obligations towards future generations. Educate consumers through Energy Audits amongst other instruments on how to use Smart Meters (where implemented) to manage consumption better.	Lead - ARMS Ltd & MRA NGOs MRRA
RES4	Design public-private investments and public private investment schemes respectively for large RES projects such as the near offshore wind farm.	Lead - MFEI MRRA
RES5	Promote private investment in R&D&I RES micro generation.	Lead - MRRA MCST UoM
RES6	Communal medium scale PV projects specifically designed for small investors and for households who do not have access to a roof top..	Lead - MRRA
RES7	Introduce feed-in tariff support without grant option for PV.	Lead - MRA MRRA MFEI
RES8	Develop the legal and planning framework to support RES success.	Lead - MRRA MEPA MRA MEPA



Recommendation		Owner	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
T1	Continue to create incentives to encourage a shift towards public transport by providing a public transport service that meets the public's aspirations. Underline lessons learnt of public transport reform, and further action required to secure a successful modal shift away from private vehicles to public transport Work with public transport operator to introduce Green Travel plans.	Lead - TM Public transport operator MITC																			
T2	Ensure (through regulatory means) that the public transport operator provides a fuel efficient service: including the exploration of use of bio-diesel as an energy source.	Lead - TM Public transport operator MITC MRA																			
T3	Introduce measures directed to achieve by 2030 up to a 35% improvement in fuel efficiency among private transport users by adopting measures that include but are not limited to the following: (i) Public awareness campaigns on issues such as eco-driving. (ii) Increase the registration fee of heavy fuel consuming private vehicles. (iii) Support the vehicle scrapping scheme directed to incentivise the replacement of the old vehicle by a brand new (and not second hand) vehicle that is fuel efficient and which has a low carbon footprint. (iv) Introduce as a mandatory requirement for all heavy commercial vehicles to be equipped with remote telemetry devises which measure CO2 emissions on a constant basis, whereby heavy commercial vehicles which surpass an agreed threshold of CO2 emissions will not be allowed to remain on the road unless works are performed on the vehicle to bring CO2 emissions in line within the maximum threshold, or the maximum load allowed for the vehicle is reduced	Lead - TM MRA MITC MFEI MEPA MHEC																			
T4	Traffic congestion reduction in Malta through measures which include but are not limited to the following: (i) Discussions with stakeholders to stagger the opening of schools in order to alleviate the moving grid lock experienced daily during the scholastic terms. (ii) Introduce CVA frameworks supported by park and ride facilities site in strategic areas. (iii) Introduce under the 2014-2020 EU Partnership agreement, a programme for road infrastructural development directed to remove network congestion bottlenecks	Lead - TM MITC MEDE MUT PPCD																			

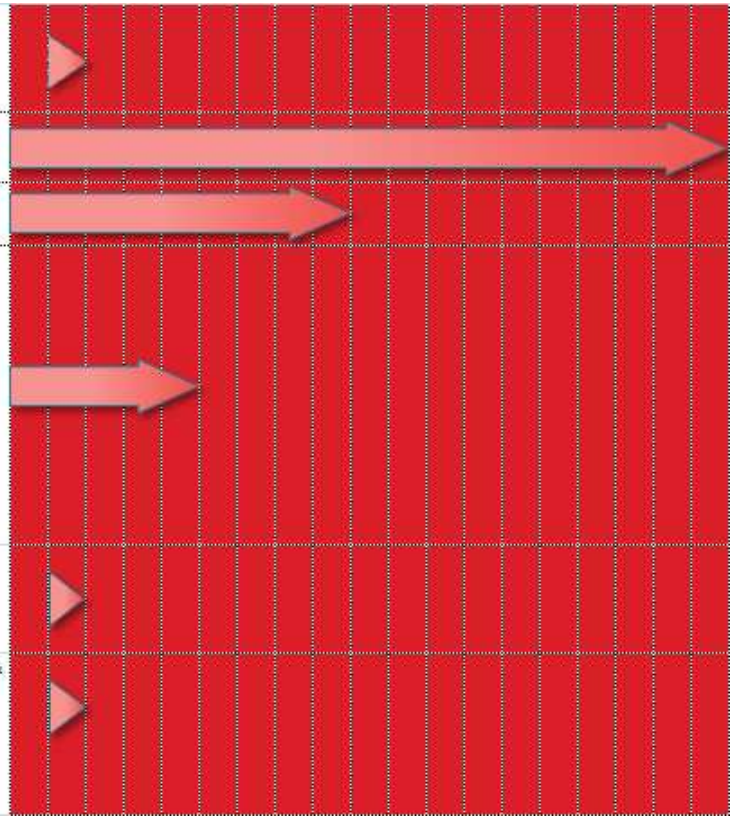
Conclude studies leading to the determination of whether the requirement that new buildings are to integrate RES sources – particularly solar based RES - is to be introduced as a mandatory planning requirement.	Lead - BRO MEPA	
Monitor and enforce regulatory framework relating to bio-liquids (bio-fuels discussed under Chapter relating to Transport).	Lead - MRA MEPA	
Ensure there are stable and transparent incentives/regulatory framework.	Lead - MRA MRRA	
Identify on-shore and off-shore sites, (at least one at transitional deep waters and one in very deep water) to undertake technical and environmental studies that would eventually be required for consenting RES projects at such sites. Initially non-technology specific baseline studies will be conducted. Technology-specific studies will be conducted at a later stage, once the most appropriate technology has been identified. Environment Impact Assessments will be carried out at the earliest appropriate moment so that process leading to the issuance of permits for the development of such farms is streamlined to the extent possible. Design of a legal and financial framework to support marine based RES solutions and thus removing any ambiguities in Maltese Law.	Lead - MEPA MRRA MTCE MFEI	
Streamline red-tape to fast track private RES investment	Lead - MEU MEPA MRRA SPS	
Direct R&D&I research to Malta's strengths: solar and marine based technologies (including wind). Work with the EU and other Island States to direct financing towards marine based RES solutions	Lead - MCST, UoM & MRRA Private Sector MFA	

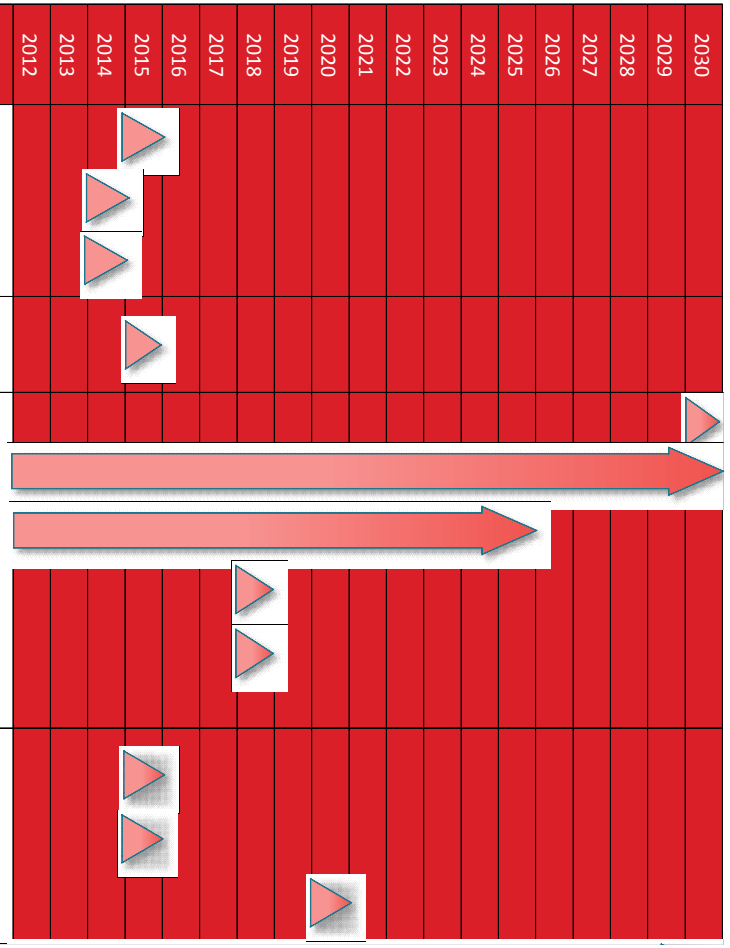
Table 1.5.4: Recommendations related to Energy Efficiency

	Recommendation	Owner
EE1	Ensure that all the set targets in the NEEAP are reached in a timely, structured and cost-effective manner through continually keeping the plan updated.	MRRA BRO
EE2	Keep under review the cost-benefit assessment of the various options relevant to the NEEAP and the set targets.	BRO MRRA
EE3	Continue, and where appropriate, intensify on-going measures and periodic schemes. Schemes should be designed and if necessary amended to reach the strategic objective of influencing market (and consumer) behaviour. Introduce a portal that provides users with interactive knowledge and information on energy efficiency. Works with stakeholders such as GRTU and the Chamber of Commerce to fill information gaps in the commercial and industrial sectors with regard to energy efficiency with specific attention to Micro-Enterprises, SMEs, agriculture and rural operators, etc. Work with and support Local Council efficiency measures directed to assist them meet the Covenant of Mayors targets on clean energy.	MRA MRRA BRO MFEI Malta Enterprise Local Councils Association and Local Councils Constituted bodies (GRTU, Chamber, MHRA)
EE4	Continue to incentivise the meeting of minimum requirements aimed at improving the energy through efficiency of buildings of incentives that include but are not limited to the following: o Use of insulation materials to reduce the passage of heat through the building. o Designing apertures to decrease the effect of solar overheating. o Introducing control of heating and cooling systems.	BRO MRRA MEPA MFEI MRA

	Recommendation	Owner	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
EE5	Review the threshold where energy management plans for major projects are required.	MRRA MRA BRO																			
EE6	Government will assess the need to revise the National Energy Efficiency Action Plan (NEEAP) by carrying out a full review of the framework relating to the governance of energy efficiency of new buildings and buildings will be carried out in 2013. Government will strengthen the ex-ante and ex-post regulatory and enforcement measures to ensure that new buildings and projects relating to rehabilitation or refurbishment of existing buildings with the aim to: - Future-proof' the minimum efficiency standards for building components. - Ensure that Malta's standards maximise the potential to achieve energy efficiency and that they make the maximum practical contribution to achieving CO2 emission targets.	MEPA BRO MRA MRRA																			
EE7	Investigate ways in which high efficiency co-generation may be promoted.	MRA MRRA																			
EE8	Achieve energy savings across the public service and sector and will continue to apply green practices with regard to recycling / waste minimisation; office consumables and equipment. Measures to include: Installing meters/sub meters in all Departments/entities where this is not present to keep track of consumption by each Department/entity Drawing up a central policy to remove all extra refrigerators. Switching off permanently a number of water heaters which are not used frequently – through the use of supply timers Carbon footprint of each government building will be displayed on a plaque in building receptions with the related figures Undertake and implement recommendations of energy audits Eliminate energy misuse in public buildings and responsibilities vis-a-vis energy behaviour at work. Maintain the current action for green public procurement by the Government to be amongst best performers in Europe Any property rented by Government from the private sector, including for the provision of social accommodation, meet the national minimum energy efficiency standards. Continue to revise and update guidelines with regard to development of new education, health and social facilities as well as industrial estates to ensure that such buildings meet the targets	All Government																			

Table 1.5.5: Recommendations related to the Transport Sector

	Recommendation	Owner
T1	Continue to create incentives to encourage a shift towards public transport by providing a public transport service that meets the public's aspirations. Underline lessons learnt of public transport reform, and further action required to secure a successful modal shift away from private vehicles to public transport Work with public transport operator to introduce Green Travel plans. For example work with Government to introduce green shuttle service that takes public officers to and back from work.	TM Public transport operator MITC
T2	Ensure (through regulatory means) that the public transport operator provides a fuel efficient service: including the exploration of use of bio-diesel as an energy source.	TM Public transport operator MITC
T3	Introduce measures directed to achieve by 2030 up to a 35% improvement in fuel efficiency among private transport users by adopting measures that include but are not limited to the following: (i) Public awareness campaigns on issues such as eco-driving. (ii) Increase the registration fee of heavy fuel consuming private vehicles. (iii) Support the vehicle scrapping scheme directed to incentivise the replacement of the old vehicle by a brand new (and not second hand) vehicle that is fuel efficient and which has a low carbon footprint. (iv) Introduce as a mandatory requirement for all heavy commercial vehicles to be equipped with remote telemetry devises which measure CO2 emissions on a constant basis, whereby heavy commercial vehicles which surpass an agreed threshold of CO2 emissions will not be allowed to remain on the road unless works are performed on the vehicle to bring CO2 emissions in line within the maximum threshold, or the maximum load allowed for the vehicle is reduced	TM MRA MITC MFEI
T4	Traffic congestion reduction in Malta through measures which include but are not limited to the following: (i) Discussions with stakeholders to stagger the opening of schools in order to alleviate the moving grid lock experienced daily during the scholastic terms. (ii) Introduce CVA frameworks supported by park and ride facilities site in strategic areas. (iii) Introduce under the 2014-2020 EU Partnership agreement, a programme for road infrastructural development directed to remove network congestion bottlenecks	TM MITC PPCD



Recommendation		Owner	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
T5	More effective traffic management.	TM/MITC																			
T6	ITS-enabled bus priority measures.	TM																			
T7	Green travel plans at university and colleges. Support measures that aim to achieve greater energy efficiency from the transport sector and influence behavioural change, including car sharing schemes. Support the use of the water taxi service system to secure a sustained inner harbour modal form of transport to the use of a private vehicle affordable and attractive	TM																			
T8	Promotion of e-work or tele-working	Government/ Ministries/private sector																			
T9	Build the necessary infrastructure to facilitate the uptake and use of electric vehicles and raise awareness through the Life + project.	MRRA																			
T10	Create incentives for the purchase and use of electric vehicles as well as plug-in hybrids.	TM MFEI																			
T11	Carry out in-depth survey on transport use to understand better the land transportation sector.	TM/MRA																			

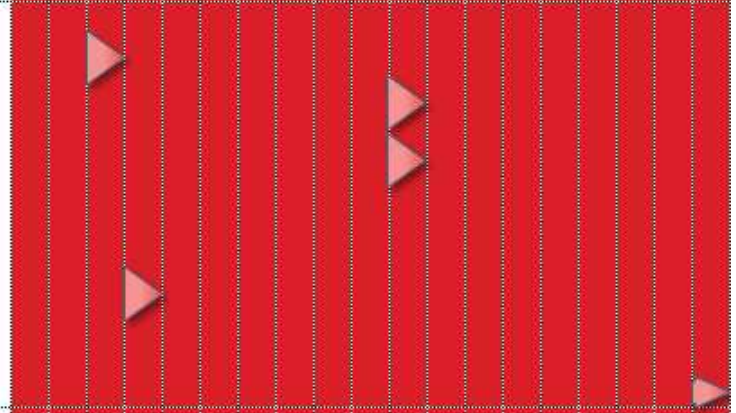
T12	Comply with fuel ground handling directive	Lead - MRA MCCAA MFEI EMC MITC	
T13	Conclude discussions with MEPA, Environmental Health Unit and the MRA on the introduction to the market of a renewable fuel substitute for petrol that is both environmentally and financially sustainable All diesel vehicles owned or leased by Government will reach a bio diesel blend of 15% (bio-petrol vehicles will be placed on same baseline should a bio-petrol that meets health and environment standard be identified). Diesel vehicles of contractors working for Government will incrementally reach a bio-diesel blend of 15% (bio-petrol vehicles will be placed on same baseline should a bio-petrol that meets health and environment standard be identified). Assess market instruments directed to render bio-diesel as an attractive substitute(bio-petrol vehicles will be placed on same baseline should a bio-petrol that meets health and environment standard be identified). Bio-diesel blend for private vehicles and pleasure sea vessels boards will be statutory increased to 15% (bio-petrol vehicles will be placed on same baseline should a bio-petrol that meets health and environment standard be identified).	Lead - MRA TM MEPA MHEC MFEI	
T14	Escalate efforts for the introduction of the Single European Sky.	Lead - TM MRA	

Table 1.5.6: Recommendations related to Hydrocarbon Exploration

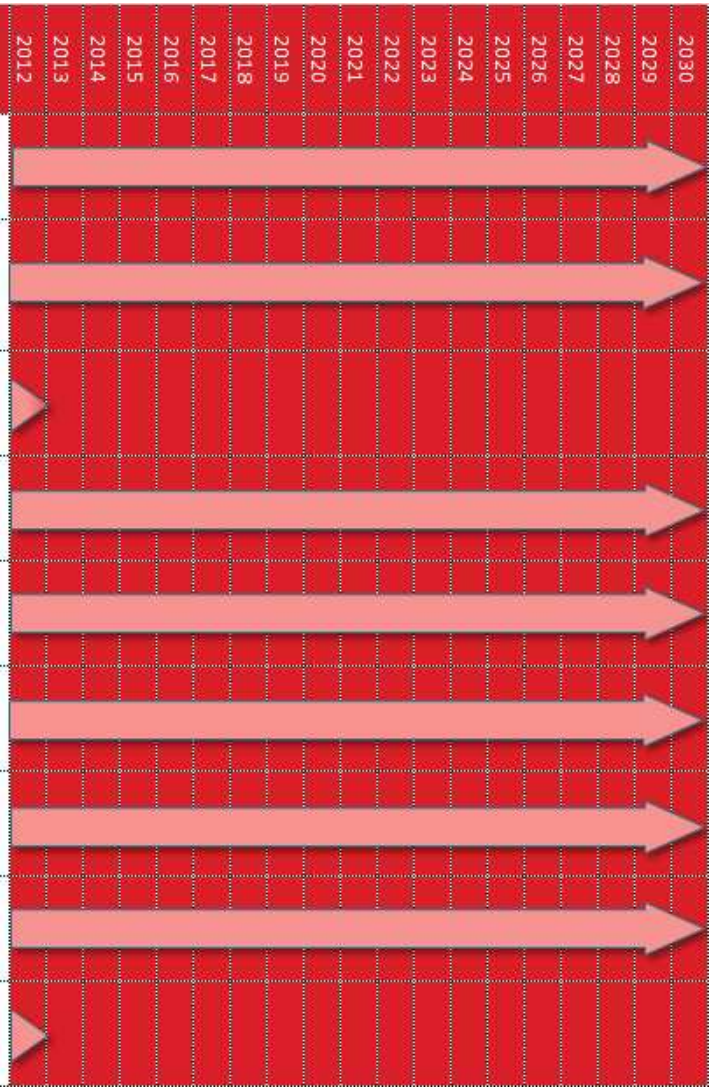
Recommendation		Owner	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
HE1	Government will continue to intensify hydrocarbon exploration by oil companies.	Lead - MRRA OPM MRA MRRA																			
HE2	Government will continue to negotiate with neighbouring countries, where disputed boundaries exist, to enable oil exploration to take place in currently disputed areas.	Lead - MRRA OPM MFA MRA																			
HE3	Government will ensure that exploration operations are carried out in an environmentally acceptable and safe manner, consistent with the best international industry practice and as required by local and international legislation.	Lead - MRRA OPM MRA																			

Table 1.5.7: Recommendations related to Climate Change

	Recommendation	Owner	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
EC1	Ensure the implementation of measures such as: the new, more efficient generation plant at Delimara Power Station, the electricity interconnector, a switch to natural gas, energy efficiency as per NEEAP, the NREAP, measures in road transport and education campaigns on energy use efficiency, since all contribute towards climate change action and improvement in air quality.	Lead - MRA Enemalta Corporation/ Government/private sector																			
EC2	Ensure that the energy-related GHG emissions from the non-EU ETS remain within the limits required by the Effort Sharing decision.	Lead - MRA TM MFEI MRRA BRO																			
EC3	Ensure that Enemalta operates the new generation plant in such a way as to achieve compliance with the applicable emission standards for this plant and mitigate the effect of waste production.	Lead - MEPA MRA Enemalta																			
EC4	Continue and possibly intensify the monitoring of fuel quality used in the inland market and bunkering.	Lead - MRA TM MITC																			
EC5	Assess the feasibility of carbon capture technology, transport and suitable carbon storage sites.	Lead - MRA																			
EC6	Carry out education campaigns on climate change issues related to energy.	Lead - MRA MRRA																			
EC7	Consider revising the substitution obligation targets to aid in the achievement of the ESD targets.	Lead - MRA MFEI MRRA																			

Table 1.5.8: Recommendations on Supporting Actions

	Recommendation	Owner
SA1	Ensure a proper regulatory oversight in the market both in regard to competition and also enforcement of regulations related to safety.	Lead - MRA MCCAA
SA2	Continue to streamline the regulatory function while ensuring that the right regulatory oversight on the market is maintained, and avoidable burdens on the operators are removed, while safeguarding consumer interests. Reduce the burden on the operators and consumers so they may benefit from a better service.	Lead - MEU BRU MRA MCCAA
SA3	Ensure that a certification scheme for RES installers is in place.	Lead - MRA MRRA
SA4	State financing in the form of grants for research, development and innovation in science and technology through the National R&I Programme.	Lead - MCST MFEI
SA5	Promotion of, and participation in, the EU Research Framework Programme (FP).	Lead - MCST OPM PPCD
SA6	Increased participation in national and transnational research projects.	Lead - MCST & UoM
SA7	Increased research on the adaptation of technologies to the local market, especially in the case of RES.	Lead - MCST & UoM
SA8	Training of the workforce at different levels for green jobs related to the uptake of renewable energy sources technology.	Lead - ETC UoM MCAST CDRT
SA9	Conclude MOU between MRA and UoM.	Lead - MRA & UoM MEDE MRRA



1.6. Financial Considerations

The consideration of financial costs of the supply of energy to any economy is critical to the performance of the energy sector in a country. In the case of Malta, energy costs for households, inclusive of electricity, transport and heating are estimated at 7.3% of total household expenditure, which is significant but lower than the average for the EU, standing at 10.3%1. In terms of costs to the overall economy, energy is likely to be present even more significant effects. When considering the energy intensity of the economy, it is likely that the cost of energy in relation to GDP would for Malta be at around 10% of GDP.

This policy document contains a mix of strategic directions and proposals for further consideration and study, within the context of changing market dynamics affecting the cost of capital investments and of fuel. It is furthermore important to consider that any future decisions to be made with respect to the energy sector must be viewed as contributing to an already existing infrastructure, with a legacy of costs. For this reason, discussions on costs associated with strategic policy directions and/or proposals put forward in this document are at this juncture premature, to be studied at a later stage where such considerations can be more fruitfully made. This would be closer to a situation of defining action plans with respect to specific initiatives and measures. Situations may also be contemplated where energy may become a source of export revenue to the country, potentially through a hub concept if not through the extraction of fossil fuels.

It is thus crucial that specific actions and measures which will be undertaken under the umbrella of this policy document would take full consideration of financial implications, spanning issues including:

- The cost of capital expenditure;
- Operational and maintenance costs, including those related to fuel and environmental/climate change operation and management;
- Costs of reinvestment;
- Possible cost savings through the introduction of efficiencies as compared to technologies being phased out or replaced;
- Possible cost savings through the avoidance of market volatility or through enabling enhanced methods of energy production planning;
- Possible cost increases on the capital recovery of existing infrastructure due to the crowding out of production from such infrastructure, or to a redundant residual value and other costs upon its decommissioning;
- Costs associated with risks inherent in newer technologies.

These costs would be valued with a more significant degree of precision at the stage of implementation of specific initiatives and actions, but always within the context of the holistic approach to the energy sector in Malta as set out in this document. Such exercises would have to be carried out in a manner which would provide the required information for the policy makers and regulatory authorities to ensure that:

[1] Source: Eurostat, Weights within the HICP.

- Energy is available in a manner which meets strategic objectives in the most efficient manner possible;
- Security and sustainability of supply is guaranteed by ensuring the long-term financial sustainability of energy provision without imposing unnecessary burdens on the consumer;
- There is a socially fair distribution of the burden of energy cost, avoiding the problem of energy poverty.

While this policy focuses on enhanced efficiency in energy provision in Malta, it cannot imply that this would entail effective reductions in the costs of such energy to households and to the overall economy. The modernisation of the energy procurement and distribution system, the enhancement of flexibility and security of supply, while meeting ever more exacting environmental standards in the energy sector are likely to impose ever higher burdens on the costs of energy provision globally, and invariably also locally. This, in an environment where the global prices of fossil fuels are expected to continue on a steady upward trend. Whereas capital investment costs could be expected to be mitigated by improvements in technology and mass production, particularly in the renewable energy sector, it is likely that such advantages would likely be constrained by an increase in demand for such technologies.

Thus, while this policy places affordability and efficiency as a key tenet of future actions within the energy sector, it cannot credibly promise any perceptible decline in the costs of energy to the country. It is very likely that the country's total expenditure on energy can be contained only through reduced consumption. It is for this reason that the policy also focuses on win-win actions which are likely to reduced excessive demand for energy while producing environmental and financial dividends.

1.7. Putting the Policy into Practice

The National Energy Policy guides the development and upgrading of the Maltese energy sector, enabling it to meet today's challenges and to perform well in the foreseeable future. This is accompanied by an analysis of the strengths and weakness of the sector and the determination of actions, measures and investments needed to enhance its strengths and eliminate or mitigate its shortcomings.

In order to ensure the successful implementation of an Energy Policy, it is important to establish a strong and reliable governance structure. This element, together with the monitoring aspect of the implementation process is discussed in Chapter 15. Once these measures are implemented, the energy sector that will emerge will be different from the one that exists today. The major changes will arise as a result of:

- Malta's connection with the European energy grid and the elimination of Malta's traditional energy isolation;
- The gradual transition to a viable liberalised energy sector driven by competitiveness and controlled by a robust regulatory framework;
- A more efficient and cleaner energy sector with the participation of renewable energy in the national energy mix.

The National Energy Policy is based over a medium term period – looking at 2020 and beyond. Due to the volatility of the sector, it is recommended that measures and action items that stem from the National Energy Policy are reviewed every three years.

2. BREAKDOWN OF THE ENERGY POLICY

This chapter outlines the different sections of the National Energy Policy and proposes ways in which to reach its objectives. This document is structured as follows:

Chapters 1-3 – Introduction and the National Context

This Section covers the context within which the energy sector operates - the objectives of the Energy Policy and the likely future direction of the energy sector, consistent with the EU 2020 vision and Malta's Climate Change commitments.

Chapter 4 – The Policy Statement

This Section outlines the policies that Government is proposing in order to meet the expectations and needs of the citizens, the economy and the country. Government's policy is to guarantee security of supply of energy and energy services, to ensure competitiveness and the achievement of national obligations to protect the environment

Chapters 5-12 – Measures, projects and programmes

Although this policy covers the energy sector holistically, for the sake of analysis it is considered under seven segments:

1. Primary Energy Sources;
2. Electricity (generation, distribution and supply);
3. Renewable Energy Sources;
4. Efficiency;
5. Transport;
6. Hydrocarbon exploitation;
7. Environmental care.

Each segment describes the present situation, a summary of the main issues analysed and programmes and measures to meet the Energy Policy objectives.

Chapter 13 - Energy Policy supporting action

This section describes actions that are considered as supporting the implementation of the policy measures, including competition, research, training and better regulation.

Chapter 14 Energy Roadmap 2050

This Section is a summary of the main messages and challenges of the EU Communication 'Energy Roadmap 2050', currently being discussed at European level, and a first insight into the implications of this strategy for Malta.

Chapter 15 Strategic Holistic Approach to the Attainment of the Energy Policy

This section presents actions that are to be adopted with regard to the implementation and management aspects of the policy.

3. CONTEXTUALISING THE ENERGY POLICY FOR MALTA

3.1. Introduction

The 2012 'Rio + 20' United Nations Conference on Sustainable Economy discussed the way forward in the context of a green economy and the institutional framework for development. It reiterated that a rethinking of the mainstream model for economic growth is clearly desirable, and a 'low carbon economy' model has been proposed. The European Union is a promoter of this model, which is designed to secure growth whilst improving human well-being, providing jobs, tackling poverty and preserving the natural capital.

This section is intended to place the development of the National Energy Policy within the global and European Union context, in particular the EU Energy Strategy[2,] so as to ensure that that the policy incorporates the best elements from international thinking and the more forward-looking policies within the European Union, and is alert to developments in the Mediterranean Region.

3.2. The Global Context Energy

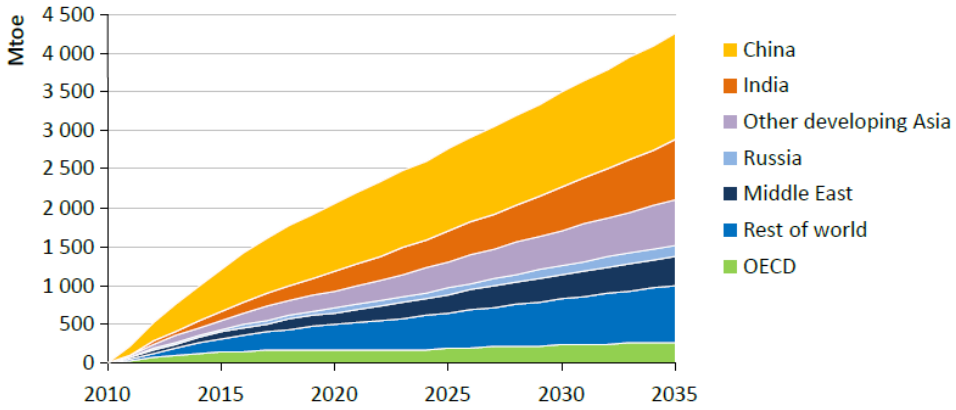
Presently, more than 80% of global energy production depends on oil, coal and gas. Coal has accounted for half of the increase in energy use in the last decade, mainly due to its use in emerging economies.

The International Energy Agency (IEA) World Energy Outlook 2011 provides a forecast on how the global energy demand and supply will evolve from 2010 to 2035 (Figure 3.2.1). Assuming that governments will follow through on the (non-binding) pledges that they have made to reduce emissions and deploy renewable energy sources, the following key conclusions are derived:

- Global energy demand is expected to grow by 30% by 2035, with China and India accounting for 50% of this increase;
- Oil imports in the EU will exceed those of the US by 2015. Overall, the Middle East and North Africa are expected to supply the bulk of the increase in the demand of oil by 2035;
- Natural gas demand will increase by 1.7 trillion cubic meters and 40% of this increase will be met by unconventional natural gas supplies (shale gas etc.). Overall, Russia will remain the main producer of natural gas followed by the US which will take the lead with respect to the exploitation of unconventional gas resources;
- Renewable energy and natural gas are expected to meet around 67% of the growth in energy demand;
- The increasing share of renewable energy will require intensive investment;
- By 2035, the dependency of the European Union on coal is expected to decrease whilst India will become the largest importer of coal. The use of coal in power generation will depend on the improved efficiency of the plants and the success of Carbon Capture and Storage (CCS).

[2] This section quotes extensively 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions Energy 2020 A strategy for competitive, sustainable and secure energy; EU Energy website; ec.europa.eu/energy and IEA Energy Outlook 2011.

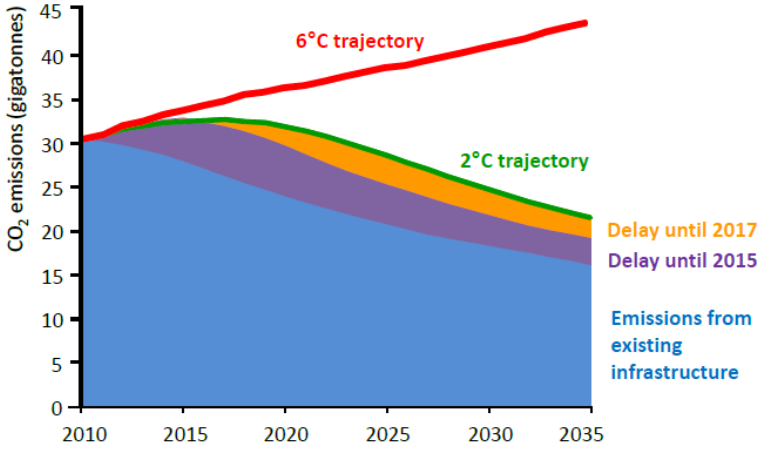
Figure 3.2.1: Global Energy Development Forecast up to 2035



Source: IEA energy outlook 2011

Despite measures already being taken, on a global level the Greenhouse Gas (GHG) emissions from energy consumption are expected to continue to increase (Figure 3.2.2). By 2035, the cumulative CO2 emissions from 2010 will account for more than three-quarters of the total emissions since 1900, with China's per-capita emissions matching the Organisation for Economic Co-operation and Development (OECD) average. By 2017, this trend will bring GHG emissions closer to the limits currently envisaged under a 20C temperature increase trajectory,[3] considered by many to be the limit on temperature increase beyond which the effects of climate change will be devastating.

***Figure 3.2.2**: CO_2 Emissions Development Forecast up to 2035*



[3] IEA energy outlook 2011

Source: IEA energy outlook 2011

With the ultimate aim being the 2°C trajectory, the IEA's World Energy Outlook 2009 presents a so-called 450 Policy Scenario which describes a pathway for energy-related emissions of CO_2 that is consistent with a peak in atmospheric concentrations of GHG of 450 ppm. This scenario requires action beyond that which is currently being implemented or contemplated, including action by the main emerging economies, such as China and India.

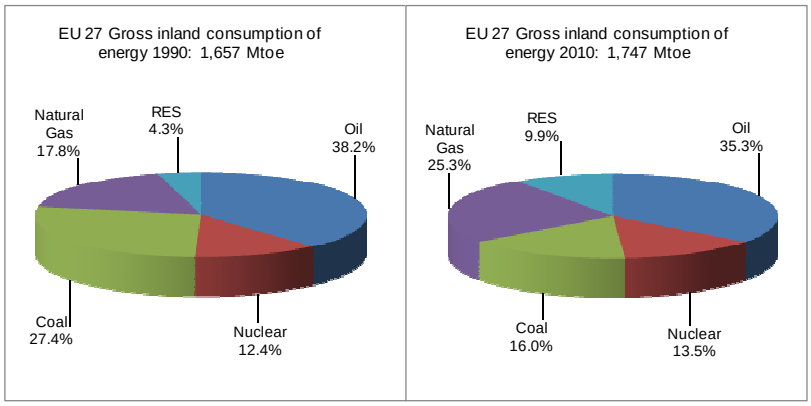
A less ambitious New Policies Scenario leads the world on a trajectory that results in a level of emissions consistent with a long-term average temperature increase of more than 3.5°C whilst a Current Policies Scenario represents a track towards a temperature increase of 6°C or more.

3.3. The EU Energy Strategy

3.3.1. EU Demand and Supply

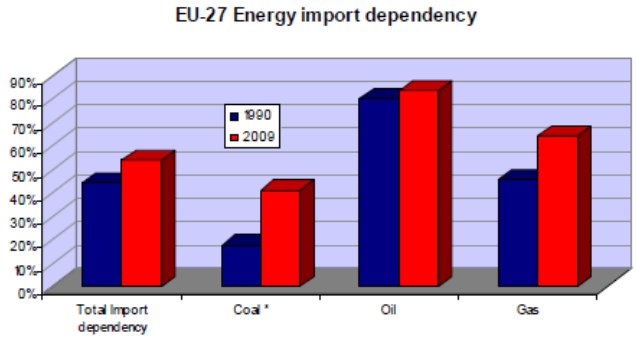
Figure 3.3.1 shows the EU 27 gross inland energy consumption by fuel in 1990 and 2009 while Figure 3.3.2 shows the energy dependency of the EU for the same years.

Figure 3.3.1: EU Gross Energy Consumption by Fuel in 1990 and 2010



Source: Eurostat Data

Figure 3.3.2: EU-27 Energy Import Dependency



Source: Market observatory for energy 2011

Overall, in 2009, the EU was dependent on imports for over half of the gross energy consumption. The electricity prices in the EU are said to be 21% higher than in the US and 197% higher than in China. Energy industries are responsible for 26% of CO2 emissions; transport follows with 19.7%.[4]

The EU Energy Strategy aims to address the major challenges of climate change, reliance on energy imports and the stress on energy resources whilst stressing the need for access to affordable and secure energy for the well-being of citizens, industry and the economy in general.

These challenges led to the adoption of an ambitious Energy Policy that covers the full range of energy sources, including fossil fuels (oil, gas, coal), nuclear energy and renewable energy (solar, wind, biomass, geothermal, hydro-electric and tidal). This is an attempt to trigger the move towards a low energy economy whilst making energy consumed more secure, competitive and sustainable - the three main objectives of the EU 2020 Energy Strategy.

3.3.2. European Energy Policy

The main objectives of the EU Energy Policy are:

- ensuring a functioning of the energy market;
- ensuring security of energy supply in the Union;
- promoting energy efficiency and energy saving and the development of new and renewable forms of energy;
- promoting the interconnection of energy networks.[5]

The objectives of the EU Energy Policy are supported by a mix of fiscal and market-based tools (mainly taxes on energy products, subsidies and the EU (CO_2) emissions trading scheme), by developing energy technologies (especially technologies for energy efficiency and renewable or low-carbon energy) and by Community financial instruments. Furthermore, in December 2008, the EU adopted a series of measures to reduce the EU's contribution to global warming and to guarantee energy supply.

[4] http://www.eea.europa.eu/pressroom/data-and-maps/data/data-viewers/greenhouse-gases-viewer
[5] Background, EU Energy Policy , European Council, 4 February 2011

3.3.2.1. Energy and Climate Package

The energy and climate change package adopted in the EU in December 2008 established specific targets to be achieved by the EU by 2020, including:

- A 20% reduction in overall EU GHG emissions;
- A 20% improvement in energy efficiency;
- A 20% share of renewable energy in the gross consumption of energy and a separate 10% share of renewable energy in transport.

These objectives are also supported by the flagship initiative **"Resource Efficient Europe"** of the European 2020 Strategy. Furthermore, the European Council has given a long-term commitment to the decarbonisation path, with a target for the EU and other industrialised countries of **80% to 95% cuts in CO_2 emissions by 2050 compared to 1990 levels.**

3.3.2.2. GHG Emission Reduction

The measures related to GHG emissions are derived from the use of energy. They include the EU emissions trading scheme (EU ETS), as established by Directive 2003/87/EC. This obliges operators of electricity generation plants to buy all their compliance needs from 2013, rather than being eligible for free allocation, except in cases where derogation applies for a transitional period.

On the other hand, the Effort Sharing Decision (Decision 406/2009/EC) covers emissions that do not fall within the scope of the EU ETS Directive. In particular, it includes direct emissions from energy consumption in buildings and emissions from transport. This legal instrument sets limits on emissions from such sources for 2020, with interim annual targets from 2013 until 2019.

3.3.2.3. Energy Efficiency

The EU aims at reducing primary energy consumption by 20% by 2020. This target is being supported by a series of measures aimed to increasing efficiency at all stages of the energy chain, from generation, transformation and distribution to final consumption. The measures focus on the public transport and building sectors, where the potential for savings is greatest. Other measures include the introduction of smart meters (which encourage consumers to manage their energy use better) and clearer product labelling. This has also led to the adoption of a number of directives and regulations.

The End-use Energy Efficiency Directive (2006/32/EC) requires that Member States submit a National Efficiency Action Plan that will lead to energy savings of 1% per annum, aiming at an indicative target of 9% energy savings by 2016. National public authorities have to take action regarding energy savings, energy efficient procurement and measures to promote energy efficiency and energy services.

The Energy Efficiency Directive is now being revised and the Commission aims at adopting the proposal by the end of 2012. This proposal envisages:

- Public bodies would need to buy energy-efficient buildings, products and services, and refurbish 3% of their buildings each year to reduce their energy consumption drastically. This proposal builds on green public procurement to emphasise further energy savings in purchases;
- End users would be encouraged to cut their energy consumption through efficiency improvements, leading to 1.5% new and cumulative savings per year. Large companies would be required to undertake energy audits every 3 years;
- Energy transformation would be monitored for efficiency;
- Certification schemes would be introduced for providers of energy services to ensure a high level of technical competence.

Other relevant Directives include:

- **Energy performance of buildings, Directive (2010/31/EU)** proposes measures and instruments (including financial instruments) to promote the objectives of the Directive. This Directive was supplemented by the adoption of the **Delegated Regulation (EU) No 244/2012** on 16 January 2012;
- **Cogeneration directive 2004/8/EC** on the promotion of high efficiency cogeneration aims at facilitating the installation and operation of cogeneration plants producing electricity and heat in one process for energy saving and action on climate change;
- Directives on **energy labelling** of household appliances (2010/30/EU) and the regulation on **fuel-efficient tyres** (2009/1222/EC) aim at helping consumers to choose products and act in ways to save energy and hence money. They also provide incentives for industry to develop and invest in energy efficient product design;
- **Directive 2009/125/EC** on Eco design aims to reduce the environmental impact of products, including the energy consumption throughout their entire life cycle;
- Action is also being taken to phase out inefficient incandescent light bulbs and encourage the switch to energy savings lamps.

3.3.2.4. Renewable Energy

The Directive 2009/28/EC on renewable energy, implemented by Member States by December 2010, sets mandatory targets for all member states to contribute to the EU overall target of a 20% share of energy from renewable sources by 2020. There is a separate target of 10% renewable energy in the transport sector for all Member States. The Directive establishes which renewable energy technologies are eligible. They include wind, solar, hydro-electric and tidal power, as well as geothermal energy for heating, and biomass. It also improves the legal framework for promoting renewable electricity.

Member States are required to implement National Action Plans that establish pathways for the development of renewable energy sources and are required to report on progress periodically. It also provides for cooperation mechanisms aimed at helping Member States to achieve the targets in a cost-effective manner through cooperation with other Member States and third countries. A sustainability criterion has also been established for biofuels to ensure that these originate from sustainable sources.

The use of renewable energy will contribute to the reduction of EU greenhouse gas emissions, reduce dependency on energy imports and encourage technological innovation and employment in Europe.

3.3.2.5. Nuclear Energy

In view of the increasing concerns regarding security of supply and CO_2 emissions, nuclear energy offers the possibility of a low-carbon energy source which is stable both in terms of cost and supply. The decision on whether to use nuclear energy is left to the EU Member States. However, at EU level emphasis is made on the need to have a common and coherent approach with respect to security, safety and non-proliferation, as well as concerning the dismantling of installations and the management of nuclear waste.

3.3.2.6. Internal Energy Market for Electricity and Natural Gas

The third Internal Energy Market package, adopted in 2009, covers both natural gas and electricity. It aims to achieve a more competitive and regulated energy market, improve energy infrastructure including interconnections between Member States and enhance consumer rights and transparency in the market. In particular the Directives 2009/72/EC and Directive 2009/73/EC, on the implementation of the internal markets of electricity and natural gas respectively, aim at increasing competition and transparency in the market.

3.3.2.7. Energy Infrastructure

The European energy market remains fragmented along national and regional lines due to insufficient interconnections between Member States. Where interconnections exist, they are often too small to carry sufficient electricity or gas for a fully functioning single energy market. Such a market would only appear if generators with surplus energy in one country are in a position to sell it to another Member State. This would put a downward pressure on consumer prices forcing convergence of the connected markets. It is indeed recognised that Europe's plans for renewable energy can only work if the Pan-European electricity infrastructure is expanded and upgraded to allow the ebbs and flows inherent to the production of most RES technologies to be absorbed across the whole European network – thus reducing the need for reserve spinning capacities in individual countries.

Additionally, the Mediterranean is one of the most fragmented regions when it comes to energy. For example, Sicily is still connected to the Italian (and hence mainland Europe) electricity grid through a relatively weak interconnector which is congested although this situation is expected to change when the two new 1000MW interconnectors are placed in service between Sicily and mainland Italy between 2014 and 2017. These realities therefore, impact, at least within the short term, Malta's ability to enjoy economies of scale benefits that would result from a seamless interconnected energy grid.

Malta's interconnectivity to the rest of Europe (and possibly North Africa as discussed below) will not only render obtaining energy from alternative sources a more viable option but is critical with regard to improving Malta's security of supply and achieving diversification of energy sources. Thus, it is important that Malta continues to work with the European Commission, the EU Council and other Member States to strengthen the energy infrastructure within the South of Europe.

It is pertinent to underline that on 19 October 2011, the European Commission made public a proposal for a Regulation on "Guidelines for trans-European energy infrastructure". The aim is to ensure the implementation by 2020 of strategic energy networks and storage facilities. Twelve priority corridors and areas covering electricity, gas, oil and carbon dioxide transport networks have been identified. It proposed a number of projects of "Common Interest" which are important to reach its climate and energy goals. These projects would benefit from an easier and more transparent permitting procedure, not exceeding three years and eligible for EU funding. The EU funding could be in the form of grants, project bonds or guarantees. The budget for the energy infrastructure projects for the period 2014–2020 is estimated to be €9.1 billion under the "Connecting Europe Facility" (CEF) – although the 2014–2020 financing is yet to be agreed to by the EU Council.

Projects of 'common interest' may benefit from subsidies of up to 50% on feasibility studies and in special cases of up to 80% on the implementation of the project.[6]

3.3.2.8. Security of Supply, the External Dimension and Enlargement

The EU imports over 60% of its gas and over 80% of its oil. Reducing this dependency on imports, and hence vulnerability to potential supply shortfalls, is a priority. The EU Energy Policy places importance on measures that ensure solidarity between Member States and the diversification of supply sources and transportation routes.

The measures supporting the holding of security oil stocks by Member States are also being given priority, and similar arrangements for natural gas supply are being considered. The action on security of oil stocks includes the enactment of Directive 2006/67/EC which obliges Member States to maintain minimum stocks of crude oil and/or petroleum products. Member States are required to maintain minimum stocks of petroleum products equal to at least 90 days of the average daily internal consumption during the previous calendar year. Directive 2009/119/EC lays down rules for holding security stocks within the Union through reliable and transparent mechanisms and is aimed at:

- making oil supply in the Union more secure through reliable and transparent mechanisms based on solidarity amongst member states;
- maintaining minimum stocks of crude oil and/or petroleum products;
- putting in place emergency procedures to be used in the event of a disruption in supply.

On the external dimension, development of international energy agreements is emphasised, in particular by strengthening the European Energy Charter, taking the initiative in an agreement on energy efficiency and participating actively in the post-Kyoto climate change scheme.

The relations with consumer countries (such as the United States, India, Brazil or China), producer countries (Russia, Norway, OPEC countries and Algeria, for example) and countries of transit (such as the Ukraine) are deemed of utmost importance for the geopolitical security and economic stability of the EU. Therefore, importance is given to development of energy partnerships with these countries and in particular neighbouring countries such as those in Africa.

[6] The Commission's energy infrastructure package, Memo/11/710, Brussels, 19 October 2011.

The energy future of the EU and Africa are increasingly tied together. This was recognised by the launching of the EU-Africa Energy Partnership in 2007. One of the goals of the operational roadmap of activities of this partnership is increased investment in energy infrastructure in Africa, including RES and energy efficiency. In this context, Malta is also backing other initiatives, the most promising of which are the Mediterranean Solar Plan and the Medring.

The strengthening of the North African high voltage transmission system to solve the inherent unstable power systems, together with commissioning large-scale renewable energy projects in the desert regions of countries ranging from Morocco to Jordan, has been identified as a win-win scenario in energy terms.

The plan envisages that European energy companies, backed by the European Investment Bank, could invest mainly in concentrated solar farms and wind farms on land in North Africa. The high renewable resource potential and low cost of land provide ideal investment conditions. Energy could be exported to the European Mediterranean countries through existing sub-sea cables and through new interconnections.

The strengthening of the relationship between the EU and non-EU southern Mediterranean members is, therefore, of strategic importance to Malta and it is in its interest to ensure that both parties come together and adopt a more comprehensive and holistic view on Energy Policy issues in the wider Mediterranean area. It is believed that such an energy nexus would strengthen Malta's energy of supply as well as its ability to diversity onto RES technology by entering into joint projects or to source RES energy from non-EU southern Mediterranean Countries.

3.3.2.9. Research and Innovation

The EU 2020 Strategy, adopted in 2010, aims to achieve a knowledge-based, resource efficient and low-carbon economy and to mainstream the role of sustainability in policy development. Eco-industries account for 2.5% of the GDP in the EU and employ 3.4 million people.

The development of low carbon technologies and innovation are considered important for the achievement of the EU Energy Policy objectives.

Important instruments such as the European Energy Programme for Recovery (EEPR) and the **Strategic Energy Technology (SET) Plan** were launched in 2009 in order to bring low carbon technologies and innovation to the market and allow renewables and low-carbon energy to compete with conventional sources of energy.

The **European Energy Programme for Recovery (EEPR)** (Regulation 663/2009), with a financial coverage of €3,980 million, allocated €1615 million to projects relating to offshore wind electricity and carbon capture and storage (CCS) all over Europe.

The **Strategic Energy Technology (SET) Plan** (14230/09) contains detailed Technology Roadmaps for 2010-2020, including the "European Industrial Initiatives" projects.

3.4. Conclusion

Being part of the European Union means that the objectives of Malta's Energy Policy should not only converge with those of the EU but equally importantly they address significant constraints that are unique to Malta as an Island State that is a Member State of the EU.

The Policy, therefore, seeks to establish the necessary foundations that will allow Malta to make a smooth transition towards a vision for energy that is underpinned by the following principles already outlined in Chapter 1:

- Efficiency and Affordability;
- Security;
- Diversification;
- Flexibility; and
- Sustainability.

4. POLICY STATEMENTS AND POLICY AREAS

4.1. Introduction

The Energy Policy is underpinned by five principles. These are:

- Energy efficiency and affordability;
- Security;
- Diversification;
- Flexibility;
- Sustainability.

These five principles give rise to the following policy areas which will guide Government action under the National Energy Policy:

1. Energy efficiency;
2. Reducing reliance on imported fuels;
3. Security of supply;
4. Reducing Emissions from the energy sector;
5. Delivering energy economically efficiently and effectively;
6. Ensuring the energy sector can deliver.

4.2. Policy Areas

Policy area 1: Energy efficiency

Policy statement: **Government will encourage and facilitate the achievement of increased energy efficiency in electricity generation and distribution, and in energy end use, and will lead by example.**

Emphasis on efficiency in the production, distribution and end-use of energy is an obvious first step. The cheapest energy is that which is not consumed, and no type of energy can be less harsh on the environment than that which is not produced. Efficiency in consumption decreases the dependency on energy sources - especially energy imports - and hence contributes to security of supply. In 2007, Government published a detailed National Energy Efficiency Action Plan (NEEAP) designed to achieve 9% savings in energy end-use by 2016. After this action plan was reviewed, the second NEEAP was published in June 2011 setting an indicative target of 22% savings in primary energy consumption in Malta by 2020.

Policy area 2: Reducing reliance on imported fuels

Policy statement: **Government will support the sustainable development of renewable energy sources, whilst continuing to provide opportunities in oil exploration.**

Malta intends to reduce its reliance on imported energy. This is currently near to total dependence, with only 1.12% of energy in 2011 originating from renewable energy sources. So far, the exploitation of indigenous resources of energy has been limited. Malta has a commitment to reach a 10% share of renewable energy in the gross consumption of energy and 10% renewable energy in transport. Despite the difficulties, Malta plans to increase the exploitation of indigenous RES, increasing the contribution of renewable energy to the national energy mix and thus meeting EU targets. Malta has also persevered in its efforts in hydrocarbon exploration prospecting. Reducing reliance on foreign sources of fuel will not only reduce expenditure, but will also enhance competitiveness and security of supply. This would contribute towards mitigation of the impacts of the shocks in world fuel markets that stem from geo-political issues, natural disasters or financial crises.

Policy area 3: Security of supply

Policy statement: **Government will seek to diversify away from the current reliance on oil products while ensuring that contingency plans are in place to cater for short-term disruption in oil supply. Malta will interconnect with the European electricity system and pursue, with the context of the EU single energy infrastructure grid and the related EU financing, the realisation of the necessary natural gas supply infrastructure.**

Malta will strive to achieve greater stability in its energy systems. This will be done mainly through connection with robust European energy grids. An electricity connection to the European mainland will provide the required means for energy trading. The introduction of natural gas, which should be financed by the EU in order to ensure that Malta is connected to the EU single infrastructure grid, will depending on the sector, contribute to the diversification of the overall energy mix, lower emissions and potentially more competitive energy prices.

Policy area 4: Reducing emissions from the energy sector

Policy statement: **Government will ensure that the commitment to reduce emissions related to the production, distribution and all consumption of energy, including the reduction of GHG and other emissions, is reflected in its policies, legislation and implementation of appropriate projects.**

Malta is highly conscious of its obligation of environmental care and will take appropriate measures to reduce GHG and other environmental effects resulting from the energy sector in line with international agreements. The reduction of the impact of energy consumption on the environment and, in particular, its effect on climate change acceleration is now a globally accepted objective. Malta has a commitment to contribute towards the international effort in the fight against climate change and locally to achieve improvements in air quality to the benefit of all citizens and visitors. As from 2013 the electricity generation sector in Malta will be obliged to purchase CO_2 allowances

(EUA's) as part of the obligations emanating from the ETS Directive 2009/29/EC and the 'polluter pays' principle. The sectors not included in the ETS, which include energy consumption in buildings and transport, are bound by the Effort Sharing Decision not to exceed a 5% increase in CO_2 emissions over 2005 by 2020.

Policy area 5: Delivering energy economically, efficiently and effectively

Policy statement: **Government will encourage the maximum competition possible within the limits imposed by the market, while ensuring that operators deliver the best quality of service at the cheapest possible prices through market forces complemented by robust regulation. In doing so, Government will seek to secure affordable energy pricing and will continue to provide a safety net to those households that may be in danger of falling within the fuel poverty trap.**

Government has demonstrated its belief that competition spurs efficiency and quality in the delivery of energy and energy services. It will continue to entrust the private sector with playing an ever-increasing role in the energy sector. The inland petroleum market has been liberalised while competition in the electricity internal market is limited to production of electricity. The electricity supply market is not open to competition. In parallel, Government will reinforce the robust regulatory framework to ensure fair competition between market operators and a fair deal to consumers, thereby ensuring sustainability. Vulnerable consumers will be appropriately supported.

Policy area 6: Ensuring that the energy sector can deliver

Policy statement: **Government is working to ensure that its fiscal policy and its education and research policies support the general objectives of ensuring security of supply, environmental protection and national competitiveness.**

The energy sector supports development of the rest of the economy. In turn, it must also be supported to ensure that it can deliver. The appropriate regulatory framework, education and research and development (R&D) are necessary for the energy sector to reach its objectives. International cooperation, including participation in the energy field, is also being stressed. Malta supports the projects and initiatives such as the Mediterranean Solar Plan, Desertec and the Medring because they can help in the diversification of energy supply in the EU – particularly in the Mediterranean area. Malta is also a ratified member of the International Renewable Energy Agency (IRENA).

4.3. Conclusion

The Policy Areas outlined above are to be the driving force of Malta's Energy Policy. Measures under these areas, will be implemented and monitored by a purposely designed governance structure.

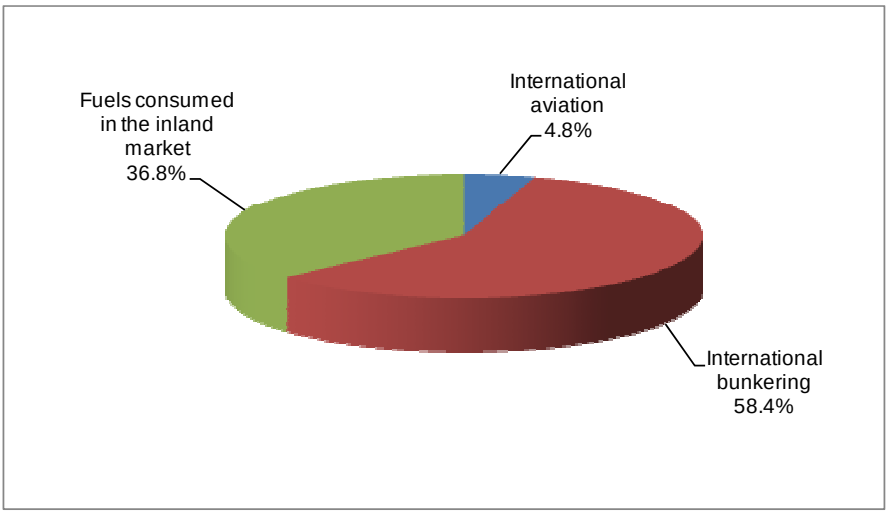
5. PRIMARY ENERGY SOURCES

5.1. Energy Sources in Malta

In crafting an Energy Policy for Malta it is imperative to keep in mind the unique characteristics of the Maltese islands and the constraints under which any Energy Policy must be implemented. Malta's limited land area and high population density, together with the lack of traditional energy resources, means that the options available to any Government with regard to Energy Policy design are limited. It is therefore, important that the direction chosen is viable and sustainable and addresses the risks which Malta faces when it comes to securing its energy requirements.

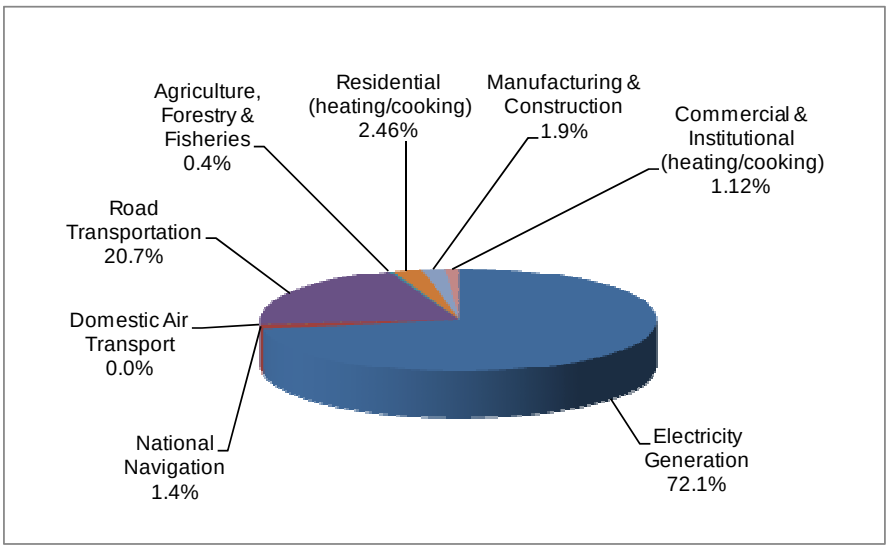
Currently almost all of Malta's energy requirements are imported. Combined with Malta's peripheral location and small market scale, this leaves Malta vulnerable to supply disruption and imported price volatility. Total energy imports for 2011 amounted to 914,891 toe. Figure 5.1.1. shows how the energy imported is distributed between international aviation, bunkering and fuels consumed in the inland market. The latter is distributed by sectors as shown in Figure 5.1.2.

Figure5.1.1: Primary Energy Imports Divided between International (Aviation/Bunkering) and Inland Market Consumption



Source: MRA

Figure 5.1.2: Primary Energy Imports Consumed in the Inland Market in 2011 by Percentage[7]



Source: MRA

Part of Malta's policy to diversify energy sources and improve the security of supply is that of continuing to promote the implementation of the EU Energy Policy for the Mediterranean which could play a strategic role in securing competitive energy prices through the use of renewable and cleaner energy generation carried out in North Africa.

5.2. Inland Petroleum Sector

In the past few years, the local petroleum sector has been in transition, moving away from the previous monopoly of the national energy company, Enemalta Corporation, towards more competitive market structures. The goal is a completely liberalised and competitive local petroleum sector, where no avoidable constraints to competition prevail.

The Government has entered into negotiations to commercialise Enemalta Corporation's petroleum assets, retaining only those related to the import of heavy fuel oil and gasoil fuels required for electricity generation. Commercialisation should also ensure adequate investments for upgrades in infrastructure and operation and create incentives for competitive practices in the sector.

The extensive capital required makes it uneconomical to recreate certain infrastructure such as pipeline networks and, to an extent, fuel storage facilities. Instead, regulated unbundling and/or regulated access charges for using fuel infrastructure based on throughput are proposed. Transparent rules on third party access to these facilities would potentially draw new entrants into the market and encourage competition.

In the interest of competition, operators would have to keep separate and unbundled accounts by fuel type, enabling a transparent price-setting structure, constant monitoring and benchmarking with international prices. Regular tests would ensure no-one abused a dominant position.

[7] These figures exclude fuels used in marine bunkering.

5.2.1. Automotive Liquid Fuels

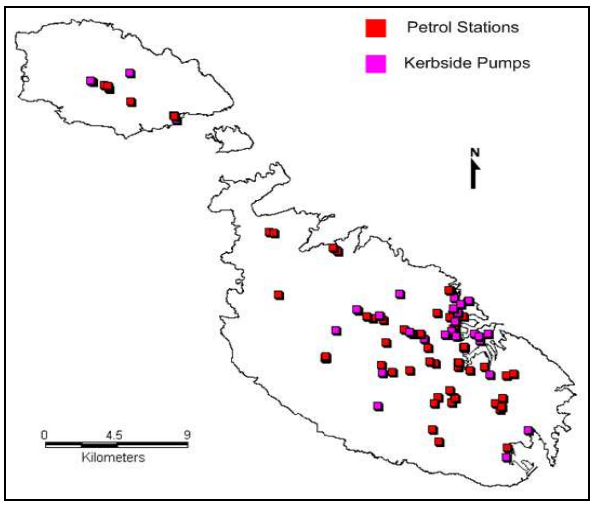
Presently, road transportation fuels are petrol, automotive diesel, biodiesel and autogas. Although the current and planned autogas stations are located in existing petroleum filling stations (PFS) the location of such stations is not actually restricted to PFS's. They can be built elsewhere, as long they are installed according to the Malta Resources Authority (MRA) LPG Codes of Practice.

5.2.1.1. Petroleum Filling Stations

Petroleum filling stations which still have a contractual agreement with Enemalta Corporation continue to operate seamlessly within the new market structure. There are two types of petroleum filling stations: kerbside pumps which have limited potential for upgrading on environmental and safety grounds; and the 'standard' petroleum station with its own forecourt.

Figure 5.2.1.1.1 shows the distribution of the 80 places to fill-up with petroleum in Malta and Gozo. The highest concentration of standard filling stations is at the South Eastern and Western District, while most kerbside pumps are located at the Northern Harbour District, because of the lack of suitable space there for building petroleum filling stations. More than 60% of all petroleum filling stations are located within the Grand Harbour area.

Figure 5.2.1.1.1: Distribution of Petroleum Filling Stations



Source: MRA

5.2.1.2. Market Structure for Petrol

The market sectors for import, wholesale, storage, distribution and retail of (unleaded) petrol are liberalised. However, at present only Enemalta Corporation is active in these sectors for this fuel. No new entrants have shown interest. Therefore, Enemalta Corporation still retains 100% of the market.

The limited interest expressed may be due to the tighter safety requirements for primary storage of petrol, the limited capacity of existing storage facilities and a scarcity of adequate sites suitable for developing new storage and handling facilities.

The reliance on one importer is not conducive to fostering competition in quality and/or price between filling stations

Although the supply of lead replacement petrol (LRP) was discontinued after January 2010, additives to unleaded petrol are available to cater for older cars still on the road.

5.2.1.3. Automotive Diesel Market Structure

Although Enemalta Corporation still retains a major share of this market, there are three other players that import, store, wholesale and distribute automotive diesel.

In 2011, Enemalta introduced biodiesel in all automotive diesels (EN 590) which it wholesales in the inland market.

As with petrol, automotive diesel mainly sells from petroleum filling stations, and normally at the prices published by Enemalta Corporation. However, diesel (EN 590) is also sold competitively in bulk to relatively large consumers, such as coach and bus operators, garages and for use in the construction industry.

5.2.2. The Market of Heating/Cooking Fuels

The fuels used for heating and/or cooking purposes include gasoil, kerosene, thin fuel oil and LPG. Fuel switching between the first three of these liquid fuels is simpler than changing to LPG which requires some investment in storage and modification of equipment. However, in general a good price differentiation between these fuels can justify this investment. In environmental impact terms, LPG has better green credentials than thin fuel oil, gasoil and kerosene.

5.2.2.1. Liquid Fuels

The market for gasoil (other than that used in the power stations) is more open, with more players actively competing in the market for a fuel mainly used in the commercial and industrial sectors for heating and industrial processes.

The markets for kerosene and thin fuel oil have also been liberalised, with Enemalta Corporation facing competition with another market player for both types of fuel.

The local demand for both kerosene and thin fuel oil is relatively small, and both are supplied in bulk to industry, hospitality facilities, commercial outlets and domestic units.

5.2.2.2. Liquid Petroleum Gas

The Liquid Petroleum Gas (LPG) market has been liberalised since 2008. At present, there are two market players, Liquigas (Malta) Ltd and Easygas (Malta) Ltd, Enemalta Corporation having ceased its activities. The infrastructural assets of Enemalta Corporation were granted on a concession basis to private operators, Liquigas (Malta) Ltd and Gasco Energy Ltd, two companies formed by Liquigas Spa and Multigas Ltd following a competitive commercialisation exercise. Certain obligations and rights

related to importation, security of supply and sale of LPG have been transferred from Enemalta Corporation to these companies.

A first priority of the operator taking over Enemalta Corporation's activities was to upgrade the service and infrastructure related to storage and bottling of LPG in cylinders. A new plant consisting of an LPG storage facility with a capacity of 8,600m^3 and complete with a bottling plant has been constructed by Gasco Energy Ltd and Liquigas (Malta) Ltd at Benghajsa and is now in operation.

In late 2010, Easygas (Malta) Ltd entered the LPG market, importing and wholesaling the fuel. A number of potential operators have also shown interest in entering the market of LPG.

Distribution of LPG in cylinders of various capacities to end-users is carried out by a number of distributors operating a door-to-door service, each with their specific area, and from fixed points of sale. Currently, negotiations are taking place to modify, if necessary, this aspect of the LPG market to foster a more competitive set-up. To this end, MRA has approved an application for a 'retail from a fixed point of sale' activity from a petroleum filling station.

LPG is also retailed in bulk through road tankers that deliver the LPG to various fixed storage facilities. This addresses the needs of the larger consumers, including hotels, restaurants, factories and a number of domestic premises. LPG in bulk volumes is usually sold more cheaply than transportable cylinders, due to the elimination of bottling and handling of the heavy cylinders.

Another method of supplying LPG is via a fixed pipe network. The installation consists of a centralised bulk tank storage supplying the fuel to various outlets through a metered gas point. At present there are four small separate pipe networks for the distribution of LPG, supplying consumers in commercial and residential establishments. This system enhances safety in places where previously batteries of connected transportable cylinders were used and again eliminates the handling of such cylinders.

5.2.3. Purchase of Fuels for Electricity Generation

Enemalta Corporation purchases fuels for electricity generation directly. The volatility of oil prices and their impact on electricity prices to consumers in Malta have always been a matter of concern, since fuel constitutes 73% of the costs providing electricity to final consumers. Enemalta Corporation normally uses risk mitigation instruments available in the market to hedge against price risks related to fluctuating fuel prices and to stabilise as far as possible electricity prices.

5.2.4. Other Matters

5.2.4.1. Aviation Fuels Markets

The amount of Jet A1 and Aviation gasoline supplied to aircraft in 2011 was 102,928 tonnes and 54 tonnes respectively.

It is Government's policy to be compliant with the Directive 96/67/EC on access to the ground handling market at Community airports.

5.2.4.2. Bunkering

Marine bunkering activities provide fuel to vessels in and outside Maltese territorial waters. Fuels traded in this activity are mainly gasoil and heavy fuel oil with a small amount of petrol. This service is important, given the amount of shipping plying the Mediterranean Sea and the size of the bunkering market, which is larger than the internal fuel market in terms of tonnes of fuel traded.

In 2011, the amount of fuel traded through marine bunkering was approximately 1.3 million tonnes of oil equivalent, while the amount consumed for national navigation was 12,000 tonnes of oil equivalent. Bunkering operations are licensed by the MRA.

5.2.4.3. Waste Oil Collection

The collection of waste oils from both onshore and offshore industries is carried out by the Waste Oils Company. The oils are treated in a facility owned by the same company at Marsa (within the Grand Harbour area) and are eventually disposed of through export to an authorised site.

The Government issued a call for tenders, inviting competitive submissions from operators interested in operating a port reception facility for ship-generated residues, residue/water mixture of noxious liquid substances, oily residues and oily mixtures as defined by Annex I and II of the MARPOL Convention at Ricasoli. The Facility is currently operated by Ricasoli Tank Cleaning Limited, a Government-owned company.

5.2.4.4. Primary Petroleum Products Storage Facilities

Private commercial oil storage facilities for fuels intended for use outside territorial waters, such as in cargo transhipments and cruise liners (and also to supply the internal market in well regulated circumstances) are operating very successfully in Malta. There is a high demand for these facilities and ancillary services due to the strategic location of Malta and its harbours with respect to the main shipping routes in the Mediterranean.

The availability of land for the safe rating of storage facilities of petroleum products is scarce. The table below indicates the location of existing Enemalta and private petroleum storage facilities and their capacity.

Table 5.2.4.4.1: Petroleum Storage Facilities in Malta

Owner	Installation Location	(circa) m3
Oil Tanking	Kalafrana	531,550
Enemalta Corporation	Ħas-Saptan	154,564
Enemalta Corporation	Delimara Power Station	90,480
Enemalta Corporation	Ras Ħanżir	65,354
Government	MOBC, Marsa	48,032
Enemalta Corporation	31st March Installation	46,774

Operated by Falzon Group	San Lucjan Oil Company Ltd	44,375
Enemalta Corporation	Marsa Power Station	37,956
Enemalta Corporation	Wied Dalam	18,181
Gasco Energy Ltd	Ix-Xoqqiet Benghajsa	8,600
Falzon Group	Waste Oils, Marsa	6,428
Enemalta Corporation	Malta International Airport	1,469
Easygas (Malta) Ltd	Valletta Road Luqa	107

Source: MRA

Future expansion of fuel storage facilities will be encouraged, subject to environmental and health conditions, in order to seek to enhance security of supply for inland market consumption, the use of existing facilities as efficiently as possible and the fostering of competition in the inland market. Transparent rules for third party access to these facilities are necessary in order to encourage the new entrants required to enhance competition in the market.

5.2.5. Economic and Fiscal Considerations

5.2.5.1. Liquid Fuels

As indicated earlier, the market for liquid fuels has been liberalised. Enemalta Corporation publishes its selling price for automotive fuels, kerosene and gasoil on a monthly basis. Generally, automotive fuels retailed from petrol stations are sold to consumers at these prices.

LPG Prices

The market for LPG is liberalised. There is an increasing level of price competition for LPG in cylinders and an adequate level for LPG retailed in bulk. However, as a transitional measure, MRA establishes the maximum allowable retail price for each transportable cylinder from the dominant player. This safeguards consumers from unduly high retail prices until the market stabilises and there is a greater level of competition in the retail of LPG in cylinders.

Although autogas is the same fuel as the LPG used for cooking and heating, its price is cheaper since the excise duty is lower than that levied on the other fossil fuels used in road transport. Autogas is coloured to mark the difference in excise duty for LPG used in transport.

5.2.5.2. *Excise Duties*

Traditionally, excise duties on energy products have been levied for revenue generating purposes. Nowadays, such excise duties are considered to be energy taxes, and are increasingly being tailored to influence consumer behaviour towards a more efficient use of energy and cleaner energy sources.

5.2.6. Consumer Education

There is no doubt that although the Maltese public has become increasingly environmentally conscious, price remains the main determining factor. There is a general recognition that over time a shift towards cleaner energy is possible. The National Energy Policy recognises the importance of timing so that in the case of environmentally friendly technologies which are approaching the right (competitive) price, effective education and information campaigns for the general public may be carried out to encourage the shift. The time is right for a holistic assessment of the market and its needs in order to better target an educational campaign and design strategies for specific sectors.

5.3. Diversification of Primary Energy Imports

The main options currently being considered for further diversification of primary energy imports are biofuels and natural gas. The biofuels alternative with regard to its use in the transport sector is discussed in Chapter 9.

At present, Malta does not have a natural gas infrastructure, no supply of natural gas and therefore no natural gas market. Natural gas is, on balance, the cleanest fossil fuel available and its use would result in a significant improvement in emissions to the air from electricity generation, in addition to its potential economic advantages. Having said this, the change from fuel oil for electricity generation to natural gas will not increase energy diversification and thus not contribute to energy security.

The small size of the Maltese energy market is an obstacle to the economic viability of energy infrastructure projects, all the more so when considering the investment required for several energy source diversification infrastructure projects to be carried out at the same time. This can be overcome if tangibly supported by European policy and solidarity.

The Government of Malta has submitted a proposal for a natural gas infrastructure project as a European common interest (CPI) project. The project includes the connection of Malta to the European natural gas network via a 150-km, 25-inch diameter pipeline to Sicily and the installation of a Floating LNG Storage and Re-gasification Unit (FSRU) to receive LNG shipments. The project establishes that this would be connected to the Delimara Power Station (via a 12-km pipeline) and to the gas interconnection pipeline to Sicily. The LNG terminal would be used to deliver Natural Gas (NG) to Malta for the generation of electrical power and potentially to supply local consumers in Malta for commercial and industrial purposes as well as for domestic use. The proposed size of the FSRU would allow 80% of the capacity to be exported by pipeline to Sicily.

In the meantime, on the basis that EU financing will be forthcoming, the Government is preparing tenders for a detailed feasibility study and a cost benefit analysis of the gas supply options.

5.4. Security Stocks of Fuel

It is prudent to have a security stock of fuel for emergencies, whether short term or long term. These emergencies may occur due to a wide variety of reasons, such as stormy weather delaying the arrival of vessels, international geo-political events or natural disasters that disrupt the availability of fuels on international markets.

Malta is presently required to hold as security stock an amount of fuel equivalent to 90 days of average daily inland consumption by virtue of Directive 2006/67/EC. This directive does not cover either LPG or natural gas. In the absence of any specific provisions, MRA has established minimum security stock levels of LPG to be held by each operator authorised to carry out any or all of the activities of an importer and/or wholesaler of LPG or to bottle or load LPG as follows:

- a minimum stock level of 20% of total storage capacity (minimum total storage capacity 50 tonnes) or eight days' average sales of the previous year, whichever is the largest; and
- the equivalent of one day of LPG filled cylinders as operational stock.

As from 1st January 2013, under the new Directive 2009/119/EC, Member States must maintain a minimum total level of oil stocks corresponding, at the very least, to 90 days of average daily net imports or 61 days of average daily inland consumption, whichever of the two quantities is greater. However, due to a derogation,[8] Malta may maintain a lesser amount of oil stocks until the end of the year 2014, corresponding to 81 days of average daily net imports. The present arrangement for LPG security stock holding may also be superseded by the provisions of Directive 2009/119/EC.

Enemalta Corporation has acted on behalf of the government as the designated stockholder of security stocks since accession to the European Union. This situation was due to be reviewed following liberalisation of the fuel market, another consequence of accession. Present Government policy states that, after the first year post-liberalisation, this responsibility should devolve to the licensed operators, who should shoulder part of the security stocks obligation, in proportion to their share of the market in the previous calendar year. This transference of obligations has still not been implemented for a number of reasons, including the strategic concentration of oil storage facilities in the hands of Enemalta Corporation and the gradual entry of new operators into the local oil importation/wholesaling segment of the fuel market.

Emergency stocks may be held outside Maltese territory. Local stock holding is obviously more secure since it does not carry any risks associated with transport in times of emergency. Although stock holding abroad is cheaper, it must be backed with robust transport contracts and, where possible, by arrangements with other operators to take advantage of their stockholding in Malta.

Intergovernmental agreements (bilateral agreements) to allow Malta to take advantage of such arrangements have been negotiated. An agreement with Italy, France and Spain has been concluded.

Bilateral agreements for emergency stock holding outside a member state territory are not a requirement under the new emergency stocks Directive. However, authorisation from other Member States' governments to hold oil stocks as emergency stocks on their soil is still required. Hence such agreements, with the appropriate modifications, may still be used to hold oil stocks in the form of 'tickets abroad.'

The Directive 2009/119/EC allows emergency stocks to be held by economic operators licensed to import and wholesale petroleum products or member states themselves or a central stockholding entity (CSE). The CSE would take the form of a non-profit making body set up by the Member State

[8] Article 25 of Directive 2009/119/EC.

to acquire, maintain and sell oil emergency and specific stocks. In the short term, Government will be delegating the emergency stockholding obligation and its management to each economic operator,[9] in proportion to each one's market share of product types for which emergency stocks should be held. The balance between the amount of security stock to be held locally and that to be held in the form of tickets abroad has to be established. The CSE option is also being considered as a robust alternative to current arrangements, and a detailed study will be commissioned to ascertain the feasibility of implementing such an option in the near-future.

5.5. Biofuel in Transport and Monitoring of Fuel Quality

The substitution of the use of petrol and diesel is a fuel source for transportation by biodiesel is discussed specifically in the Chapter 9.

One of the parameters determining the fairness, or otherwise, of fuel prices, is the quality of the fuel concerned. Hence, monitoring of quality and enforcement of standards of fuel distributed from petrol stations is necessary to ensure customers get value for money, to preserve vehicle performance, and to control air pollution. This sphere of activities is a priority for the MRA.

Currently, around 300 samples of Diesel EN 590 taken from petrol stations are tested annually to ensure that the sulphur content is within the standard for this type of fuel.

Throughout the year the MRA regularly conducts circa 100 tests for the FAME (biodiesel) content in EN 590. Tests on biodiesel at petrol stations and at local production facilities are carried out less frequently since the volume sold per year is low.

Full tests on automotive diesel and petrol are also carried out to verify that their environmental and quality parameters conform to the relevant EU standards. Tests on automotive fuels are also carried out in response to consumer complaints.

Monitoring of the quality of fuel used locally is important to foster competition while guaranteeing the quality of fuels sold to consumers. This also has the effect of controlling the impact on the environment of the fuels used.

Quality tests mainly related to sulphur content are also done on marine bunkering fuel intended to be used in marine vessels plying inside and outside Malta's territorial waters.

In 2012, the MRA started to carry out LPG quality tests. Routine checks on LPG cylinders picked up from the distributors are done to verify that the correct quantity of gas is being delivered to consumers by MCCAA. Furthermore, Compliance Officers from MCCAA also check the prices being charged by the distributors on a regular basis.

An effective monitoring framework is important to foster a competitive LPG market while guaranteeing the quality of LPG sold to consumers and used in the market. Consumers should get a good price-quality balance.

[9] Economic operators in this context refers to importers/wholesalers of petroleum products.

5.6. Conclusion

Table 5.6.1: Summary of Main Issues and Measures for Primary Energy Sources

Issues	Measures
Malta depends almost totally on imported energy products to meet its energy needs, with limited diversification in terms of alternative fuels and availability of fuels with low emission factors. This increases the vulnerability to shocks in the international fuel markets, such as price surges and scarcity of supply.	Maximise diversification of energy imports and exploitation of indigenous sources of energy. Carry out feasibility studies on the potential for a natural gas infrastructure. Pursue the implementation of the natural gas infrastructure subject to EU financing under the EU single energy infrastructure grid.
Commercialisation of Enemalta Corporation's petroleum assets has not been concluded.	Require separate and unbundled regulatory accounts for the fuel infrastructure and by fuel type to ensure transparency of the new operator following commercialisation. Implement regulated transparent access charges for fuel infrastructure to encourage new entrants in the market.
Despite liberalisation, there is only one market player and there have been no new entrants in the petrol market. This is due to the relevant infrastructure being controlled by a single market player. This is not conducive to the development of a competitive market for this fuel.	Investigate the following solutions to encourage competition: ▪ The construction of new storage tanks. ▪ Transparent auctioning of storage capacity. ▪ Regulated third party access fees.
Although there is upstream competition for some fuels, consumers are still not benefiting from a choice in prices. Automotive fuels retailed from Petroleum Filling Stations are generally being sold at the price published by Enemalta, even where private importers have made substantial inroads in Enemalta Corporation's previous monopoly. Where importers are wholesaling fuels to Petroleum Filling Stations at prices cheaper than those of Enemalta Corporation, this should be passed to consumers.	Vigilance and investigation by MCCAA on prices of automotive fuel sold from Petroleum Filling Stations.
The most advantageous combination of security stock holding of fuel locally and abroad has still to be determined and action taken accordingly. Local stock holding is obviously more secure but the balance between security and costs has to be found.	Determine the amount of stock that needs to be held locally strictly from the point of view of security of supply. Determine the optimal balance between security stock held in Malta and abroad by each of the economic operators. Develop a way forward as to the establishment of the CSE as a longer term solution.
The monitoring framework for petrol stations for consumer issues has to be sufficiently robust. Monitoring of key parameters is required to ensure customers get value for money, preserve vehicle performance and control air pollution.	Continue to monitor and enforce compliance with quality standards and fair competition in liquid fuels.

Despite significant progress in competition following liberalisation and the granting on a concessionary basis of Enemalta Corporation's assets, some issues of competition in the LPG market remain. Some issues stemming from previous commercial arrangements that are not fully compatible with today's consumer needs and a competitive market model are constraining competition and preventing consumers and some stakeholders from fully enjoying the benefits of competition.	Continue to monitor and enforce compliance with quality standards and fair competition and the LPG market. Contractual agreements entered into between Enemalta and a number of stakeholders prior to the liberalisation of the inland fuel market in 2007 are being reviewed in the context of competitive market structures.
Information on the use of fuels in the different economic sectors and households is limited. A holistic assessment of all the aspects of energy consumption in Malta is necessary to enable the design of a strategy to target specific consumer sectors in the appropriate use of the various fuels.	Carry out a holistic study on all available sources of energy to be used as a basis for creating incentives for their rational use, depending on their characteristics and in line with general Energy Policy objectives.
The availability of adequate fuel storage facilities is important both for security of supply and to enhance competition.	Analysis of future expansion of fuel storage facilities with due regard to the need to enhance security of supply for local consumption, efficient use of existing facilities to foster competition with due regard to the environment.

5.7. Programmes and measures concerning primary energy

Table 5.7.1: Action Plan for the Primary Energy Sector

Programme Measure number	Measure Description	Implementation			
		Contribution to the six Policy Priority Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
F-1	Optimal flexibility to maximise diversification of energy imports and maximise exploitation of indigenous sources of energy.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	% of energy consumed by sources	2009 and on-going activity	Lead – MRA MRRA
F-2	Require separate and unbundled regulatory accounts for the fuel infrastructure and by fuel type to ensure the new operator operates in a transparent manner, following commercialisation of Enemalta Corporation fuels assets.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Status	On-going	Lead – MRA Privatisation Unit Enemalta MRRA

Programme Measure number	Measure Description	Implementation			
		Contribution to the six Policy Priority Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
F-3	Investigate the possible solutions to encourage new entrants in petrol market.	Policy area 5: Delivering energy economically, efficiently and effectively	Status	2015	Lead – MRA
F-4	Vigilance and investigation on prices of automotive fuel sold from Petroleum Filling Stations.	Policy area 5: Delivering energy economically, efficiently and effectively		On-going activity	Lead – MCCAA
F-5	Finalise the remaining aspects of the policy regarding security stock holding and its implementation.	Policy area 3: Stability in energy supply Policy area 5: Delivering energy economically, efficiently and effectively	Status	By 2012	Lead – MRA MRRA
F-6	Continue to monitor and enforce compliance with quality standards and fair competition in the fuels markets.	Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Status	On-going activity	Lead – MRA – Monitoring Lead – MCCAA – Competition

Programme Measure number	Measure Description	Implementation			
		Contribution to the six Policy Priority Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
F-7	Carry out a holistic study on all available sources of energy to be used as a basis for creating incentives for their rational use, depending on their characteristics and in line with general Energy Policy objectives.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Status	by 2013	Lead – MRA MRRA
F-8	Assess market instruments to influence consumer behaviour towards a more efficient use of energy and use of cleaner energy sources.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Status	2013	Lead – MFEI MRA

Programme Measure number	Measure Description	Implementation			
		Contribution to the six Policy Priority Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
F-9	Comply with the fuel ground handling Directive	Policy area 5: Delivering energy economically, efficiently and effectively	At least two fuel operators at the airport	2013	Lead – MRA MCCAA MFEI Enemalta MITC
F-10	Analyse the potential for future expansion of storage facilities with due regard to the need to enhance security of supply for local consumption, efficient use of existing facilities to foster competition with due regard to the environment.	Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Status	2011 and on-going activity	Lead – MFEI MRRA MTCE MEPA MRA
F-11	Carry out feasibility studies on the potential for a natural gas infrastructure. Pursue the implementation of the natural gas infrastructure if feasible and subject to EU financing.	Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Status	2013	Lead – MFEI MRA MRRA

6. THE ELECTRICITY SECTOR

6.1. Introduction

In Malta the generation, distribution and supply of electricity are at present carried out by one vertically integrated company, Enemalta Corporation. Although the generation of electricity is liberalised, there are no significant licensed Independent Power Producers (IPPs). Production by IPPs is limited to relatively small plants generating electricity from renewable energy sources for auto-production (for own use) and/or for sale to Enemalta Corporation. Distribution is a natural monopoly of Enemalta Corporation, the only organisation allowed to supply electricity to final customers. Substantial changes are expected to occur in the coming years to continue to modernise and improve the electricity sector in Malta.

This Chapter of the Policy considers options with respect to meeting the demand for electrical energy in Malta up to 2020 and beyond. The analysis is based on the following principal elements:

- the identification and estimation of demand for electricity and its likely growth;
- the articulation of objectives to be attained in meeting the identified demand;
- key decisions which will need to be taken in the context of the provision of electricity in Malta which can at this stage be identified as milestones;
- the identification of strategic options to inform decision-making in a manner which meets the overall objectives;
- the formulation of a preferred strategic approach to the provision of electricity in Malta over the coming years.

A key consideration in this analysis is the prevalence of uncertainty, affecting estimates of demand, and, perhaps to an even higher extent, the availability, feasibility and costs of potential sources of electricity supply. These uncertainties need to be explicitly allowed for in the policy approach and are indeed a major consideration shaping the policy recommendations presented here.

The elements of the analysis are considered through the formulation of scenarios pertaining to three milestone years for policy formulation and implementation, namely 2014, 2018 and the period post-2018.

The year 2014 is chosen because it represents a situation whereby plans which have already been decided upon with regard to electricity production in Malta would have been implemented. Chief among these are:

- the operation of the energy interconnector to Sicily;
- the decommissioning of the Marsa power plant;
- the commissioning and operation of the Delimara power plant extension and;
- the gradual introduction of power generation through photovoltaic and waste treatment renewable sources in line with the NREAP as discussed in the next Chapter.

The year 2018 is chosen because by that year, critical decisions would need to be made and implemented in order to:

- replace parts of the original Delimara power plant infrastructure;
- meeting of the energy efficiency, renewable, transport and climate change 2020 targets set by the EU.

The strategic considerations made with regard to the 2018 scenario would also inform decision-making with respect to Energy Policy decisions for the coming decade and beyond. In this regard, however, the debate would also be more fully informed with an analysis based on prospective technological options.

Before turning to this analysis, it is useful to briefly review the legacy situation with respect to the electricity sector in Malta which serves as an essential background to the future strategic policy considerations.

6.1.1. The Role of Enemalta Corporation

Conventional electricity generation has over the past decade been being carried out in two power stations, at Marsa and at Delimara. Total generation capacity is 551 MW, of which 247 MW is installed at Marsa Power Station and the remaining 304 MW coming from the Delimara Power Station.

The generation capacity at the Marsa Power Station is made up of a 210 MW steam plant and a 37 MW gas turbine. The steam plant dates back to the early 1950s and is, not only past its design life, but the major cause of CO_2 emissions. It is to be closed down as soon as possible. The shutdown of the Marsa steam plant will account for a loss of 40% of generation capacity.

The Delimara Power Station was commissioned between 1992 and 1998 and consists of (2 x 60 MW) 120 MW steam plant, a 110 MW combined cycle gas turbine and two open cycle gas turbines, each with a capacity of 37.5 MW used only for peaks and emergencies. An extension to the power station comprising a new plant with a nominal capacity of 149 MW, consisting of 8 x 17 MW Diesel engines (compression ignition engines) is expected to come on line in late 2012.

The extension may operate on heavy fuel oil (HFO) or gasoil with the possibility to convert to natural gas, if the infrastructure required to supply natural gas becomes available. The plant will contribute to lower emissions through better technology efficiency at maximum of 46% and through flue gas abatement measures. The use of HFO will produce more by-products than the gasoil alternative, but the latter is more expensive.

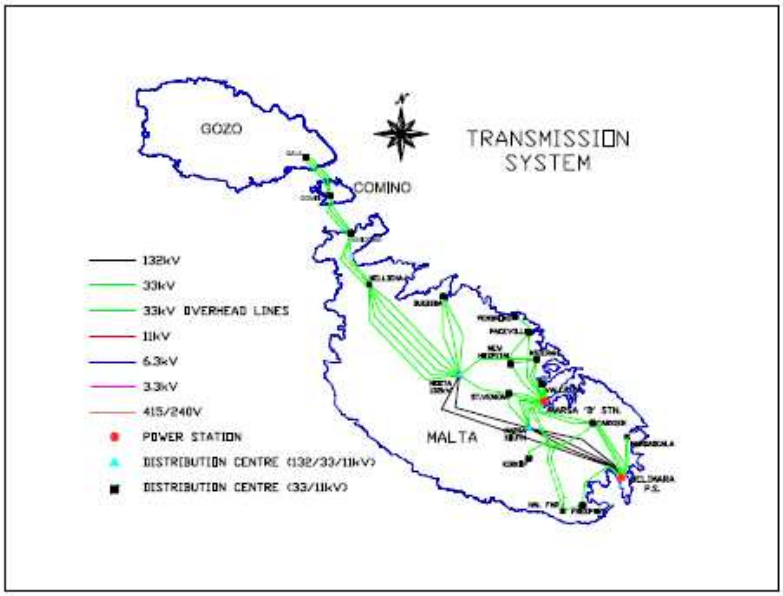
The power stations are supplied by HFO and gasoil having a sulphur content of 0.7% and 0.1%, respectively – which are well within the EU Directives on this matter. The conventional steam plants are operated by HFO while gas turbines and combined cycle gas turbines operate on gasoil. All the gas turbines can be converted to natural gas if this becomes available.

The overall average efficiency of the steam plant at Marsa and Delimara Power Stations, as derived from the information in the Enemalta Corporation's Annual Report for 2010, are 26% and 32%, respectively. This relatively low efficiency is attributed to plant technology and the cyclic demand which requires operation at part loads and reduced efficiency.

The reserve generation capacity compared to the peak demand, and considering plant operating in summer, is around 60 MW compared to the maximum peak ever of 434 MW in 2008. Normally Enemalta Corporation keeps a minimum spinning reserve of 10-15 MW sufficient to meet reasonable demand variations, but not a major loss of generating capacity. Spinning reserve is expensive if provided by gas turbines and diesel engines using gasoil.

Malta has a distribution system that practically spans the whole country, but is currently isolated from any other robust international system. Figure 6.1.1.1 shows the electricity distribution system in Malta as in 2012. The network consists of 132 kV, 33 kV and 11 kV underground cables and overhead lines connecting the two power stations to the distribution centres, which in turn are connected to substations supplying final consumers at 230/400 V.

Figure 6.1.1.1: The Electricity Distribution System in Malta



Source: Enemalta Corporation

Underground infrastructure, either buried or laid in tunnels, is more capital intensive than overhead lines. Tunnels have the advantage of allowing more cables to be laid at a later stage without disturbing roads. While the 132 kV circuits are either buried or laid in tunnels, a considerable financial effort has been made to relocate 33 kV and 11 kV circuits in rural areas from overhead to underground. Due to its small size and structure, the network is considered as one distribution system and there is no independent transmission system in the country. Enemalta Corporation

carries out the function of Distribution System Operator. The technical losses in the distribution network are estimated at 4.6% of the electricity sent out from the power station.

Malta has been granted an exemption from the requirement of Directive 2009/72/EC to open the electricity supply market to competition. Enemalta Corporation is the only supplier of electricity to final customers, supply being defined as the sale, including resale, of electricity to customers. As such the electricity supply function includes meter reading, billing of electricity to customers and handling of customer related issues.

In 2011, the estimated average duration of supply interruption per customer for the year due to incidents on the distribution system was around 211.16 minutes, of which 67% was due to unplanned interruptions. Faults occurring in the distribution system accounted for 86.93% of the unplanned interruptions and damage to cables by third parties caused the remaining 13.07%.

The customer minutes lost attributed to shedding due to incidents on the generation side were 48.57minutes.

Apart from the technical losses in distribution estimated at 4.6%, about 5.2% of the electricity sent out from the power stations is not billed. That is attributed to meter and billing deficiencies and theft. Electricity consumption by street lighting is metered and amounts to about 2% of the electricity sent out.

6.1.2. Overriding Electricity Policy Considerations

A 200 MW HVAC electricity interconnection with Sicily is projected to come into operation in 2013. Government believes that having an interconnection with the European electricity grid finally breaks the insularity of the islands, contributes to security of supply through diversification of sources and enables Malta to access the EU internal electricity market.

The integration with the EU electricity market may potentially enable Malta to benefit from economies of scale of larger plants with more competitive prices. In addition, the interconnection will provide the Maltese electricity system with the robustness of being connected to a larger system, necessary to improve the reliability of the electricity system and enable the cost effective integration of large scale intermittent renewable energy sources such as large scale wind farms.

Further diversification options are being considered which include a second electricity interconnection and/or the use of natural gas, if this fuel becomes available in Malta. The latter option would in the long term (2020-2025) require further investment in local generation capacity. These decisions will be taken not only after the feasibility study on the gas infrastructure is concluded but are also subject to EU financing directed to ensure that Malta will be interconnected to the EU Single Energy infrastructure grid.

It is not the policy of Government to consider nuclear power generation in Malta.

The use of coal with traditional generation technology is currently not considered an option for diversification due to environmental considerations and a lack of space for the disposal of resulting waste products. Be that as it may, the potential use of coal complemented by carbon capture and

storage technology or other technology that results in "clean coal" energy will be subject to appropriate technical, environmental and cost benefit feasibility assessments.

6.1.3. Tariff-Setting and Billing Issues

All electricity consumers pay a regulated tariff approved by the MRA. The following principles underlying the setting and approval of electricity tariffs by the MRA was subject to active consultation with various stakeholders. The principles are:

- Tariffs are to be transparent and non-discriminatory;
- Tariffs are to foster energy use efficiency and energy conservation;
- Tariffs are to be cost reflective, guaranteeing an adequate rate of return to operators, but not allowing the recovery of avoidable inefficiencies;
- Tariffs are to ensure that there is no cross-subsidisation between tariff groups as well as between consumers of the same group;
- Deserving vulnerable consumers are to be assisted directly by Government.

In approving the tariffs, Government and MRA strove to ensure stability in prices and reduce the impact of the volatility in the price of fuels on the international market.

In February 2009 ARMS Ltd was set up as a joint entity by Enemalta Corporation and Water Services Corporation, to manage meter reading, billing and customer relationship management, as part of a business process reengineering exercise within both corporations. It is expected that both corporations will gain significant benefits by consolidating their meter-to-cash processes and customer contact services to ARMS Ltd. The functions that ARMS Ltd is carrying out on behalf of the two corporations are the following:

- Meter reading.
- Billing and invoicing.
- Debt management and collections.
- Customer Care.

The following improvements were recorded since ARMS Ltd took over the meter-to-cash process:

- An increase of 98% in the number of bills issued to customers annually;
- A 40% reduction in customer front office waiting time and a further 20% reduction in customer front office service time;
- a 52% increase in call centre calls answered success rate;
- reduction of 61 debtor days with debt financial saving of approximately €1m per annum;
- 230% increase in direct debit accounts.

In addition, by the end of 2012 around 210,000 smart meters will have been installed. The automatic remote meter reading and the addition of more metering points along the distribution system will enable more control and identification of sources of electricity losses, theft and inaccuracies. The smart metering system, especially through the consumption behaviour information it can provide, will also be a tool for educating consumers in energy and use efficiency.

The automatic remote meter reading and the addition of more metering points along the distribution system will enable more control and identification of sources of electricity losses, theft

and inaccuracies. The smart metering system, especially through the consumption behaviour information it can provide, will also be a tool for educating consumers in energy and use efficiency.

6.2. The Identification and Quantification of the Demand for Electricity

The measure of demand for electricity which is considered to be relevant for the purposes of this section of the Policy is the consumption of electricity from the national grid exercised by all final users such energy. This measure of demand thus would not include:

- consumption in power plants;
- distribution losses;
- energy generated by users for their own use;
- the reduction in electricity requirements through the use of solar water heating and other energy saving activities.

Table 6.2.1 indicates that the demand volume as defined above in 2010 stood at 2,103.9 GWh. These figures, sourced from the workings underpinning the NREAP, contain an element of buffer (of the order of around 10%) over and above the actual demand for the year which was effected by an extraordinary downturn. It is considered that to avoid the risk of underestimating potential future demand, which may be affected by a reversal of the recent downturn, it is prudent to retain such buffer in the estimates.

Table 6.2.1: Energy Demand (GWh)

	2010
Gross Energy generated	2,520.3
Use in power plants	-138.0
Distribution losses	-126.0
Efficiency gains	-118.1
Shift to solar water heating	-34.2
Demand for Electricity	**2,103.9**

Source: MRA

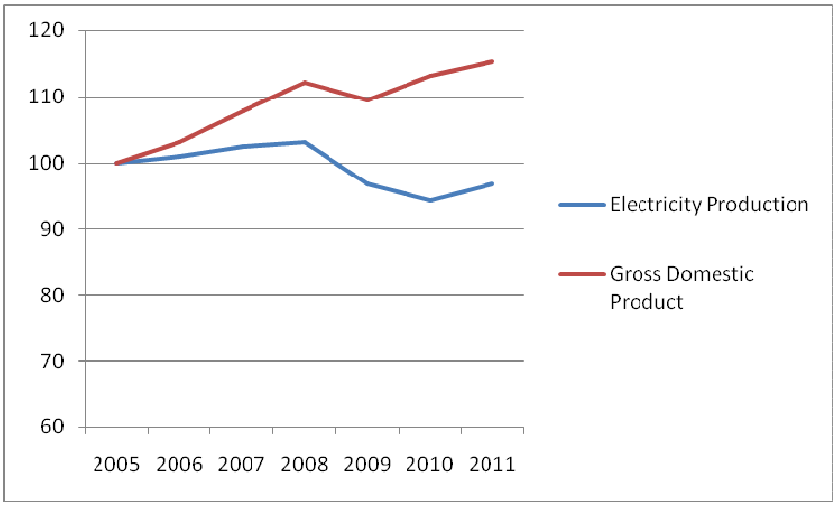
The next step is to derive projections for the demand for electricity over the period to 2018. There is significant uncertainty surrounding these estimates, influenced by a number of factors including:

- the rate of economic growth;
- the sectors contributing to economic growth and their relative energy intensity;
- developments in the costs of energy and in energy prices to the consumers;
- changes in patterns of the consumption of energy, including:
  - the use of electricity-saving devices;
  - a possible shift to electric vehicles in the transport sector.

These considerations reduce the relevance and credibility of point forecasts relating to any time period. Rather, the Policy approach towards the provision of electricity in Malta is here based on the

derivation of ranges of values for possible demand in the years 2014 and 2018. Projections are undertaken on the basis of a historic analysis of the relationship between electricity production, which for the purposes of this exercise is construed to reflect demand, and the volume of Gross Domestic Product in Malta. The development in the data, spanning a period from 2005 to 2011[10], is shown in Figure6.2.1.

Figure 6.2.1: Electricity Production and Gross Domestic Product (2005=100)



Source: NSO

An examination of the data presented in Figure 6.2.1 indicates an extent of decoupling of energy production from economic activity between 2005 and 2008, when GDP was growing at a markedly faster pace than electricity production. This may, to an extent, resulted in responses to the introduction of a policy of cost recovery in energy pricing, coupled with the increases in energy prices. A significant drop in energy production took place in 2009 and 2010, partly due to the 2009 economic recession, but also reflecting other considerations, because although the GDP level had by 2010 rebounded to a level higher than that in 2008, electricity production in 2010 fell by over 8% compared to the 2008 level. Factors conditioning demand included the use of alternative energy sources, developments in energy prices relative to disposable income, energy saving measures and a continued restructuring towards relatively less energy intensive sectors of economic activity. It is interesting to observe that in 2011, electricity production was relatively elastic to GDP growth, possibly indicating some elements of reversal of the tendencies observed in the previous two years.

These results indicate that on average during the period, for each 1% change in the growth of the volume of Gross Domestic Product, the demand for electricity rose by 0.23%. It also indicates that the regime shift occurring from 2009 onwards resulted in a level of electricity demand which was

[10] While this time span may be viewed as relatively short, it ensures that the data set captures the recent economic situation which is more relevant for the purposes of effecting projections, in the context of an economy which has over the past decade changed significantly in terms of its sectorial composition. Data comparability over time is best assured by focusing on this time period.

7.2% lower than that which would have otherwise occurred on the basis of the continuation of trends in the previous period[11].

These findings provide the basis for the formulation of the three scenarios which are considered for the forecast of the demand for electricity. A **mid demand estimate** scenario is constructed as follows:

- the 7% drop in demand in the post-2008 situation is assumed to be gradually reversed between 2012 and 2014;
- a GDP volume growth rate which rises gradually from 1% in 2012 to 3% by 2018;
- a reaction of electricity demand to GDP growth equal to the relevant elasticity estimate between 2012 and 2014, rising to the mid-estimate plus one standard deviation of such estimate (a total of 0.358 thereafter).

A second scenario involving a **low demand level estimate** which features the following elements:

- only one-third of the 7% drop in demand in the post-2008 situation is assumed to be gradually reversed between 2012 and 2014;
- a GDP volume growth rate which rises gradually from 1% in 2012 to 3% by 2018;
- no reaction of electricity demand to GDP growth between 2012 and 2014;
- a reaction of electricity demand to GDP growth post-2014 equal to the relevant elasticity estimate less one standard deviation of such estimate (equal to 0.098).

The realisation of this scenario would involve a combination of weak economic growth, growth into sectors which are less energy-intensive, and significant increased utilisation of alternative energy sources.

The third scenario considered here involving an **upper demand estimate** for electricity, is derived as follows:

- the 7% drop in demand in the post-2008 situation is assumed to be gradually reversed between 2012 and 2014, as in the mid demand estimate scenario;
- GDP volume growth rising gradually from 1% in 2012 to 6% by 2018;
- the sensitivity of electricity demand to GDP growth equal to the mid demand estimate plus one standard deviation between 2012 and 2014 (a total of 0.358), and to the mid-estimate plus two standard deviations thereafter (a total of 0.488).

[11]The information content of the data shown in Chart 6.1 may be summarised by means of a regression analysis:

$\ln(e) = 6.668 + 0.228\ln(y) - 0.072s$
s.d. (0.604) (0.130) (0.013)
$r^2 = 0.9$ *F=20.3*

where e is the demand for electricity
y is the volume of Gross Domestic Product
s is a dummy variable with a value of 0 between 2005 and 2008, and 1 in later years to account for the presumed regime shift in the latter period

Through the third element, this scenario would also take into account the possibility of a marked shift of transport modes to electric vehicles.

Table 6.2.2: Demand Projections

Mid-Level Projections					
	Estimate (Gwh)	Reversal of 2009-10 drop	GDP growth	Elasticity response	Total Growth
2011	2170.0				
2012	2218.3	2.00%	1.0%	0.23%	2.23%
2013	2277.8	2.34%	1.5%	0.34%	2.68%
2014	**2349.3**	2.68%	2.0%	0.46%	3.14%
2015	2370.3	0.00%	2.5%	0.89%	0.89%
2016	2391.4	0.00%	2.5%	0.89%	0.89%
2017	2417.1	0.00%	3.0%	1.07%	1.07%
2018	**2443.0**	0.00%	3.0%	1.07%	1.07%
Low-Level Projections					
	Estimate (Gwh)	Reversal of 2009-10 drop	GDP growth	Elasticity response	Total Growth
2011	2170.0				
2012	2184.5	0.67%	1.0%	0.00%	0.67%
2013	2201.5	0.78%	1.5%	0.00%	0.78%
2014	**2221.2**	0.89%	2.0%	0.00%	0.89%
2015	2233.8	0.00%	2.5%	0.57%	0.57%
2016	2246.6	0.00%	2.5%	0.57%	0.57%
2017	2261.9	0.00%	3.0%	0.68%	0.68%
2018	**2277.4**	0.00%	3.0%	0.68%	0.68%
High-Level Projections					
	Estimate (Gwh)	Reversal of 2009-10 drop	GDP growth	Elasticity response	Total Growth
2011	2170.0				
2012	2221.2	2.00%	1.0%	0.36%	2.36%
2013	2285.0	2.34%	1.5%	0.54%	2.88%
2014	**2362.6**	2.68%	2.0%	0.71%	3.39%
2015	2420.1	0.00%	5.0%	2.43%	2.43%
2016	2479.1	0.00%	5.0%	2.43%	2.43%
2017	2551.5	0.00%	6.0%	2.92%	2.92%
2018	**2626.1**	0.00%	6.0%	2.92%	2.92%

The results of this scenario analysis are presented in Table 6.2.2. In the mid demand level scenario, electricity demand growth is by an average of 2.7% per annum between 2010 and 2014, to reach 2,349 GWh in the latter year. This is consistent with the demand forecast presented in the NREAP.

After that period, the annual growth in demand is projected to slow down to 1% per annum, to reach 2,443 GWh by 2018.

In the low demand level scenario, demand growth is projected at 0.8% per annum between 2010 and 2014, slowing to an average of 0.6% per annum thereafter.

In the high demand growth scenario, average annual growth in electricity demand would stand at 2.9% between 2010 and 2014, slowing to 2.7% thereafter. The demand level reached in 2018 under this scenario, equal to 2.6TWh, is consistent with the forecast presented in the NREAP.

Figure 6.2.2: Forecasts for Electricity Demand

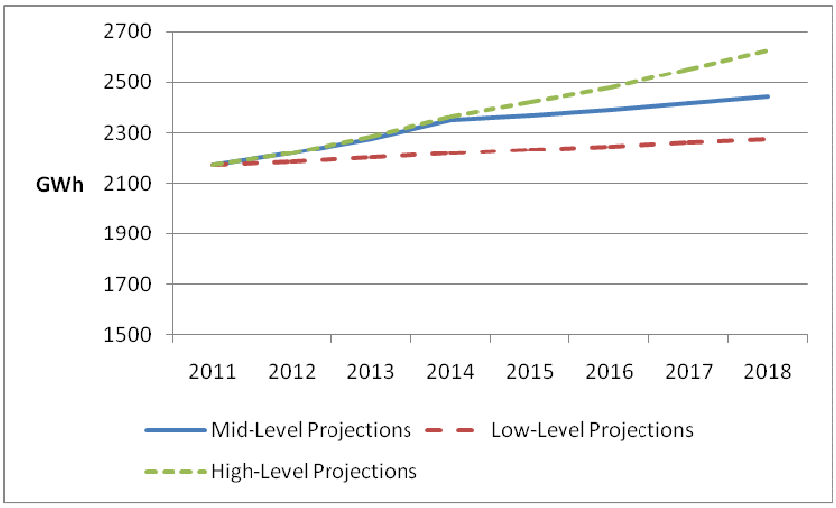


Figure6.2.2. summarises the main characteristics of the results of the demand projection scenarios. It is shown that up to 2014, the expected capacity level scenario presents results which are close to the upper estimate scenario. By 2018, the mid-level scenario is closer to a mid demand point between the two polar scenarios. By that year, the variation between the upper and the lower demand scenario estimates amounts to just over 15%.

It is considered that this scenario analysis, while relatively simple, adequately captures the likely future trends in the demand for electricity and the uncertainties which may impinge on it.

Another important characteristic of demand is its volatility across different periods of time within the year. The available sources of supply must not only meet the total amount of demand per year measured as a flow of electricity (GWh), but must also be able to meet fluctuations on an hourly basis, especially points of peak hourly demand. In order to capture this effect, data on hourly fluctuations in electricity demand is here used for a typical year made up of 8,760 hours, based on a data set spanning a three-year period of observation. This information is summarised in Table 6.2.3, which indicates the average level of demand in different periods of time, categorised on the basis of month and time of day, relative to the overall average hourly demand for electricity throughout the year. Minimum (maximum) values for demand relative to the yearly average are furthermore indicated for periods when demand is lower (higher) than the yearly average.

Table 6.2.3: Fluctuations in Electricity Demand
(ratios to annual average hourly average value)

		Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	**Average over the time of day**
Time of day	1-6	0.69	0.71	0.97	0.71	**0.77**
	6-12	1.02	1.01	1.27	1.03	**1.08**
	12-18	1.04	1.03	1.31	1.07	**1.11**
	18-24	0.99	0.95	1.21	0.99	**1.03**
Average over the 3-month period		**0.93**	**0.93**	**1.19**	**0.95**	**1.00**

Extreme Minimum/Maximum Values

		Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	**Overall Minimum/Maximum**
Time of day	1-6	0.58	0.54	0.72	0.58	**0.54**
	6-12	1.20	1.39	1.64	1.33	**1.64**
	12-18	1.30	1.39	1.64	1.33	**1.64**
	18-24	0.07	0.06	1.55	0.58	**1.55**

As expected, the analysis shows peak demand levels between the hours of 1200 and 1800 in the months between July and September. In this period, average demand is 31% over the annual average, with peaks at around 64% over the annual average. It is furthermore interesting to note that peaks exceeding 55% of the annual average are registered in the same months between the hours of 1800 and 2400. Also as expected, lowest demand levels are on average registered between the hours of 1 and 6, although in the months between July and September, average demand during this time is close to the overall annual average.

6.3. Policy Objectives for the Electricity Sector

The Energy Policy must at the very basic level ensure that the demand patterns identified in the previous section are effectively met. In meeting this identified demand, the following objectives are to be furthermore pursued:

- operating in an economic efficient manner which is conducive to minimising the overall financial costs of electricity consumed in Malta through the patterns of consumption and the utilisation and operation of the various sources of supply;
- meeting international and national commitments with respect to environmental performance and climate change GHG emission reduction in the context of energy management;
- ensuring a sufficient security of supply to meet with emergencies and unexpected events;

- relying on diversified sources in terms of technologies and vintages thereof, so as to minimise the risks attendant with excessive reliance on any one particular technology, including those emanating from the possibility of future changes in costs;
- inculcating a degree of flexibility in electricity consumption and production patterns so as to facilitate the attainment of the above goals.

These five objectives may in some instances complement each other. The diversification of electricity production into renewable sources would be conducive to meeting environmental objectives and could contribute to enhancing security of supply. If undertaken in terms of relatively small, incremental investments, they could also contribute to reaping the potential of technological improvements yet to be attained.

On the other hand, the minimisation of the financial cost of energy produced in Malta would often present trade-offs with all the other objectives. Meeting environmental standards, investing in reserve capacity, and diversification into smaller units of generation entail implications on energy costs, which often translate into competitiveness and affordability concerns.

The Energy Policy must identify a preferred approach or approaches so as to optimise on these trade-offs. In this regard, the attainment of the targets as set out in Malta's NREAP and the Climate Change Strategy on mitigation are a key requirement, and indeed one of the primary objectives of this policy. These are described further in Chapter 8.

6.4. The Strategic Approach to Policy with Respect to the Electricity Sector

Within the context of the framework for the electricity sector set through the decisions taken and plans formulated up to this stage, the Government is adopting a strategic approach in its policy towards the electricity sector so as to ensure the attainment of the objectives described in the preceding section in the face of the considerable uncertainties characterising the energy market, which may present both threats as well as opportunities to the sector. Among the major sources of uncertainty, there are:

- developments in demand;
- trends in fossil fuel prices;
- the levels and movements of prices of electricity sourced through the European grid;
- the extent of improvements in different RES technologies, and the associated impacts on costs;
- the viability of alternative sources of energy production from the environmental development perspective;
- the actual yields from RES sources, including waste-to-energy projects, as adopted in the NREAP, form part of the Solid Waste Management Strategy for the Maltese Islands[12], as affected by local operating conditions of waste management projects and changing public behaviour regarding waste;
- the effectiveness and proliferation of the further use of energy saving technology such as heat pumps.

[12] A Solid Waste Strategy for the Maltese Islands, Parliamentary Secretariat for tourism, the environment and culture; January 2010.

Climate change is global, hence if Malta invests abroad in RES projects it will still displace fossil fuels elsewhere and hence is contributing positively to climate change. These factors may in future call for a reconsideration of projects and plans formulated so far. Flexibility and dynamism as underlined earlier but important to re-emphasise, are key to the success of this Energy Policy. The strategic policy implications of these factors can, furthermore, be better understood in terms of their effects on energy sector performance.

6.4.1 Scenarios for the Electricity Sector in Malta

In order to generate further insights into these issues and their potential relevance to the consideration of policy options with respect to the electricity sector, this Energy Policy produces scenarios for electricity generation in 2014 and 2018. The 2014 scenario is very much rooted into the production scenario which at this stage can be envisaged to prevail at that time. The scenario can be discussed in terms of its implications on the sources of energy used, financial costs, carbon emissions, and the relative implications of shocks which may affect the system. The 2018 scenario presents the possibility of possibly wider options for energy generation.

In the construction of scenarios and the effects of shocks on their results, a model is utilised which enables the derivation of annual production plans based on hourly developments in demand and upon the available sources of electricity. In general, the sources utilised and their main characteristics in terms of modelling are as follows:

- production from the available generating plant at the Delimara power station including:
  - eight Diesel engines in the new extension having a capacity of 17MW each;
  - from the original Delimara infrastructure:
  - two steam turbines having a capacity of 60MW each;
  - two open cycle gas turbines of 37.5MW capacity each and one combined cyclr gas turbine unit of 110MW capacity, which, due to their high operating costs, are not considered for use explicitly in the model, but are retained as a source of additional capacity and only in exceptional circumstances.
- the electricity 200MW HVAC interconnector with Sicily;
- production from RES in line with the projections in the NREAP, with the output there of being modelled on an hourly basis as relevant.

The production from fossil fuels takes into account the minimum output of generating units and the minimum time they must be retained in operation once they are switched on. The electricity interconnector to Sicily is modelled as a completely flexible source which can, in any hour supply into or out of the country electricity up to its capacity limit of 200MW. There are no restrictions on the use of the interconnector in any hour which are based on its use during previous hours. The facility to use the interconnector to potentially export electricity may be useful in the context of inflexible production from renewable or fossil fuel sources which exceeds domestic demand for electricity.

Photovoltaic energy production is modelled to depend upon fixed production coefficients which determine the hourly yield from infrastructure which would on average deliver 17.3% of its

theoretical maximum capacity. These conditions would depend on the availability of natural light source. The output of photovoltaic units, characterised by time of their operation, relative to the average yield, is summarised in Table 6.4.1.1, based on observations in Malta relating to 8,760 hours in a year over a 3-year period. The results provided are very much in line with expectations in this regard.

Table 6.4.1.1: Fluctuations in Photovoltaic Output

		Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	**Average over the time of day**
Time of day	1-6	0.00	0.01	0.01	0.00	**0.01**
	6-12	1.74	2.37	2.36	1.58	**2.01**
	12-18	1.71	2.32	2.31	1.56	**1.98**
	18-24	0.00	0.01	0.01	0.00	**0.01**
Average over the 3-month period		**0.86**	**1.18**	**1.17**	**0.78**	**1.00**

Extreme Minimum/Maximum Values

		Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	**Overall Minimum/Maximum**
Time of day	1-6	0.00	0.00	0.00	0.00	**0.00**
	6-12	3.60	3.84	3.94	3.30	**3.94**
	12-18	3.58	3.82	3.92	3.30	**3.92**
	18-24	0.00	0.00	0.00	0.00	**0.00**

In a similar manner, the output of wind power facilities is modelled to depend upon fixed production coefficients, dependent upon meteorological conditions, which determine the hourly yield from infrastructure which would on average deliver 30% of its theoretical maximum capacity. These coefficients, indicating hourly output relative to the average yield, observed over 8,760 hours in a year over a five-year period, are summarised in Table 6.4.1.2. Relative to photovoltaic production, wind offers a more stable source of energy across seasons and time-of-day. It provides lower yields over the June to September period when solar energy production would be at a peak.

Table 6.4.1.2: Fluctuations in Wind Energy Output

		Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	**Average over the time of day**
Time of day	1-6	1.09	0.91	0.53	1.06	**0.90**
	6-12	1.23	1.13	0.72	1.17	**1.06**
	12-18	1.30	1.21	0.86	1.24	**1.15**
	18-24	1.07	0.90	0.55	1.05	**0.89**
Average over the 3-month period		**1.17**	**1.04**	**0.67**	**1.13**	**1.00**

Extreme Minimum/Maximum Values

		Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	**Overall Minimum/Maximum**
Time of day	1-6	2.16	0.16	0.02	2.36	**0.02**
	6-12	2.45	2.30	0.06	2.27	**2.45**
	12-18	2.46	2.43	0.14	2.36	**2.46**
	18-24	2.14	0.06	0.03	2.16	**0.03**

It is interesting to consider the correlation between the hourly patterns of the demand for electricity and the fixed yield coefficients associated with photovoltaic and wind technology. This information is provided in Table 6.4.1.3. Based on hourly patterns over annual periods, electricity demand and the output of photovoltaic installations present a positive correlation of 44.2%. This result reflects the fact that there is a correspondence between demand peaks, typically occurring during the day and in summer months, and the output of this type of technology. On the other hand, a mildly negative correlation between demand patterns and wind technology output is found, primarily due to its weak output in the summer months of peak demand.

Table 6.4.1.3: Correlation between Electricity Demand and Output from Renewable Sources

	Demand	PV output	Wind Output
Demand	1.000		
PV output	0.442	1.000	
Wind output	-0.157	0.229	1.000

The production from solid and liquid waste is another possibility considered in the scenarios. This is assumed to occur at a constant rate throughout the year, and subject to the available capacity for output, which would be limited by the availability of infrastructure and waste inputs.

The default pecking order for the use of technology to satisfy demand on an hour-by-hour basis is:

1. the use of available energy from renewable sources;
2. the mandatory use of energy from the Delimara power plant on account of generating plant switched in earlier hours and which would have to continue operating for a minimum period of time;
3. the use of the interconnector, which may on one hand supply energy to Malta, or in instances used to export energy in case that the above two sources exceed demand;
4. the use of the Delimara extension facilities on a discretionary basis;
5. the use of the original Delimara facilities on a discretionary basis.

This pecking order takes into account technical and cost considerations, mainly:

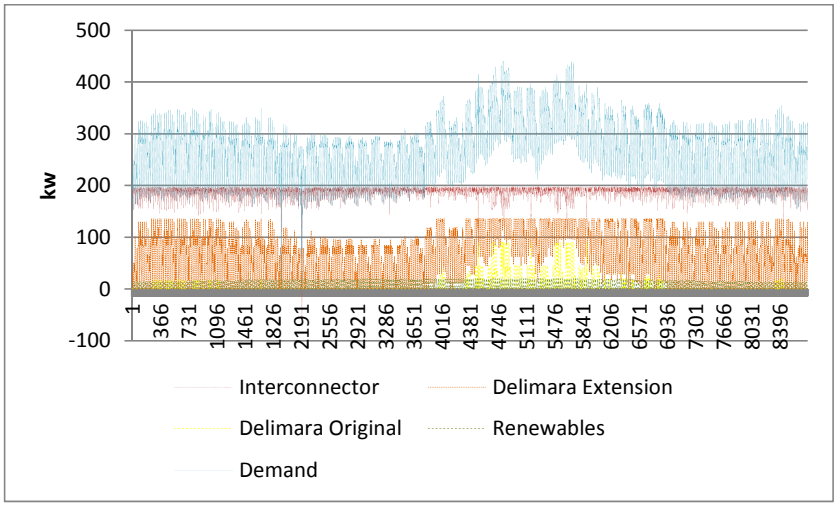
- (1) and (2) have to be mandatorily used or exported as they would be available irrespective of demand or discretionary decisions;
- (3) is preferred to (4) is preferred to (5) on account of cost considerations, whereby it is assumed that the price of electricity acquired through the interconnector will be more favourable than that for domestic energy production, while the Delimara extension will present efficiency and cost improvements over the original Delimara facilities, mainly in the use of fuel and in the added flexibility of being able to use smaller-sized turbines.

6.4.2. An Indicative 2014 Scenario

On the basis of the foregoing discussion, an indicative scenario for electricity production in Malta in 2014 can be derived. Demand is set, for indicative purposes, consistent with the mid-level scenario for the year, earlier established at around 2,350GWh.

On the basis of the modelling approach described above, the production plan to meet the demand for electricity in 2014 can be derived, which is depicted in Figure 6.4.2.1. The plan indicates that production from renewable sources would account for between 3% to 7% of electricity demand, while around 70% would be satisfied through the interconnector. Domestic production through fossil fuels would be used to satisfy under 30% of total demand, of which under 2 percentage points would emanate from the original Delimara power plant installation. The plan expects no time of insufficient supply of energy, and actually features some export of energy through the interconnector. This scenario is consistent with the targets of the NREAP.

Figure 6.4.2.1: Hourly Indicative Production Plan (2014*)*



In this context, it may be expected that the reliance on the interconnector would improve the performance of the energy sector by significantly reducing domestic carbon emissions, diversifying sources of supply, creating additional security capacity, introducing more flexibility in the system while possibly overall to an extent reducing financial costs.

The effects of changes in the operational conditions of the system can be discussed next. The changes which are here considered include variations in demand and in hourly deviations within it, in the costs of oil and in the price at which electricity is acquired through the interconnector, and in the actual capacity developed for the generation of electricity through RES.

Variations in demand would in the main have to be accommodated through changes in production through fossil fuel sources. This is because the interconnector would in the preferred scenario be already used at levels close to capacity, leaving little room for it to accommodate demand fluctuations. Output from renewable sources can likewise not be changed on a discretionary basis to meet demand. This identifies a crucial role for domestic fossil fuel, in that it provides a relatively flexible source of electricity to meet fluctuations in demand and to accommodate increases beyond those which can be expected at the mid-level projection.

Reductions in the variability of hourly deviations in the demand for electricity, keeping total annual demand constant, leads to a reduction in fossil fuel electricity generation, compensated by an increase in electricity acquired through the interconnector. This may be understood in terms of the fact that domestic generation based on fossil fuel is mainly needed to cope with peaks in demand. This would entail some minor reduction in overall costs of production, and a perceptible positive effect in terms of emissions reductions.

In the case of changes to the price of crude oil, a 10% change would be likely to change the overall costs of electricity in Malta by around 2%. This is because the reliance on diversified sources of

energy, chiefly the interconnector to the European market would be sheltering the domestic economy from shocks to the prices of crude oil.

Changes in the availability of electricity from RES are lastly discussed. In terms of the production plan, it is seen that an increase in photovoltaic capacity tends to crowd out principally electricity generated through local production rather than that sourced from the interconnector. On the one hand, there are rigidities in local production associated with the need to keep generating plant switched on for a minimum period of time, as opposed to the higher flexibility, and consequent capacity to respond, associated with the sourcing of electricity through the interconnector. On the other hand, electricity sourced through the interconnector is the preferred source for energy acquisition, rendering the response in it less elastic to that associated with local production. The latter consideration prevails in this case. Because of this, the increased use of RES through PV units would entail a limited increase in the overall costs of electricity production, accompanied by a significant reduction in emissions.

6.4.3. Possible Scenarios for 2018

The scenario for 2018 presents more flexibility in terms of production technologies which may be in operation by then. The key strategic decisions which the country will be facing are:

- whether to incur the expense, currently subject to a specific study, of conversion to gas fuel leading to achieve an even more pronounced reduction in carbon emissions, over and above that resulting from the commissioning of the Delimara power plant extension, the sourcing of electricity through the interconnector, and the utilisation of RES for electricity;
- the derivation of the optimum balance between different sources of RES in view of the cost to yield profiles which will be applicable by then, as well as their technical, economic and environmental viability within the country in the light of technological advances which would be taking place.

Security of supply issues are expected to be even less of a consideration than in 2014, because of the expected enhanced diversification of sources, also through the proliferation of RES by 2018.

In discussing these elements, the following issues are of relevance:

- carbon emissions targets are well on the way to being achieved through the operation of the new Delimara infrastructure, the reliance on the interconnector and the proliferation of RES;
- it may be desirable to create significant spare capacity in terms of the production of energy from RES, to ensure the attainment of the desired level of production, allow for the possibility of increases in the required regulatory amounts particularly given the EU's target to achieve a decarbonisation of the EU's energy system of 80% to 95%, and possibly benefit from the export of such energy at potentially favourable prices;
- PV technology costs are coming down significantly and their relative advantages should be exploited already in the short term, but due to their potential capacity limits in terms of land availability, consideration of wind-based technology should be continued especially in the

light of the potential cost reductions which may be expected with regards to offshore installations in the medium term.

These considerations point towards a desired strategic approach whereby:

- A significant effort towards renewable energy production would continue to be undertaken through a continued gradual spread of photovoltaic generation to benefit from continuing advances in technology, but subject to limitation in the availability of space;
- Improvements in wind generation technology, feasibility and costs would be continued to be monitored so that investments in this technology would be undertaken at an appropriate time. It can at this stage be reasonably anticipated that in the coming few years, a critical point will be reached where the further proliferation of photovoltaic units in Malta would be severely constrained, at the same time that the costs of wind technology, possibly offshore-based, could through technological innovation be driven sufficiently low so as to render investment in such technology sufficiently attractive as well as when uncertainties associated with impacts of wind turbines are clarified;
- Local production through gas fuel would be undertaken if, as already underlined, there is considerable financial support from EU sources which would facilitate Malta's connectivity to the EU single energy infrastructure grid.

An additional fall-back position to cater for unforeseen circumstances that may disrupt or delay the achievement of the objectives set out in the NREAP is the of use co-operative mechanisms provided by the RES Directive to reach part of its RES targets. The three intra-European co-operation mechanisms foreseen by the RES Directive are statistical transfer, joint projects and joint support schemes. Additionally, there is the option of joint projects with non-EU member states on condition that the energy they produce is consumed in the EU. In this regard, Malta is keeping track of progress with regard to the Mediterranean Solar Plan initiative amongst others. The interconnection between Italy and Tunisia are particularly interesting because Malta will soon be connected to the European grid.

Government is also open to consider the adoption of new technologies when the opportunity arises. Developments in technology may allow Malta to attain the current targets faster and possibly exceed them. In fact, Malta is watching the evolution of technologies to harvest:

- marine based energy (all types that are adaptable for Malta’s marine conditions);
- production of biofuel from marine algae;
- ground source heat energy;
- small-scale concentrated solar power;
- carbon capture technologies.

Maltese entities are also participating in research work on the above technologies. In view of geo-physical limitations of the islands, Malta embraces adoption of marine based innovative RES technologies which could prove viable.

In terms of the implementation of additional, alternative and experimental non sea RES based technologies, the strategic approach adopted by Government at this stage is to consider these as

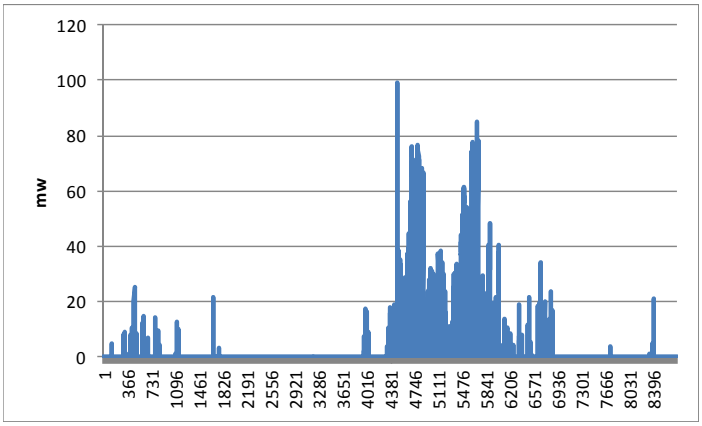
production intended for the European market, rather than to serve the domestic market in the first place. Such technologies could be considered to serve national demand once that their suitability for the purpose is proven on the grounds of technical, financial, environmental and regulatory feasibility.

With regard to the sea based RES technology as stated given Malta's unique characteristic that the sea provides, for post 2020, the greatest potential for siting RES solutions Malta will focus efforts to have its sea waters serving as a research hub for the development of new marine based technology.

6.4.4. Post-2018 Situation involving the Decommissioning of the Original Delimara Turbines

A post-2018 situation will feature the eventual decommissioning of the two 60MW original Delimara power plant turbines. This would give rise to a situation where the availability of electricity would fall short of demand indicating the need for investment in either new generating plant or the second interconnector. Figure 6.4.4.1. shows the likely pattern of incidence of the periods of insufficient supply.

Figure6.4.4.1: Hours of Insufficient Supply Upon Decommissioning of Original Delimara Turbines



The considerations made earlier on would impinge upon the options which will in future be available to cover this shortfall, which may include:

- delaying decommissioning at risks of higher operational costs, emissions, and supply failures;
- expanding solar production, especially as the peak shortages also happen to be in solar-intensive months, but subject to space limitations;
- replacing the turbines with other fossil-fuel based turbines, which may not be financially attractive if the conversion to gas fuel is eschewed;
- investing in another interconnector, which could be expensive but would also afford a better measure of security of supply.
- other options which may become available in future.

The derivation of definitive conclusions in this regard require a cost benefit assessment to determine the full implications of the options available.

6.5. Conclusion

This analysis identified and estimated the demand for electricity and its likely growth in Malta, subject to uncertainties which inevitably surround this variable. It articulated objectives to be attained in meeting the identified demand and focused on key decisions which will need to be taken in the context of the provision of electricity in Malta. It furthermore identified strategic options to inform decision-making in a manner which meets the overall objectives.

The key conclusion which emerges from this analysis is that there seems to be a relative advantage in an approach which focuses primarily on efforts towards renewable energy production. In view of the financial impacts and the limited relevant contribution to environmental regulatory compliance, undertaking local production through gas fuel would be justifiable only if significant financial support from EU sources were to be available to enable Malta to be connected to the EU single energy infrastructure grid as well as to position Malta for post 2020 RES targets within the context of the EU 2050 Roadmap which seeks a decarbonisation of the EU energy system by 80% to 95% of 1990 levels.

The spread of photovoltaic generation should continue in a gradual manner, also to benefit from continuing advances in technology and constant decreases in the cost of the technology. At the same time, improvements in wind generation technical feasibility and costs would be continued to be monitored so that investments in this technology would be undertaken at the appropriate times. In the coming years, a critical point is expected to be reached where the further proliferation of photovoltaic units on land in Malta would be severely constrained, at the same time that the costs of wind technology, possibly offshore-based, would have been driven sufficiently low so as to render investment in such technology sufficiently attractive.

Looking further ahead into the future, the issues of meeting demand in a post-2018 scenario within the context of the decommissioning of the original Delimara plant would have to be considered. While a number of options may be explored at this stage, there are likely to be others which will present themselves within the context of future technological developments.

Table 6.5.1: Summary of Main Issues and Measures in Electricity

Issues	Measures
The electricity system is not only isolated, but is not sufficiently robust to cope with major faults both in generation and distribution. The integration of a large-scale wind farm could cause network operability problems. Frequent unscheduled shutdowns of the older generation plants, mainly arising out of faults, are the main contributors to consumer interruptions, with knock-on negative effects on economic activity.	Continue with the construction of the Malta-Sicily electricity interconnector. Strengthen the grid as appropriate to enable multiple use of RES solutions.
The cyclical nature of demand constrains the operation of the plant and, together with isolation, leads to uneven use of the generation plant. Moving away from the most efficient operation rating when the demand is low and sometimes also leads to the utilisation of the more expensive quick-to-start plant to meet the occasional peaks. Inefficiency leads to higher levels of pollutants released into the environment.	Continue Smart meter programme Continue with demand side management measures to increase wise energy use.
Plant efficiency also depends on technology. 60% of the local generating capacity is classical steam technology, with relatively low efficiency, particularly the aged steam plant at the Marsa Power Station, which generates 40% of Malta's electricity. It was designed when environmental sustainability was not a priority and is located in a densely populated area. The CCGT, with an efficiency of around 40%, is the most efficient generating plant available in Malta but normally the most expensive to operate due to fuel cost (gasoil). The new Diesel plant at Delimara Power Station (DPS) will contribute to lower emissions through better technology efficiency (a maximum of 46%) and abetment measures. The use of HFO will produce more by-products than gasoil used but the latter is more expensive.	Commission and put into service the Delimara Power Station extension. Shut down Marsa Power Station.

Issues	Measures
The 'old' part of the Delimara power station will reach its 25 years design life as follows: - No 1 and No 2 (60MW respectively) steam turbines by 2017. - Gas turbine 1 and 2 (37.5MW respectively) by 2020.* - 110MW CCGT by 2023	Determine a strategy to replace the Delimara plant that is flexible and that to the extent possible diversifies Malta from the use of oil as an energy source whilst at the same time ascertaining security of supply and towards renewable energy production, primarily solar RES solutions in so far that planning and environment constraints are met. *(given that these gas turbines are rarely used, the lifetime is actually much longer than quoted)
There is no diversity in fuels used for electricity generation. A more diversified portfolio of energy sources can help to mitigate oil price volatility provided the prices of alternative energy sources do not perfectly correlate with those for oil. All fossil fuels suffer volatility for different reasons. The cost-benefit analysis[13] for DPS extension indicates that the price per kWh of electricity using natural gas could be greater than HFO but cheaper than gasoil. Natural gas could also be used in the existing CCGT and OCGT plants.	Island generation to switch to natural gas only subject to EU financing that allows Malta to connect to the single energy infrastructure grid being made available and in potentially meeting post 2020 EU and Climate Change de-carbonisation targets. In planning the post 'old' part of Delimara use of gas as an energy source should be considered vis-a-vis the EU post 2020 RES targets. Ensure that fuels are procured through transparent and robust procedures, and regulated by financial instruments.
Emissions per unit of electricity generated are relatively high. Electricity generation accounts for about 75% of the GHG emissions from the energy sector. Currently each unit of electricity accounts for 0.86 kg of CO2 emissions. The sector is also a heavy emitter of NOx and SO2. The use of HFO 0.7% sulphur in all steam plants and gasoil 0.1% in the other plants have helped to reduce of SO2emission. The burner modifications in Delimara boilers will contribute to a reduction in NOx. The new diesel engine plant is expected to have a lower CO2 emitting factor of 0.59kg/kWh and lower emissions of NOx and SO2 through abetment measures. The use of natural gas would lower the emissions per unit generated.	Island generation to switch to natural gas only subject to EU financing that allows Malta to connect to the single energy infrastructure grid being made available and in potentially meeting post 2020 EU and Climate Change de-carbonisation targets. Should gas infrastructure be introduced a cost benefit assessment should be carried out with regard to the potentiality of introducing a grid for the distribution of gas to major industrial and commercial hubs and, potentially, domestic consumers. Informed by ongoing and further planned analysis of distributed energy potential, the Government will assess the long term implications for our distribution/transmission networks of realising that potential.

[13] The Estimation of Economic Costs of Operation of the Delimara Extension Power Station Equipment Using Different Types of Fuel Report Submitted by Enemalta Corporation in the Context of the Application for IPPC Operating Permit for the Delimara Power Station Extension, May 2011.

Issues	Measures
Interruptions of supply are mainly due to loss of generation capacity (an evident deficiency in reliability and security of supply) with a related impact on economic activity. The use of SCADA and frequency shedding can contribute to reduce supply interruption time for certain faults in the electricity system. An interconnection with a larger robust system would increase the fault riding capability of the electricity system in Malta.	Continue with the construction of the Malta-Sicily electricity interconnector.
Technical losses are currently estimated to be around 4.6% of the units sent out to the grid, which is considered a reasonable loss level for a distribution network. The latest study on technical losses done by Enemalta is dated 2010. Losses in the distribution system have to be compensated with more generation. This means extra emissions to the environment and extra cost per unit of billed electricity.	Continue to invest in the modernisation and strengthening of the grid and distribution system to reduce technical loses.
Level of units lost and unaccounted for in 2010 made up 14.8% of the units sent out to the grid, of which 9.8% is attributed to meter inaccuracies, the billing process and theft.	Ensure that ARMS Ltd carries out analysis and audits to address theft as well as to strengthen the billing process.
The lowest level of redundancy (n-1) cannot be guaranteed at all times through the network. Parts of the HV network operate close to full capacity during peak demand. The lack of redundancy increases the possibility of a widespread and prolonged interruption of supply when faults arise. The reinforcement of the distribution system is necessary to ensure reliable electricity provision to consumers.	Reinforcement of the distribution system.
The distribution system consists of overhead lines and underground cables. Overhead lines are vulnerable to faults caused by bad weather conditions and are visually disturbing; underground cables are subject to damage by road works and other contractors. Although underground tunnels are capital intensive, they can be reutilised to lay more cables and they protect cables better from third-party damage.	Current policy will continue.

Issues	Measures
Competition in the electricity sector is restricted. Opening up the market with its present structure and size could lead to security of supply issues because the market may not provide the necessary incentive to invest. There is conflict between economies of scale, flexibility of operation and the technical and economic feasibility of sufficiently large number of producers and suppliers.	Current Government policy on the competition in the electricity market will be retained.
The best dispatch strategy between on-island generation and import from the interconnector is still to be determined. On-island generation and the purchase and sale (export) of electricity via the submarine cable provide a high degree of flexibility which requires study, skill and full knowledge of the foreign markets and financial instruments to maximise the benefits. This will ensure that the potential benefits provided by connections to the various European energy networks are maximised. The benefits span security of supply, competitiveness and environmental sustainability.	Determine the best on-island generation mix (including generation through RES technology) and future operational and market strategies in the event of full integration with European and other energy grids. The power purchase agreements with regard to the purchase of electricity through the interconnector is a strategic matter and has to be handled accordingly.
Demand side management is currently limited to differentiated night and day tariffs for non-residential consumers with an annual consumption of 5 GWh or more.	Continue Smart meter programme. Continue to introduce demand side management measures. Following the completion of the roll out of Smart Meters, will launch a multi tariffs policy to shift demand for certain types of energy consumption by domestic, industry and enterprise from peak to off-peak energy use.
A number of consumers are on energy benefits. The Ministries of Finance and Social Policy respectively will decide which energy benefits are necessary from time to time and which consumers are eligible. The eligibility criteria are published on the Government website. Government will also consider shifting from a recurrent based social energy measures through the provision benefits to one that supports households in reducing their energy footprint through capital RES and energy efficiency investment.	Continue to take the necessary measures to combat energy poverty.

6.6. Programmes and Measures for the Electricity Sector

Table 6.6.1: Action Plan for the Electricity Sector

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
E-1	Commission and put into service the Delimara Power Station extension.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Consumption of fuel per kWh Emission levels by type per unit produced Customer minutes interruptions due to generation capacity loss Reduction in cost per unit attributed to improved efficiency	Underway	Lead - Enemalta
E-2	Shut down Marsa Power Station.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Status	2013-2015	Lead - Enemalta

Programme Measure number	Measure Description	Implementation		Timelines and Trajectories	Entity Responsible for Implementation
		Contribution to the Six Policy Priority Areas	Indicators		
E-3	Construct the Malta-Sicily interconnection.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Cost per unit of imported electricity Percentage of electricity imported Emissions saved per unit imported	Underway. Target to complete by 2013	Lead - Enemalta
E-4	Determine the best on-island generation mix and operational and market strategies in the event of full integration with European and other energy grids.	Policy area 1: Energy efficiency Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Overall cost per kWh Emissions per kWh	2014	Lead – Enemalta
E-5	Negotiate a power purchase agreement for the purchase of electricity over the submarine interconnector that is economically strategic to Malta's requirement	Policy area 1: Energy efficiency Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Overall cost per KWh	As appropriate	Load – MFEI Enemalta MFEI

Programme Measure number	Measure Description	Implementation		Timelines and Trajectories	Entity Responsible for Implementation
		Contribution to the Six Policy Priority Areas	Indicators		
E-6	Determine a strategy to replace the Delimara plant that is flexible and that diversifies Malta from the use of oil as an energy source whilst at the same time ascertaining security of supply	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Cost per unit of imported electricity Percentage of electricity imported Emissions saved per unit imported	2013-2015	Lead – MRA Enemalta MFEI
E-7	Switch island generation plant to natural gas.	Policy area 1: Energy efficiency Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Cost per unit produced locally using natural gas Percentage of electricity produced by natural gas Emissions per unit produced	Subject to EU financing which would allow Malta to connect with the EU Single Energy Infrastructure and within the context of the EU's post 2020 RES targets leading to the EU 2050 Roadmap	Lead – MRA MRRA MFEI Enemalta

Programme Measure number	Measure Description	Implementation		Timelines and Trajectories	Entity Responsible for Implementation
		Contribution to the Six Policy Priority Areas	Indicators		
E-8	Continue the Smart meter programme. Launch a multi tariffs policy to shift demand to non peak hours across all consumer sectors Introduce demand side management measures.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Number of smart meters installed Completion of the nationwide roll-out of smart metering and remote billing functioning Reduction in unbilled units (excluding technical losses) Demand side management measures implemented	2013 2014 Ongoing	Lead – Arms Ltd Lead – Enemalta Lead - MRA
E-9	Reinforce the distribution system.	Policy area 1: Energy efficiency Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Percentage reduction in customer minutes lost attributed to lower network faults Percentage of distribution system with n-1 redundancy Percentage technical losses in distribution	2012 onwards	Lead - Enemalta
E-10	Ensure that the procurement of fuels is done through transparent and robust procedures, and regulated by financial instruments, with the backing of the best expert advice.	Policy area 3: Stability in energy supply Policy area 5: Delivering energy economically, efficiently and effectively	Status of procurement procedures Annual fuel bill over electricity generated	On-going activity	Lead - Enemalta MFEI MRA

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
E-11	Continuing to take the necessary measures to combat energy poverty.	Policy area 5: Delivering energy economically, efficiently and effectively	Percentage of eligible consumers being assisted by Government to pay their bills Percentage annual increase in electricity bills per average household	On-going activity	Lead – MJDF MFEI

7. RENEWABLE ENERGY

7.1. Introduction

As is discussed in the Chapter on the Electricity (Chapter 6) and Transport Sectors (Chapter 9), the development of RES is key to Malta's Energy Policy. Malta is bound by specific targets at the international level in terms of the proportion of its consumption to be served through renewable sources in the coming years. At the same time, the renewable energy sector is strongly conditioned by volatile dynamics in terms of technological improvements and costs. Local renewable energy production is furthermore affected by specific constraints of an environmental and spatial planning nature.

This Chapter reviews recent developments in this regard, and looks into some prospective developments over the coming years. The backdrop to the discussion is provided by means of a review of the country's National Renewable Energy Action Plan (NREAP), which sets the overall targets to be achieved by the policy and presents a number of options on the way forward. It is understood that the direction provided in the NREAP remain subject to review in the light of developments in this highly dynamic area. The prospective review shown in the options provided in the NREAP is provided as an indication of potential future developments, which may be complemented or substituted by other initiatives in line with the flexible approach required for the success of the strategy.

The overall approach indicated by this Policy Document with respect to the Electricity sector is highlighted in the conclusion to Chapter 6. This indicates that the spread of photovoltaic generation should continue in a gradual manner, also to benefit from continuing advances in technology and constant decreases in the cost of the technology. At the same time, improvements in wind generation technical feasibility and costs would be continued to be monitored so that investments in this technology would be undertaken at the appropriate times.

In the coming few years, a critical point is expected to be reached where the further proliferation of photovoltaic units on land in Malta would be severely constrained, at the same time that the costs of wind technology, possibly offshore-based, would have been driven sufficiently low so as to render investment in such technology increasingly more attractive. With respect to the Transport sector, an increased intensification of the use of biofuels is being indicated as the principal approach for compliance with renewable energy targets.

This Chapter furthermore reviews measures recently introduced to encourage households and the business community to invest in RES technologies. Over the past recent years, Government introduced a number of grant schemes to assist in the long-term development of the local RES industry and to reduce household expenditure on energy and make renewable energy hardware more affordable. The schemes also aimed to increase public awareness about renewable energy technology and thereby expand the market. Furthermore, Government is itself planning to invest in a number of RES projects for the production of electricity. Furthermore, a number of measures were announced in the Budget Speech for 2013 to intensify Government's efforts in this regard.

7.2. The National Renewable Energy Action Plan As A Road Map for Future Development

The NREAP states that Government's policy is to fully exploit all reasonable potential indigenous RES and to support the private sector in similar endeavours. Government accepts its obligation to participate in international efforts to mitigate climate change while recognising that RES on its own merits is objectively beneficial for Malta in terms of security of supply, reduction of the country's dependence on foreign energy sources given that it constitutes a source for energy generation, and the potential for job creation. Another relevant consideration in this regard is that Malta has international obligations that could translate into sanctions if not respected.

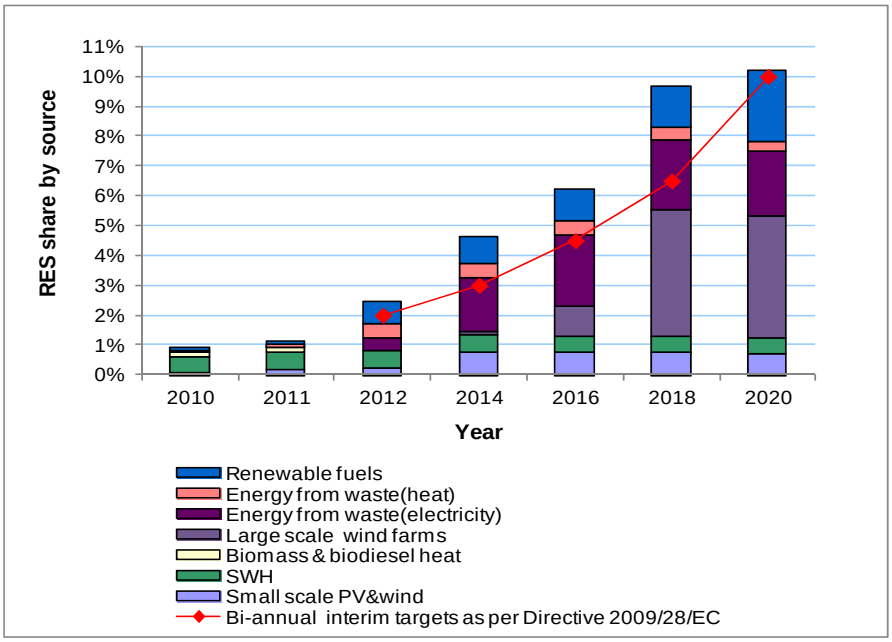
In July 2010, Malta submitted its NREAP to the EC, as required by Directive 2009/28/EC on the promotion of renewable energy. This action plan provides a roadmap on how the country plans to reach 10% of renewable energy share in the final consumption of energy by 2020 and how intermediate targets will be met, including the separate 10% renewable energy requirement in transport.

The renewable energy target share of the final energy consumption by 2020 is established in Maltese legislation by Legal Notice 538 of 2010,[14] the Promotion of Energy from Renewable Sources Regulations. Taken into account are the intermediate trajectory, the obligation to submit the NREAP, the eligible sources of renewable energy and the methodology for calculating the contribution of each renewable source to the target.

The share of renewable energy consumed in Malta in 2010 and 2011 was 0.88% and 1.12% respectively, broken down by sources as shown in Figure 7.1.1. The actual renewable energy consumption in 2010 and 2011 includes a percentage of consumption of biodiesel and biomass for heating purposes which was not predicted in the NREAP.[15] Figure 7.1.1 also shows the bi-annual projections as in the NREAP for the contribution from the different renewable energy sources up to 2020. The bi-annual trajectories from 2012 to 2020 as established by Directive 2009/28/EC are also shown in Figure 7.2.1. The NREAP projections show that the bi-annual trajectories will remain above the interim indicative targets established by the RES Directive up to 2020. The trajectories are not necessarily binding but variations from plans have to be justified.

[14]The Directive 2009/28/EC on the promotion of the use of energy from renewable sources has been mainly transposed into national legislation by the Legal Notice 538 of 2010, the Promotion of Energy from Renewable Sources Regulations. Provisions related to grid connection and access, and dispatch of electricity from renewable sources are found the Electricity Market Regulations (LN 166 of 2011).
[15] NREAP : Malta's National Renewable Energy Action Plan as required by article 4(2) of Directive 2009/28/EC-6 July 2010.

Figure 7.2.1: NREAP Projections up to 2020



Source: NREAP and MRA

In the context of the preparation of the NREAP, four alternative options were considered towards the achievement of renewable energy targets as per Directive 2009/28/EC. Table 7.2.1 shows three of the alternatives based on the achievement of the 10% share in the gross consumption of energy, mainly through indigenous sources and an amount of imported renewable fuels.

The first three options consider different uptakes in large scale wind and PV investment. The contribution from other technologies/sources such as solar water heaters, micro-wind, waste-to-energy and biofuels were considered as fixed for all options. In the case of waste-to-energy contribution to the national renewable targets, the projections in the National Solid Waste Strategy were taken as given since this strategy was already subject to a SEA. The fourth option considers the use of one of the intra-European cooperative mechanisms to replace the contribution from large scale wind farms. The cooperative mechanisms do not apply for the separate 10% renewable energy in transport.

Table 7.2.1: NREAP Projections up to 2020

Contribution by 2020	Option 1	Option 2	Option 3	Options 4
Large Onshore wind(capacity)	14.45 MW (38GWh)	14.45MW (38GWh)	0	0
Large Offshore wind(capacity)	0	95-100MW (216GWh)	0	0
PV(capacity)	169MW (259GWh)	28MW (43GWh)	194MW (297GWh)	28MW (43GWh)
Micro wind(capacity)	0.13MW	0.13MW	0.13MW	0.13MW
Waste to Energy (solid waste) capacity	15.18MW (85.5 GWh)	15.18MW (85.5 GWh)	15.18MW (85.5 GWh)	15.18MW (85.5 GWh)
Biogas capacity	7.34MW	7.34MW	7.34MW	7.34MW
Biofuels (energy)	149GWh	149GWh	149GWh	149GWh
SWH (energy)	35GWh	35GWh	35GWh	35GWh
Contribution from Intra-European joint mechanism	0	0	0	Equivalent to 4% of the gross energy consumption in 2020

Source: NREAP and MRA

The alternatives considered in the preparation of the NREAP are discussed in the SEA document, which identified Option 2 as the preferred option.[16] The discussions were based mainly on studies performed in 2005[17] and 2009,[18] respectively, by the MRA with the assistance from Mott Macdonald Ltd of the UK. Having also considered (among others) solar, wind, biomass, tidal and wave energy, the 2005 study concluded that solar and wind energy had the greatest potential, employing technologies available at the time. The 2009 study was an update of the first study.

The SEA identified potential issues related to the implementation of the onshore and offshore wind farms, such as visual impact and effect on fauna and flora, which have to be assessed in further detail. Solar photovoltaic systems are land use intensive and could also have adverse impact on biodiversity and the landscape. However, mitigation is possible if the technology is included within existing structures or brownfield sites are used.

The use of cooperative mechanisms as proposed in option 4 would lead to a loss on the physical energy contribution from RES which would have to be replaced from conventional electricity either produced locally or imported. The loss of the RES electricity would have a negative contribution to air pollution if the electricity is produced locally through conventional electricity and the significance of the impact would depend on the fuels used. This impact would not apply to imported electricity. There would also be a negative impact on security of supply since Malta would rely more on imported energy, either in the form of fossil fuels for electricity generation or direct electricity imports.

[16] Strategic Environmental Assessment on the Energy Policy for Malta.
[17] Strategy for Renewable Electricity Exploitation in Malta Volume 1: Renewable Electricity Target Final Report July 2005.
[18] Feasibility study for increasing the renewable energy credentials, January 2009.

Reliance on cooperative mechanisms could potentially result in a cheaper solution if large RES projects benefiting from economies of scale are tapped.

It is thus to be highlighted that within the overall strategic approach which entails a strong commitment towards the achievement of the headline targets set, the Policy document is **emphasising the importance of a flexible** approach towards the utilisation of renewable energy technologies in Malta with the view to optimise energy performance in terms of financial, environmental and energy security considerations whilst at the same time meeting the 2020 RES obligations.

7.3. Renewable Energy in Malta: Recent Incentives and Prospective Developments

7.3.1. Solar Water Heaters

Since 2005, Government launched a number of grant schemes to promote the use of solar water heaters (SWH) for households. These gave a rebate on the purchase price of solar water heaters. This amounted to 20% in the first grant scheme, launched in 2005, and was capped at a maximum of €116.48. Uptake was rather low. In 2006 the maximum rebate was doubled to €232.94 and the uptake of SWH tripled with an average of 1,700 SWH per year. The later scheme lasted until 15 February 2009.

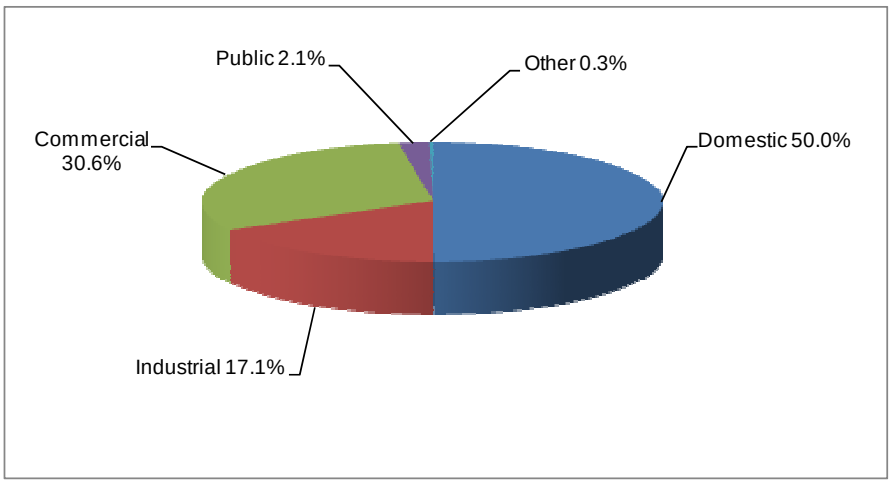
Subsequently, in 2009, Government increased the rebate further to 66% of eligible costs up to a maximum of €460. This yielded a penetration of 3,500 solar water heaters per year. In 2010, a fourth scheme for solar water heaters was launched giving a 40% rebate to a maximum of €560 on eligible costs on approved systems and installations. This scheme saw the sales of solar water heaters decrease since eligibility was restricted. Two new schemes were launched in 2011. One funded through 85% ERDF funds and 15% national funds and the other totally from national funds: the grant is 40% up to a maximum of €400.

The penetration of solar water heaters for households as at the end of 2010 is estimated at 15,119 installations with a calculated solar heat capture of 28 GWh.

7.3.2. PV Installations

The photovoltaic (PV) installations registered with the MRA, which include systems already connected to the grid, under construction or in the process of being authorised/licensed, (as at 31 May 2012) amount to 16 MW. Of these around 10MW are recently connected to the grid. These systems would produce circa 25 GWh/annum when in operation. As shown in Figure 7.3.2.1, this capacity is mainly distributed between domestic, industrial and commercial premises with a small percentage on public buildings and other buildings, such as local councils, NGOs and building belonging to religious institutions.

Figure 7.3.2.1: Uptake of PV Installations[19]



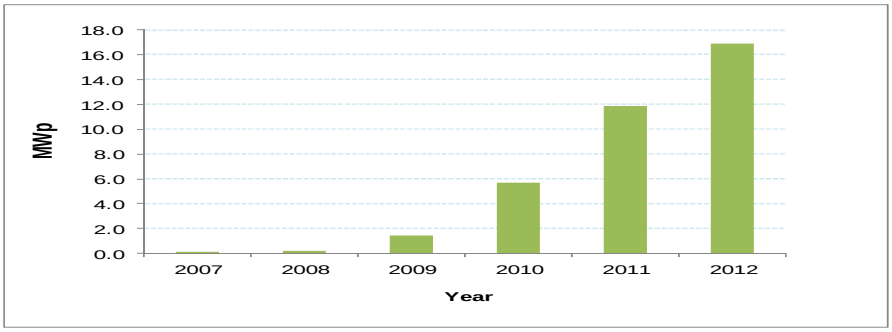
Source: MRA data

The introduction of a feed-in tariff for solar Photovoltaic systems in the residential and non-residential sectors (combined with a capital grant) in 2010 through LN 422/2010 has contributed to the uptake of photovoltaic installations. Prior to these regulations coming into force there was a net metering arrangement for PV systems. It is no longer available for PV systems approved after the establishment of the feed-in tariffs. Under the net metering arrangement any units exported in excess of those imported from the grid are paid at rate of 7c/kWh.

Feed-in tariffs as per LN 422/2010 are paid only for units produced from PV systems and exported to the grid. Owners of the photovoltaic systems were given the option to either consume the electricity they produce on site and export only the surplus, or else export all the electricity produced, subject to the conditions of the feed-in tariff regulations.

Figure 7.3.2.2 shows the cumulative capacity registered with the MRA from 2007 up to 31 May 2012. The sharp increase between 2010 and 2012 is evident.

Figure 7.3.2.2: PV installations Uptake Trend



Source: MRA data[20]

[19] PV capacity registered with the MRA as at 31 May, 2012.

7.3.3. Solar PV in the Residential Sector

A major part of the uptake of the PVs on residential premises took place from 2009 onwards as a direct result of grant schemes enabling households to benefit from 50% of the initial capital investment, capped at €3,000.

7.3.4. PV in the Non-residential Sector

In the non-residential sector, grant schemes were part-funded under the ERDF scheme managed by Malta Enterprise. This grant scheme catered for the generation of electricity from renewable sources or efficiency measures in the industrial/commercial sector. Applicants could benefit from a grant of up to 50% on the initial investment, capped at €100,000. Three grant schemes of this type were launched between 2009 and 2010. Renewable energy solutions such as the solar and wind energy technologies for electricity generation were eligible.

Other support measures were made available for the agricultural and tourism sectors.

A similar scheme was also launched for renewable energy-related building projects for education, NGO and religious institutions and for local councils. As with the domestic sector, there was a significant increase in PV capacity uptake from 2009 onwards in conjunction with the launching of the grant schemes by Malta Enterprise. Most of the uptake took place in 2010 and 2011, with an increase of 1.78 MW and 4.9 MW, respectively.

Given the decreasing trend in the prices of PV systems technology, the point may soon be reached at which this technology becomes more financially attractive relative to other technologies.

7.3.5. Other PV Projects

Following a competitive tender process designed to obtain the most advantageous purchase price of PV energy, Government has awarded a concession to a private entity. This entails a number of roof tops of public buildings with a total useful area estimated to reach 67,000m² being leased for the purpose of establishing, operating and maintaining photovoltaic systems for a period of 25 years and selling the electricity generated to Enemalta Corporation.

The installation capacity for this project is approximately equal to 4.5 MWp and is estimated to generate about 7.5 GWh.

Government intends to follow up with Phase 2, generally similar to Phase 1 but guided by any lessons from the initial initiative.

Government is also considering implementing schemes to encourage investment in RES, such as communal medium scale PV projects that would provide the opportunity to small investors that do not have their own space to install the PV. Public-private investments schemes for large RES projects are also being considered.

Malta Industrial Park (MIP) intends to draw up a strategy that will facilitate the use of roofs in industrial zones for the installation of PV systems.

[20]Based on PV capacity registered with the MRA as on 31 May, 2012.

7.3.6. Permits for PV and SWH Installations

The Malta Environment and Planning Authority (MEPA) issued a set of guidelines[21] in 2007 on planning permits for solar applications installed within the curtilage of a building. The guidelines cover issues related to planning and development permits. These guidelines simplified the permitting process for the installation of such systems, because, subject to compliance with the guidelines, no planning permits were required in most cases. Solar applications that fall outside the scope of these guidelines may require a planning permit from the local planning authority.

A system of fast track permitting was also adopted by the MRA for PVs not larger than 16 Amps per phase to facilitate the installation of these systems and their connection to the grid. Larger PV systems still require authorisation prior to construction and, once commissioned, a licence to operate before connection to the grid.

7.4. Biofuels and Bioliquids for Electricity Generation and Other Uses

It is understood that bio-fuels and bio-liquids are only beneficial if they are produced in a sustainable manner – without inducing food scarcity and without interfering unduly with the wider environment. This is a preoccupation at international level and is reflected in EU directives and local legislation. Market players are being obliged to verify and audit according to criteria established by law[22] the bio-fuel and bio-liquids being put on the market to ensure they originate from sustainable sources.

Enemalta Corporation has investigated the possible use of bio-liquids in the combustion boilers of its power stations which currently use HFO. Tests have been carried out using different bio-liquids, both separately and as a mix with HFO. The station boilers can be adapted to use such fuels at relatively low cost.

The main problem encountered is the lack of certainty in the supply of such bio-liquids and their inconsistency in calorific value and quality. The more expensive bio-liquids are fairly consistent in quality, but the extra costs involved tend to make them highly uncompetitive. Lack of consistency and the uncertainty in supply availability implies that combustion parameters need to be adjusted whenever the fuel is changed. This in turn implies periods of inefficient operation with increased emissions.

The introduction of bio-liquids in the industrial sector for space heating and other processes will be investigated in line with national efforts to reduce GHG emissions.

7.5. Energy from Waste

One of the objectives of the solid waste strategy[23] is to promote waste management technologies that maximise the potential for energy from waste. The strategy includes a number of 'waste-to-energy projects' considered in the NREAP. The technologies favoured by the strategy are Mechanical and Biological Treatment (MBT) and the use of Biogas and RDF (Refuse Derived Fuel) for incineration/heat recovery.

[21] Development Control Policy and Design Guidance 2007 – MEPA http://www.mepa.org.mt/LpDocumentDetails?syskey=%20655.
[22] The Legal Notice 553 of 2010, Biofuels (Sustainability criteria) Regulations.
[23] A Solid Waste Management Strategy for the Maltese Islands, First Update, December 2010.

In October 2011, WasteServ Malta Ltd was granted the licence to generate electricity for its own consumption and export by means of two combined heat and power units at the Sant' Antnin Waste Treatment Plant in Marsascala. This plant, with a total capacity of 1.737MW, will be fired by biogas produced onsite by the MBTs through anaerobic digestion of the organic part of municipal waste. The total energy production of the plant is expected to be 6.5 GWh annually, as from 2012. The recovered heat from these engines will be used for heating water to be utilised in the various processes of the plant itself and to supply heat energy to the nearby Razzett tal-Ħbiberija therapeutic indoor swimming pool.

The Waste Strategy also foresees the setting up of a centralised waste digester to treat animal manure. Due to economies of scale, the Government encourages a centralised approach, but the implementation of decentralised waste management facilities for treating animal waste is also encouraged.

These facilities will include digesters to convert manure into biogas and a liquid effluent. The biogas is converted to electricity through an engine-driven generator and fed into the grid, while the liquid effluent and the organic residues yield valuable fertilizers. The first such facility planned for Siggiewi will have an electricity generation capacity of about 275kW. The heat capacity will be 315kW.

Operators of these facilities will be paid a feed-in-tariff and other established environment incentives. The 'energy from waste' capability of such facilities favours a reduction in both greenhouse gas and pollution to the water aquifers, since less raw manure is applied to the ground.

The recovery of energy from sewage is also being given importance, with the first electricity generation plant being installed by Water Service Corporation at the sewage treatment works located at Ta' Barkat (limits of Xghajra).

7.6. Energy from Wind

7.6.1. Micro and Medium Wind

The projected uptake of micro and medium wind has been, as expected, negligible. This is mainly because of uncertainty about energy yield, the relatively high cost of installation, planning permit issues and the absence of an advantageous feed-in tariff.

MEPA published a set of planning permit guidelines[24] for micro wind turbines with capacities up to 20 kW in 2010. These guidelines indicate the locations and conditions under which such wind turbines may be permitted. So far the only wind turbines that have been approved are for research purposes to assess their environmental impact and yield.

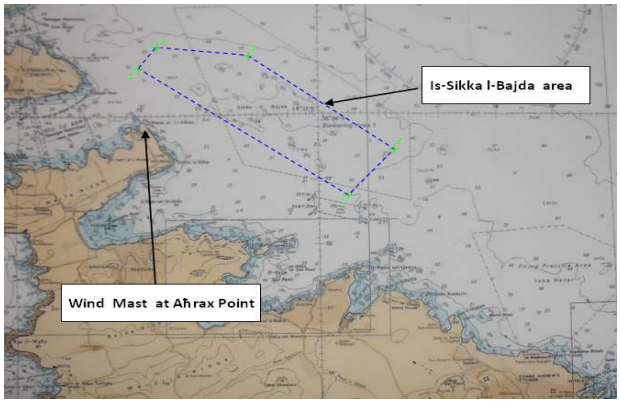
[24] Planning Guidance for Micro-wind Turbines – May 2010 – MEPA http://www.mepa.org.mt/LpDocumentDetails?syskey= 1242.

7.6.2. Large Wind Farms

7.6.2.1. *Measurement of the Wind Resource*

An 80metre Wind Monitoring Mast was installed in October 2009 at Aħrax Point, limits of Mellieha, as part of a project to assess the viability of the wind resource at Sikka l-Bajda, where an offshore wind farm is projected. Figure 8.5.2.1.1 shows the Sikka l-Bajda site and Aħrax Point.

Figure 7.6.2.1.1: The Sikka l-Bajda Site.



The One-Year average wind speed at Aħrax Point (Nov. 2009-Oct. 2010) was calculated to be 7.18 m/s at 80 m above ground level. The long term average wind speed at this site at 80 m was estimated to be equal to 6.84 m/s which is at the lower limit of commercial viability for large wind farms.

Collection of wind data over an extended period is being carried out for Sikka l-Bajda, in order to have more representative and robust figures essential for the bankability of a project on or near that site. Wind studies for the other candidate sites are still being carried out.

7.6.2.2. *Large-scale Wind Farm at Sikka l-Bajda, limits of Mellieha*

The Environmental Impact Assessment for the Sikka l-Bajda wind farm has recently been concluded and formally submitted to MEPA.

The area of interest for the location of an offshore wind farm is a reef close to St Paul's Bay and Għadira. The project covers a sea area of around 11 km2, with water depths varying between 10 and 35 m.

From the information collected so far, the Environmental Impact Assessment recommends that additional information on avifauna activity is collected. It recommends this could be done through a Pilot Project entailing the installation of radar equipment and a turbine. The radar equipment will monitor and record avian activity in the area for a period of not less than a year before and for a period of not less than a year after a single turbine is installed. It is being recommended that the radar monitoring during the Pilot Project will take place 24hours, 7days a week and the remote monitoring is further supplemented with land and nesting observations of the avian species frequenting the area.

The full Sikka l-Bajda wind farm is projected to have a maximum installation capacity of between 72 to 95 MW. The precise way forward will be determined once the feedback on the Environmental Impact Assessment is completed.

This project is expected to provide green jobs – another Government priority – not only through the work required for its construction and operation, but also through increased investment and business opportunities. It could perhaps serve as a demonstration project in the Mediterranean Region and to lay the ground for establishing Malta as a centre for servicing the wind energy industry in the Central Mediterranean and North Africa.

7.6.2.3. *Large-scale Wind Farm at Wied Rini, limits of Rabat*

This wind farm is planned to have a maximum generating capacity of 10.2 MW. It is estimated that the project will cover an area of circa 0.65 km2, with the altitude being around 200 metres above sea level. The Environmental Impact assessment for Wied Rini is being concluded and will be submitted to MEPA in the near future.

7.6.2.4. *Hal Far Industrial Estate, limits of Zurrieq*

This wind farm is planned to have a maximum capacity of 4.25 MW. The project covers an area of circa 1.7 km2, with the altitude above sea level varying between 45 and 75 m.

The site is located close to Natura 2000 sites. An Appropriate Assessment for birds has expressed concern about the shearwater species. The level of knowledge of the interaction of species and wind turbines is low and the precautionary principle applies. The main concerns relate to the displacement/disturbance effects during the operational phase of the project.

Since this site is located very close to the airport, there are also issues being raised about possible interference of the wind turbines with the airport radars and the penetration in the inner horizontal obstacle-free surface of the airport. Currently a number of mitigation measures are being discussed.

7.6.2.5. *Deep Offshore Sites*

The exploitation of deep offshore sites is of interest to Malta because they have higher wind speeds and are located further away from the coast where little or no visual impact would be present and where permitting would be less difficult. The Government is monitoring evolving technologies and, in the meantime, supports joint development projects.

Malta constitutes an ideal platform for such deep offshore projects, aimed at pioneering innovative renewable energy technologies and mitigating climate change effects. Malta is committed to taking advantage of opportunities as they arise and will support applications for funding by diligent participants in relevant programmes.

The Government is in contact with foreign entities currently developing novel deep offshore wind technologies. It has been reported that two full-scale prototype deep-sea wind generators operating on different floating technologies were installed in foreign waters circa 2011 and are presently operational.

7.7. Initiatives Announced in the Budget Speech for 2013 and Related Measures

The Budget Speech for 2013 introduced a number of initiatives towards promoting the use of renewable energy. A feed-in tariff system for the installation of PV panels by the private sector which are not supported through other funding was introduced as follows:

- Installations of less than 1MW on rooftops: 18c/kWh for 20 years;
- Installations of less on the ground: 17c/kWh for 20 years;
- Installations of less than 1MW on rooftops: 17c/kWh for 20 years; and
- Installations of less than 1MW on the ground: 16ckWh for 20 years.

The Budget Speech furthermore announced plans for a new PV panel scheme for households, including the finalisation of scheme in favour of families not able to invest in PV panels on their rooftops . This will be in part achieved through the setting up of solar farms on public land.

As from 2012, the Government has introduced a high energy users scheme for factories which consume in excess 2GWh annually, where 6 establishments have benefited for a total investment of €7.7 million. A lower threshold for Gozitan establishments will be introduced to incentivise the production of renewable energy in the Island Region.

7.8. Conclusion

This policy document reaffirms the commitment by Government in the long term development path towards the achievement of RES targets. A number of initiatives have been taken in recent years to implement in practice the policy intentions, with other complementary approaches being studied for the future. It is to be recognised that the technical, economic and environmental feasibility with respect to a number of these initiatives remains to be studied. While placing an emphasis on the development of PV technologies in the immediate term, Government is keeping all options open with respect to the best mix of renewable energy sources to optimise the country's energy performance over the medium to long term.

Table 7.8.1: Summary for Main Issues and Measures for Renewable Energy

Issues	Measures
The NREAP is based on the production of energy from indigenous renewable sources and imports of biofuels. Meeting the set targets for RES uptake means that, for the first time, Malta will have part of its energy consumption originating from indigenous sources, which will introduce an element of diversification to the present state of almost total dependence on energy imports, thus contributing to enhanced security of supply. Consumption of renewable energy will contribute to lowering the emissions and discharges from the energy sector into the environment.	Ensure the timely implementation of the NREAP and take corrective actions where necessary to meet the biannual targets and the 10% target by 2020.
The NREAP is a dynamic plan being implemented within a constantly changing context, but the uncertainties and risks associated with it need to be narrowed. Large scale renewable energy projects will have to undergo the necessary environment assessments to address site specific issues. The NREAP needs to be constantly updated to reflect progress in implementation and changes that may become necessary as new knowledge becomes available. Implementation of major projects depends on the outcome of detailed feasibility and environmental studies. Proper procedures related to permitting cannot be prejudiced. Besides, Malta is fully stretched to reach its targets from indigenous sources and there is no margin to spare.	Keep under review the cost-benefit assessment of the NREAP, which should include externalities and new technologies with a better cost-benefit as they become available, including contingency options, such as a co-operative mechanism.

Issues	Measures
An updated cost-benefit assessment of the NREAP is necessary. Investments in RES will be prioritised in terms of overall value for money and 'quick wins'. Aspects of security of supply will be evaluated in more detail to determine the cost-benefits of maximising local potential of RES, vis-à-vis resorting to co-operative mechanisms with other EU Member States. Such a study will also determine holistically the environmental benefits of the various options and prioritise on the basis of investment accordingly and will mean that the country is making the best of its limited resources, adopting beneficial technologies as they become commercially available without overburdening consumers and the economy.	Continue to review the cost-benefit assessment of the NREAP, which should include externalities and new technologies, which as they become available, can provide better cost-benefits, including contingency options, such as a co-operative mechanism. Leverage new economic dimensions of RES technology such PV solution the prices of which has fallen significantly since 2009.
The uptake of RES is very grant dependent. Grant schemes are only available for specific intervals during the year and normally individuals would not invest in RES outside the periods of validity of such schemes. This does not provide the necessary foresight and stability for the industry to invest in personnel training and creates uncertainty for job creation in this industry.	Introduce feed-in tariff support without grant option for PVs. Ensure that there is a stable and transparent incentives/regulatory framework.
Despite the huge improvement in recent years, the awareness of individual consumers of their responsibilities arising from climate change issues does not appear to be sufficiently high. The more consumers are aware of such issues and the responsibilities that go with them, the more they act in favour of the environment, including investing in RES technology that is still more expensive than conventional technology. After all, national obligations should at least in part be translated to individual obligations. More information campaigns are necessary.	Public information programmes to raise citizens' appreciation of the implications of climate change and their obligations towards future generations.

Issues	Measures
Lack of opportunities for small investors without roof space to invest in RES, leaves potentially valuable private investment untapped. Investment in large scale projects is more rewarding than small scale individual investment because of economies of scale.	Design public-private investments schemes for large RES projects. Communal medium scale PV projects specifically designed for small investors and for households who do not have access to roofs.
The bio-liquids market needs to be better regulated (bio-fuels are discussed in the Chapter on Transport).	Monitor and enforce the regulatory framework with regard to the bio-liquid market and establish incentive mechanisms as appropriate.
Conclude studies leading to the determination of whether the requirement that new buildings are to integrate RES sources – particularly solar based RES - is to be introduced as a mandatory planning requirement.	Conclude studies.
No protection of individual solar rights reduces investor's confidence for fear that the planned output of a solar plant is reduced through action by others (e.g. neighbours) over which he has no control. Reduced output results in lower environmental benefits.	Develop the legal framework to support RES success.
Malta as a small Island state in the south-south of Europe has indigenous issues that requires specific related R&D&I – particularly how the vast sea territory can be exploited for the generation of electricity through RES – such as Wind generation.	Leverage the National R&I Fund managed by the Malta Council for Science and Technology as well as networking with further and tertiary education institutions to intensify local R&DI research and studies in order to develop sustainable and RES energy solutions that reflect Malta's local characteristics. Focus primary on areas that play to Malta's strengths, so as to increase chances of success: solar and marine based solutions. Establish Malta as a world leader for research development and deployment of marine based RES technologies and working with EU, research institutes and other Island states. Step up efforts to tap EU funds such as the second call for the NER300 directed to pursue marine based RES technologies. Promote private investment in R&D&I in RES micro-generation.

Issues	Measures
New guidelines with regard to the installation of RES technology in residential and commercial buildings are yet to be issued.	Update appropriate planning guidelines with regard to the installation of renewable technologies, including BIPV technologies. Issue a draft white paper with regard to legislative changes required with regard to the issue of social rights and how these are to be addressed.

7.9. Programmes and Measures in the Renewables Sector

Table 7.9.1: Action Plan for the Renewable Energy Sector

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
RES -1	Ensure the timely implementation of the NREAP and take corrective actions where necessary to meet the biannual targets and the 10% target by 2020.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively	Biannual share of renewable energy in gross consumption in total and by type Annual share of renewable fuels in transport in total and by type	2012-2020	Lead – MRRA

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
RES -2	Continue to review the cost-benefit assessment of the NREAP, which should include externalities and new technologies, which as they become available can provide better cost-benefits, including contingency options, such as a co-operative mechanism.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Status	On-going	Lead – MFEI MRRA MRA

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
RES -3	Public information programmes to raise citizens' appreciation of the implications of climate change and their obligations towards future generations. Educate consumers through Energy Audits amongst other instruments on how to use Smart Meters (where implemented) to manage consumption better.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Number of campaigns Change in public perception	On-going	Lead ARMS Ltd & MRA NGOs MRRA

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
RES -4	Design public-private investments and public private investment schemes respectively for large RES projects such as the near offshore windfarm.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Number of investment schemes	Ongoing	Lead – MFEI MRRA

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
R-5	Promote private investment in R&D&I RES micro generation.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Number of projects	Ongoing	Lead – MRRA MCST UoM

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
The RES-6	Communal medium scale PV projects specifically designed for small investors and for households who do not have access to a roof top..	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Number of projects	2013-2014	Lead – MRRA

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
RES -7	Introduce feed-in tariff support without grant option for PV.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Status	2012-2013	Lead – MRA MRRA MFEI
RES -8	Develop the legal and planning framework to support RES success.	Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Status	2012	Lead – MRRA MEPA MRA MEPA

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
RES-9	Conclude studies leading to the determination of whether the requirement that new buildings are to integrate RES sources – particularly solar based RES - is to be introduced as a mandatory planning requirement.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Planning regulations	2013	Lead – BRO MEPA
RES -10	Monitor and enforce regulatory framework relating to bio-liquids (bio-fuels discussed under Chapter relating to Transport).	Policy area 5: Delivering energy economically, efficiently and effectively	Percentage of bio-liquids use	Ongoing	Lead - MRA Lead - MEPA
RES -11	Ensure there are stable and transparent incentives/regulatory framework.	Policy area 5: Delivering energy economically, efficiently and effectively	Number of incentives implemented to support renewables and continuity	2012-2020	Lead - MRA MRRA

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
RES-12	Identify shore and offshore sites, (at least one at transitional deep waters and one in very deep water) to undertake technical and environmental studies that would eventually be required for consenting RES projects at such sites. Initially non-technology specific baseline studies will be conducted. Technology-specific studies will be conducted at a later stage, once the most appropriate technology has been identified.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	At least 2 onshore and at least 1 deep transient and 1 very deep offshore sites for non-wind and wind RES solutions Legal and financial framework of marine RES based solutions	Studies to be completed by 2016	Lead - MEPA MRRA MTCE MFEI

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
	Environment Impact Assessments will be carried out at the earliest appropriate moment so that process leading to the issuance of permits for the development of such farms is streamlined to the extent possible. Design of a legal and financial framework to support marine based RES solutions and thus removing any ambiguities in Maltese Law.				
RES-13	Streamline red-tape to fast track private RES investment	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Review and reform process	2013	Lead – MEU MEPA MRRA SPS

Programme Measure number	Measure Description	Implementation			
		Contribution to the Six Policy Priority Areas	Indicators	Timelines and Trajectories	Contribution to the Six Policy Priority Areas
RES-14	Direct R&D&I research to Malta's strengths: solar and marine based technologies (including wind). Work with the EU and other Island States to direct financing towards marine based RES solutions	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Set-up RES Marine Based Small Island State Research Institute	2013	Lead – MCST, UoM & MRRA Private Sector MFA

8. ENERGY EFFICIENCY

8.1. Energy End-use Efficiency

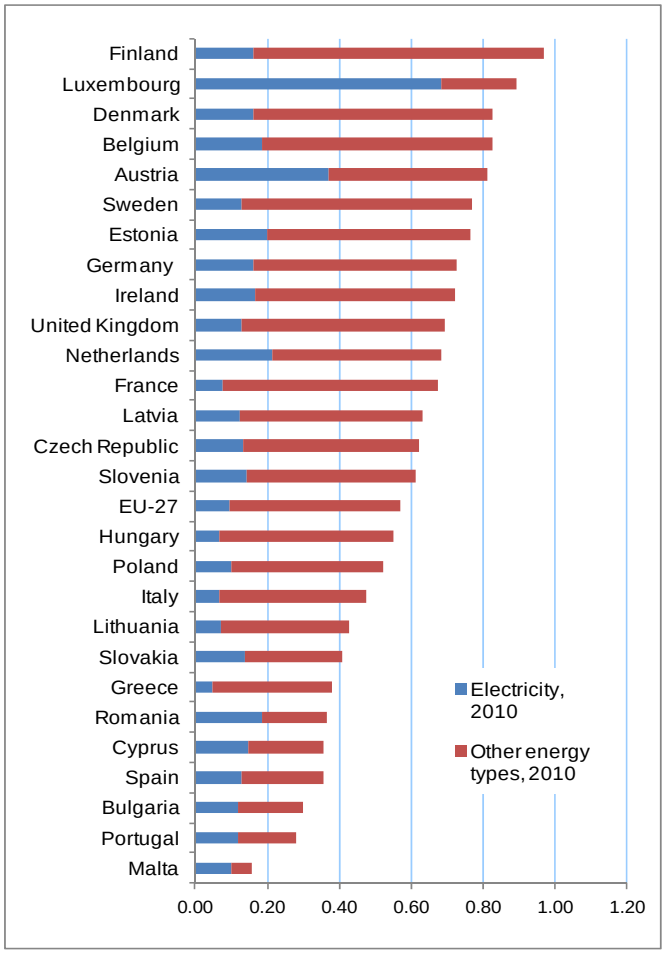
The prudent use of energy is inextricably linked to the promotion of sustainable consumption patterns. Legislation and regulations must continue to promote energy efficiency and conservation and to help educate the population on the benefits of both. Investment should occur in energy efficiency or conservation measures where this is less expensive than the long-term costs of building extra generation capacity, taking also into account environmental costs.

Figure 8.1.1 compares the 2010 energy consumption of households per capita in tonnes of oil equivalent in the EU 27 countries alongside the EU 27 overall average for 2010. This figure indicates that in 2010 Malta had a consumption per capita of 0.15 toe which was the lowest household consumption per capita in 2010 among the EU27 countries and well below the EU27 average of 0.57 toe.

These results are partly a reflection of the effects of climatic conditions on the use of energy by households. Euro-barometer surveys carried out since 2004, furthermore indicate that the Maltese population is, in general, careful about the use of energy resources. The latest survey, published in April 2011, shows that 87% of the Maltese respondents indicated they have cut down on electricity use for lighting and domestic appliances while 68% said they have reduced the use of heating and/or air-conditioning. On the other hand, only 4% of respondents said they took initiatives to save energy at work.

These considerations show that education must play a key role in bringing about more sustainable consumption patterns. Awareness campaigns with regard to energy efficiency and conservation must be continuous, stepped up, and specifically focused to deliver key priority messages. The effectiveness of such efforts also needs to be continuously monitored. Industry and small business need to be properly advised as to ways in which they can use their properties in a more energy efficient manner and make use of technological advancements in RES which could benefit them directly.

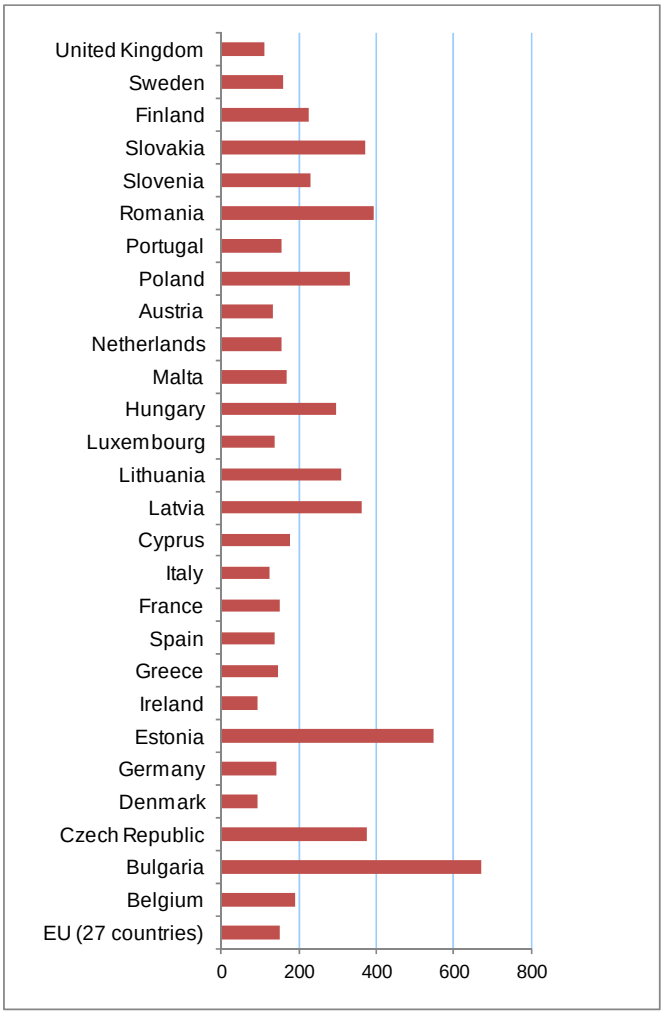
Figure 8.1.1: Household Consumption per Capita



Source: Eurostat Data

Figure 8.1.2 presents the energy intensity of the economy for the EU 27 countries, measured as the gross inland consumption of energy divided by GDP (kg of oil equivalent per €1,000) for 2010. This indicator is the ratio between the gross inland consumption of energy and the gross domestic product (GDP) for a given calendar year. It measures the energy consumption of an economy and its overall energy efficiency. The energy intensity of the economy in Malta in 2010 was higher than the EU 27 average. Concerted efforts are needed to address this problem.

Figure 8.1.2: Energy Intensity of the Economy



Source: Eurostat Data

8.2. The National Energy Efficiency Action Plan

An important development in this regard was the publication, in 2008, of a detailed National Energy Efficiency Action Plan (NEEAP) designed to achieve 9% savings in energy end-use by 2016.[25] This first NEEAP established the following indicative targets for Malta:

- Target adopted for 2010: 3% or 126 GWh.
- Target adopted for 2016: 9% or 378 GWh.

The above energy efficiency targets are based on the average annual energy consumption between October 2001 and September 2006. This was established in line with the methodology established in Annex 1 of Directive 2006/32/EC.

The interim target for 2010 was achieved, due mainly to progress registered in three sectors:

1. the industrial sector including in water production;[26]
2. the domestic sector, responding to schemes to replace appliances, change lighting systems and install solar water heaters;
3. the transport sector, due to developments in the national car fleet composition brought about by changes in the vehicle registration system.

The 2008 NEEAP was reviewed and the second NEEAP was published in 2011 which includes a list of measures to be implemented within energy generation and distribution. The revised NEEAP sets a target of 22% savings in primary energy consumption by 2020 with an intermediate target of 15% in 2014. It is based on national productive models of energy consumption and assumes, primarily, that the energy end-use savings envisaged in the NEEAP will be achieved and that the new electricity generation plant in Delimara will be commissioned, as well as a new interconnector with Sicily. Energy savings targets expected from each measure are included in the NEEAP.

Energy savings are calculated with reference to the gross primary energy consumption. For this purpose the energy used in aviation is capped at 4.26%[27] of the gross energy consumed, similar to the method for calculating the share of renewable energy in the gross energy consumption.

The NEEAP seeks to emphasise a medium to long term behavioural and cultural change towards a more efficient use of resources, without restricting the possibility of an increase in justifiable energy consumption due to economic growth or structural changes. Without such a change in behaviour and culture, consumers will rely excessively on grants and other support schemes to adopt energy efficient goods rather than act on their initiative. Education and training on energy efficiency are also envisaged to help to bring about this behavioural and cultural change.

[25] Directive 2006/32/EC[25] on energy end use efficiency and energy services sets an indicative target of 9% savings in energy end used by 2016
[26] WSC incorporating the latest energy-recovery technology in its Reverse Osmosis Desalination Plants.
[27] The renewable energy Directives provides that in the case of Malta and Cyprus the energy consumed in aviation should be capped at 4.26% of the gross energy consumption.

8.2.1. Energy Efficiency Measures in the Private Sector

Since the publication of the NEEAP, efforts to promote energy efficiency have mainly targeted the residential, commercial (mainly tourism) and industrial sectors. Government made substantial investments through support and incentive schemes to achieve the targets set in the plan. A number of schemes generally consisting of grants were launched. The uptake in most schemes met expectations.

8.2.1.1. Energy Efficiency Schemes for the Residential Sector

In the residential sector, the grants covered the purchase of electric vehicles, roof insulation and double glazing. A rebate scheme on the purchase of A-rated washing machines, dishwashers, air-conditioners and tumble dryers and A+ and A++ rated refrigerators was also available between the years 2006 and 2008. This was followed by the distribution of energy saving lamps to households between 2009 and 2010. The latter two schemes have contributed to change the market for these goods thanks to people's raised awareness of the benefits of energy efficiency.

Government has introduced a scheme to subsidise roof insulation and double-glazing for households to reduce energy consumed and to educate citizens on energy saving measures in buildings.

Government periodically embarks on energy efficiency campaigns. A good example was the campaign 'Switch', intended to educate and disseminate good practices to save energy and water in the home.

8.2.1.2.Energy efficiency schemes for the non-residential sector

8.2.1.2.a.Malta Enterprise Energy Grant Scheme

Malta Enterprise, the national economic development agency responsible for promoting and facilitating investment in Malta, launched a scheme in 2009 under the European Regional Development Fund (ERDF) 2007-2013 programme. Proactive businesses could invest in solutions to reduce the impact of energy costs on their business. Grants covering expenditures related to energy from renewable sources and energy efficiency measures were provided. Three grant schemes were launched between 2009 and 2010 where enterprises could benefit from up to a 50% grant on the capital investment, capped to a maximum of €100,000. Investments eligible for grants included energy saving solutions and lighting, such as the installation of intelligent lighting systems, solar heating, thermal insulation, building management systems and energy-saving lighting.

Malta Enterprise also provided the services of subsidised energy auditing by professionals available to the industry. These audits are intended to indicate in a structured way feasible measures for efficiency in energy end-use.

8.2.1.2.b.Energy Efficiency Measures in the Hospitality Sector

Enterprises in the hospitality sector, such as licensed hotels, guesthouses, hostels, snack bars and restaurants, may benefit from a loan financed by Malta Enterprise. These may not exceed €400,000 or 80% of the total investment, as approved by the corporation. The loan has to be repaid within 5

years and will have an interest rate of 1.5% over the discount rate charged by local commercial banks.

Enterprises in the hospitality sector can achieve significant savings through the support available for these investments, which can be redirected to investing in developing new markets, products, services and other core business requirements.

8.2.1.2.c.Energy Efficiency in Space Heating and Cooking

Apart from electricity, fuels such as thin fuel oil, gasoil, propane, kerosene and Liquefied Petroleum Gas find various uses both in the residential and the non-residential sectors.

LPG is used by households for cooking and space heating. Non-residential use of LPG is for cooking, sanitary water and space heating, mainly in the hospitality industry. The amount of LPG used depends on the efficiency of appliances and how they are used. There is a lack of information on the efficiency of the present stock of appliances, such as cookers, gas heaters and boilers that use LPG.

The business plan of the concessionaire who took over Enemalta Corporation's LPG operations is ambitious in promoting the introduction of other uses of LPG that are new to Malta, but which take advantage of the efficiency of this fuel where heating (and cooling) are concerned.

Heating gasoil 0.1%, thin fuel oil and kerosene for space heating are used in small amounts by households, but are mainly used in space heating and industrial processes in the commercial and public sectors. Customs administer an excise rebate scheme to incentivise gasoil 0.1% used for heating purposes in both residential and commercial applications. This scheme was introduced to curb the use of LCO (used instead of LHO) and has proved to be widely popular since its introduction in 2009. Gasoil 0.1% is cleaner than LCO.

8.2.2. Energy Performance of Buildings

Directive 2002/91/EC on the energy performance of buildings, transposed by LN 261 of 2008, promotes the improvement of the energy performance of buildings, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness.

Through the Energy Performance in Buildings regulations, enforced through the Building Regulation Office, specific minimum requirements for energy efficiency will be imposed on new building projects. The obligation to investigate alternative energy sources or methods - such as co-generation, solar cooling possibilities, heat pumps, geo-thermal possibilities or alternative heat recovery methods - has been introduced. This Office is also organising training courses for assessors of dwellings in Malta intended for Engineers and Architects who would like to become registered as EPB (Dwellings) Assessors as per LN 308 of 2010.

In 2006, the Technical Guidance Document on Minimum Requirements on the Energy Performance of Buildings Regulations was published. This was followed by the Energy Performance Rating for Dwellings in Malta (EPRDM) software, which has been the official method for rating the energy performance of dwellings in Malta since 2009.

Large scale residential and commercial projects are required to submit energy and water management plans as part of the application procedure for a development planning permit. The aim

is to ensure that energy and water efficiency is taken into consideration at the start of, and throughout, the design process. This applies, in particular, to 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.

The 2nd NEEAP also includes strategies and measures to achieve the national target for zero energy buildings.

The strategies for achieving the national targets for zero energy buildings are twofold:

1. Existing minimum requirements for the Building Envelope in new buildings and buildings undergoing major renovation should be tightened by 30% to 50% as from 2013. These minimum requirements will be upgraded by a further tightening of 20% to 30% as from 2017. The percentage of tightening depends on the building category.

2. The energy harvest from renewable energy sources should be increased to cut down the use of and dependency on fossil fuels by regulating the allocation of 50% of the roof space in new buildings for these renewable energy sources or imposing obligatory use of the latter as from 2013. As from 2017, the use of renewable energy sources to provide between 70% and 90% of the energy needs for cooling and heating of spaces and hot water will be imposed. If such requirements cannot be met because of site conditions, the owners will have to contribute financially to setting up communal renewable energy source facilities.

Both these strategies will reduce the carbon dioxide emissions from energy use in buildings.

The proposals in the 2nd NEEAP for achieving the national target for zero energy buildings will be evaluated and may be redefined after a regulatory impact assessment and cost benefit analysis studies are undertaken.

It is envisaged that by the end of 2018 all new buildings being constructed for use by public authorities will qualify as nearly-zero energy buildings.

The refurbishment and transformation of existing buildings into nearly zero-energy building stock will be encouraged. The feasibility of adopting market-based instruments such as grants, tax deductions and other incentives to achieve this will also be assessed. Such instruments may be applied for those owners entering into a commitment that clearly shows their building will have higher energy efficiency and nearly-zero net energy use. The Energy Performance Certificate will be the main document testifying to this improvement.

8.2.3. Energy Efficiency in the Public Sector

In the public sector, Government has appointed green leaders entrusted, among other things, to encourage and champion energy efficiency. More effort is required to reap the energy saving potential of the public sector. Government has also introduced a green travel plan in order to ensure a reduction in the use of public sector cars and integrate travel to and from meetings. This measure started out as a pilot project at OPM and this year has been expanded to other Ministries.

8.2.3.1. The Carbon Footprint of Government Entities

In Budget 2010, Government announced the intention to calculate the carbon footprint of departments and government entities, and to introduce a system of incentives to reduce it. Major efforts are currently focused on data collection and its management. The Financial Policy and Management Division within the Ministry of Finance, the Economy and Investment is currently undertaking research to establish a database of government property, its carbon footprint and incentives for its reduction, as announced in the Budget 2010.

8.2.3.2. Energy Savings Measures by Public Entities

In 2007, Government published a corporate environmental policy which sets targets for energy efficiency in Government-owned industry for which it is responsible, some of them being major energy consumers in the country. The Water Services Corporation, in particular, which accounts for nearly 5% of the national electricity demand, has carried out a number of measures to make the production and distribution of water more energy efficient.

The Maltese Islands have limited groundwater sources and it is also difficult to control its quality. To meet EU and local standards, groundwater is blended with high quality water produced from three main reverse osmosis (RO) plants at Pembroke, Għar Lapsi and Cirkewwa. This has necessitated extensive seawater desalination by RO, which accounts for almost 60% of the potable water demand of 31 million cubic metres per annum. The plants were retrofitted with the most efficient energy-recovery hardware available. All this is accompanied by an aggressive leakage detection campaign to ensure all avoidable losses are eliminated.

8.2.3.3. Energy Audits Targeting Government Buildings

Government had set up a programme for energy audits for buildings used by the public service. These include but are not limited to: offices, courtrooms, town halls, police and fire stations, schools and community centres. Their historic utility use and costs were analysed. Auditors then carried out a walk-through audit of the buildings and talked with staff to identify opportunities for energy savings.

8.2.3.4. Energy Conservation in State Schools

The Foundation for Tomorrow's Schools, set up by the Government in 2001, has among its objectives the management and financing of the development, building, upgrading and refurbishment of State schools. Energy conservation and inclusion of renewable energy sources is a core principle of the Foundation's policy in the design and construction of new schools.

Since the policy's implementation, the Energy Performance in Buildings Regulations (which will also affect the energy performance of new schools) has come into operation. In fact, most of the measures being implemented in the schools go beyond the Regulations' minimum requirements.

Additional benefits of this policy include practical education on energy and water conservation and integration of micro RES in buildings, water conservation (collection of surface run-off), and improved building properties, for example: sound insulation, waterproofing through use of polyurethane foam in roof insulation, and increased control of thermal comfort for schools to use, instead of air-conditioning for space cooling/heating.

8.2.3.5. Energy Saving Measures in Social Housing

The Housing Authority has a five-year plan started in 2009 to provide for the building of additional social housing residential units that will incorporate energy saving measures within the building structure. These are over and above those required to comply with the minimum requirements that have since come into force. The aim is to reduce the direct and indirect electrical power demand of social housing from the national grid.

8.2.3.5.a.Participation by Local Councils in the Covenant of Mayors

Around half of the local councils have signed up to the Covenant of Mayors,[28] and half the signatories have already submitted an action plan in favour of energy efficiency.

The signatories are: Ħal Balzan, Birkirkara, il-Fgura, l-Għarb, Għajnsielem, Ħal Għaxaq, Ħad-Dingli, Ħal Għargħur, Ħal Tarxien, Ħaż-Żebbuġ, l-Iklin, l-Isla, il-Kalkara, Ħal Kirkop, Marsascala, l-Mdina, il-Mellieha, l-Mġarr, il-Mosta, in-Naxxar, Pembroke, il-Qala, Ħal Qormi, il-Qrendi, ir-Rabat (Città Vittoria), San Ġiljan, San Lawrenz, San Pawl il-Baħar, Santa Luċija, Santa Venera, Tas-Sliema, is-Swieqi, Ta' Kercem, Ta' Xbiex, ix-Xagħra and ix-Xewkija.

8.2.3.5.b.Government Incentives to Local Councils

The Department of Local Government launched two energy aid schemes to encourage local councils to invest in energy efficient measures or renewable energy. Grants of 80% up to €10,000 were provided for investment in energy savings.

Examples of energy efficiency projects put into practice include changing lighting to energy saving and LEDs, and installing double-glazing on windows. The majority of projects involve the installation of renewable energy equipment.

8.2.4. Other Energy Efficiency Measures

8.2.4.1. ICT and Improved Energy Efficiency

In 2008/9, the Commission identified a number of routes and concrete actions for the Intelligent Communication Technology (ICT) industry, so that EU member state governments and their regional and local administrations could exploit the enabling capacities of ICT to improve energy efficiency across society and the economy. The recommendations aim to ensure full coherence of ICT policies with national, local and regional approaches to make the transition to an energy-efficient, low-carbon economy. They include:

- a minimum functional specification for smart metering to provide consumers with improved information on energy consumption, and improved capabilities to manage it, together with setting up a coherent timeframe by the end of 2012 for rolling out smart metering;
- monitoring and management of energy consumption in buildings;
- energy efficient work practices, such as tele-working and e-government;
- delivering innovative technologies that reduce wasteful consumption of energy in devices;

[28] http://www.eumayors.eu/

- adopting and implementing procurement practices that exploit the strength of public sector demand to promote the dematerialisation of ICT goods and services.

8.2.4.2. Automatic Meter Management System

ARMS Ltd, on behalf of Enemalta and the WSC, are managing an Automatic Meter Management system complete with Smart Electricity Meters. When installation is completed, the utilities will be able to put in place demand management measures centred on a flexible tariff system, not limited to off-peak benefits. This will also provide consumers with up-to-date information on their consumption trends,[29] in enabling them to appreciate how they can use electricity most efficiently and hence save on their bills.

8.2.4.3. Co-generation

A feasibility study analysing the potential of co-generation on the Maltese Islands, carried out by the MRA, showed that, given present energy prices, this technology is feasible in some sectors. The report was published on the MRA website.[30] Government intends to investigate ways to promote high efficiency co-generation.

[29] A study carried out in Ireland (Smart Metering Information Paper 4 Results of Electricity Cost-Benefit Analysis, Customer Behaviour Trials and Technology Trials, published in 2011) indicated that the deployment of a range of time-of-use tariffs in conjunction with demand side management stimuli are found on average to reduce overall electricity usage by 2.5% and peak usage by 8.8%.
[30] Malta's Report in line with Article 10(1) of Directive 2004/8/EC on the promotion of co-generation based on a useful heat demand in the internal energy market and an analysis of Potential for Co-Generation in the Maltese Islands.

8.3. Conclusion

Table 8.3.1: Summary for Main Issues and Measures Related to End-use Efficiency

Issues	Measures
The National Energy Efficiency Action Plan (NEEAP) guides the move towards energy efficiency and sets targets for achievements. There are, however, barriers to be addressed: ▪ Raising awareness, though the effect of the NEEAP is usually short term; ▪ legislative acts (e.g., through building codes, minimum standards for equipment); ▪ fiscal measures (e.g., higher taxes on inefficient vehicles); ▪ financial measures (aid schemes to promote market reform); ▪ leadership by the public sector, demonstrating the energy savings action taken and its effects, and stimulating the market for energy efficient products. ▪ Regulatory measures (by enforcing appropriate energy savings obligations on stakeholders).	Ensure that all the set targets in the NEEAP are reached in a timely, structured and cost-effective manner through continually keeping the plan updated and by implementing supporting measures such as sustained education measures, market incentives, etc.
The NEEAP must be kept under review and updated to ensure cost effectiveness and to take corrective action where necessary based on actual performance, experience, new knowledge and information, as well as new standards and technologies that become available.	Update the cost-benefit assessment of the various options relevant to the NEEAP and the set targets.
Some imperfections or failures in the market need to be tackled. Examples are: ▪ Distorted price signals, such as prices of energy efficient or RES equipment set too high. ▪ Split incentives (e.g. for rented commercial buildings and car hire), representing a dilemma where investors (such as hire companies) minimise investment in efficient energy-using technology where the resulting higher energy requirements will not be paid by them but by their clients.	Continue, and where appropriate, intensify on-going measures and periodic schemes. Schemes should be designed and if necessary amended to reach the strategic objective of influencing market (and consumer) behaviour as well as in correcting market imperfections or failures.
Lack of visibility and knowledge of the energy efficiency measures as well as the savings potential of tackling the hidden costs of inefficient energy use. There is still ignorance about the best technology and the most suitable type of energy to use for the various activities.	Continue with the implementation of education and communication campaigns envisaged in the NEEAP.
Non-participation of energy suppliers who do not consider their role to provide an energy service, but rather to sell a product. This is another aspect of the need to raise awareness among the different categories of stakeholders.	Continue with the implementation of education and communication campaigns envisaged in the NEEAP.
Energy management plans are only required in EIAs of major projects. Work is on-going to assess the potential for extending the scope of the measure and implementing standard thresholds to identify projects that are significant (in terms of energy use) at the start of the planning process, independently of environmental legislative requirements.	Review the threshold where energy management plans for major projects are required.

High efficiency co-generation has to be promoted.	Investigate ways in which high efficiency co-generation may be promoted.

8.4. Programmes and Measures on End-use Energy Efficiency

Table 8.4.1: Action Plan for End-use Efficiency

Programme Measure number	Description	Implementation			
		Contribution to the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
EE-1	Ensure that all the set targets in the NEEAP are reached in a timely, structured and cost-effective manner through continually keeping the plan updated.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy efficiently and effectively	Percentage of total energy savings per annum Energy intensity of the economy 22% energy savings by 2020	2008-2020	Lead – BRO All Ministries Enemalta

Programme Measure number	Description	Implementation			
		Contribution to the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
EE-2	Keep under review the cost-benefit assessment of the various options relevant to the NEEAP and the set targets.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy efficiently and effectively	Status	2008-2020	Lead – BRO MRRA MFEI

EE-3	Continue, and where appropriate, intensify on-going measures and periodic schemes. Schemes should be designed and if necessary amended to reach the strategic objective of influencing market (and consumer) behaviour. Introduce a portal that provides users with interactive knowledge and information on energy efficiency.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply	Number of incentives, educational, and technical audit and support measures implemented	on-going January 2015	Lead – MRA MRRA BRO MFEI Malta Enterprise MCCAA Local Councils Association and Local Councils Constituted bodies (GRTU, Chamber, MHRA)

	Works with stakeholders such as GRTU and the Chamber of Commerce to fill information gaps in the commercial and industrial sectors with regard to energy efficiency with specific attention to Micro-Enterprises, SMEs, agriculture and rural operators, etc. Work with and support Local Council efficiency measures directed to assist them meet the Covenant of Mayors targets on clean energy..	Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Number of Schemes Number of Schemes and financing	2012 - 2020 2012 - 2020	

EE-4	Continue to incentivise the meeting of minimum requirements aimed at improving the energy through efficiency of buildings of incentives that include but are not limited to the following: o Use of insulation materials to reduce the passage of heat through the building. o Designing apertures to decrease the effect of solar overheating. o Introducing control of heating and cooling systems.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Number of schemes	2012 - 2020	Lead – MFEI BRO MRRA MEPA MRA

EE-5	Review the threshold where energy management plans for major projects are required.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Status	On-going	Lead – BRO MRRA MRA

EE-6	Government will assess the need to revise the National Energy Efficiency Action Plan (NEEAP) by carrying out a full review of the framework relating to the governance of energy efficiency of new buildings and buildings will be carried out in 2013. Government will strengthen the ex-ante and ex-post regulatory and enforcement measures to ensure that new buildings and projects relating to rehabilitation or refurbishment of existing buildings with the aim to: - Future-proof' the minimum efficiency standards for building components. - Ensure that Malta's standards maximise the potential to achieve energy efficiency and that they make the maximum practical contribution to achieving CO_2 emission targets.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy economically, efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Continuous review	On-going	Lead - BRO MRA MRRA MEPA

EE-7	Investigate ways in which high efficiency co-generation may be promoted.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Status	2012-2015	Lead - MRA MRRA

EE-6	Achieve energy savings across the public service and sector and will continue to apply green practices with regard to recycling / waste minimisation; office consumables and equipment. Eliminate energy misuse in public buildings and responsibilities vis-a-vis energy behaviour at work. Maintain the current action for green public procurement by the Government to be amongst best performers in Europe Any property rented by Government from the private sector, including for the provision of social accommodation, meet the national minimum energy efficiency standards.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector Policy area 5: Delivering energy efficiently and effectively Policy area 6: Ensuring that the energy sector can deliver	Achieve energy savings by 33% Education and behaviour management measures implemented Higher quartile of best performers in EU 2015	2025 Ongoing 2020 Ongoing thereafter	Lead – MRRA All Government

	Continue to revise and update guidelines with regard to development of new education, health and social facilities as well as industrial estates to ensure that such buildings meet the targets set in the Energy Efficiency Plan.		2012-2020	Ongoing	

9. TRANSPORT

9.1. Road Transport

The transport sector accounts for the largest share of the total use of conventional energy and is today almost fully dependent on fossil fuels. Road transport accounts for around 74% of the fuel use in the inland market, excluding that used in international aviation and power stations.

In 2011, the fuel mix used in road transport was made up of unleaded petrol (45.7%), EN 590 automotive diesel (53.2%) and 1.1% biodiesel. The monitoring of quality of the various fuels imported for automotive use is covered in Chapter 5.

9.2. Private Vehicle Fleet

Malta has one of the highest levels of private car ownership in Europe, at about 3 cars for every 4 citizens.[31] Private vehicles account for 76.9%[32] of the total number of licensed motor vehicles. The transport sector will have to go through a radical transition over time. The challenge with regards to a reduction of the amount of traffic on the roads will remain for the foreseeable future.

The vehicle fleet in Malta has been increasing steadily in recent years. At the end of 2011, the total number of registered motor vehicles stood at 311,947[33] – an increase of 2.4% over 2010 (and an increase of 124% compared to 1990). Vehicles older than 10 years account for 66.4% of the national vehicle stock.

A trend in recent years is the high percentage of imported 'used' cars, which in 2010 amounted to 65% of the total newly licensed cars for that year. The main reason is the relatively cheaper price and lower registration tax of second-hand cars.

9.3. Preferences in Transport Use

The National Household Travel Survey was carried out in May 2010[34] on a sample of over 6,000 households to seek information on their travel habits. The Figure 9.3.1 shows the method of transportation used on a departure basis.

The findings confirm that, in general, people prefer to travel by private car, with around 75% of all trips being carried out as driver or passenger in a private car. Similar surveys will be carried out in 2013 to assess better transport use.

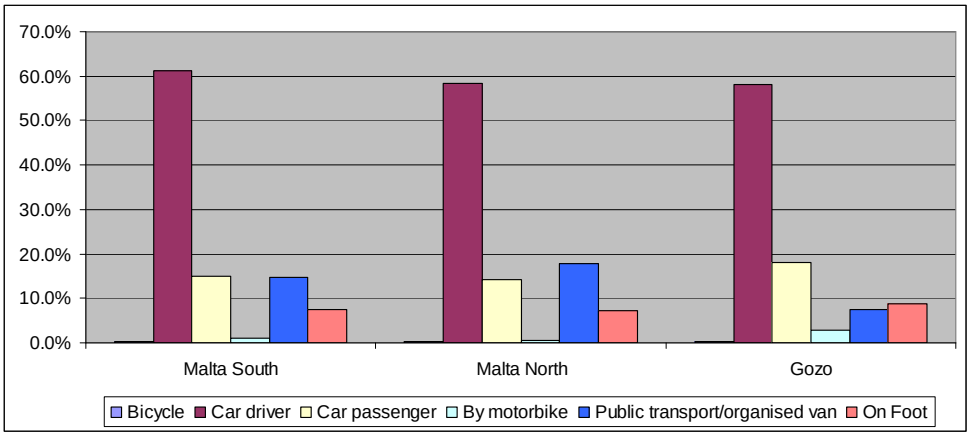
[31] Total number of private vehicles as at 3rd quarter 2011: 310,409 (Source: NSO, News Release, Motor Vehicles: Q3/2011, October 2011). Total estimated population 2011: 417,608 (Source: NSO, News Release, World Population Day: 2011, July 2011)

[32] NSO, News Release, Motor Vehicles: Q4/2011, February 2012. Available from: http://www.nso.gov.mt/statdoc/document_file.aspx?id=3239 [Accessed on 2 February, 2012]

[33] NSO, News Release, Motor Vehicles: Q4/2011, February 2012. Available from: http://www.nso.gov.mt/statdoc/document_file.aspx?id=3239 [Accessed on 2 February, 2012]

[34] National Household Travel Survey 2010, 26 May, 2010, Transport Malta.

Figure 9.3.1 Main Methods of Transportation by Region



Source: National Household Travel Survey, 2010

9.4. Measures Being Taken in Road Transport

A number of measures are being or have been implemented to improve the efficiency in road transport and reduce the impact of this sector on the environment.

9.4.1. Public Transport Reform

The main challenge Malta has been facing in recent years is how to shift the preferred mode of individual transportation from personal vehicles to public transport, and thereby achieve energy savings in fuel consumption. To achieve this shift it is important that public transport offers a continually expanding range of choice and quality to meet the demands of various commuters.

Government began to reform public transport in 2011 and will continue to reform various sectors of the public transport system up to 2015. The public bus service is now under new management and a new fleet of buses, having more efficient Euro V standard engines, was introduced to replace the old fleet.

Although the public transport reform had significant teething problems, staged changes in the bus routes and timetables have improved customer satisfaction. Having said this, to date the new management are yet to reach the desired 99.8% reliability on timings and routes which has accounted for a cautious uptake - which can only be addressed once reliability is improved and that it becomes clearly evident that public transports constitutes a clear alternative to the use of a car.

Apart from the bus service reform, several other measures were taken to improve the public transportation system. More park and ride facilities were provided, water taxis were introduced facilitating inter-harbour crossings between either side of Grand Harbour, from the Three Cities to Valletta and from Sliema to Valletta, and some measures of positive discrimination in favour of public transport have been introduced. Government has also issued tenders to provide cross-harbour ferry services that will also complement the vertical lift connection between Lascaris Wharf

and the highest part of Valletta. Once again more incentives for those using Park and Rides need to be introduced. This is evidenced by the limited success of the Parks and Ride against payment as opposed to those free of charge when they were first introduced. This has more to do with a cultural shift rather than actual marketing although this would no doubt help. Transport Malta is in the process of implementing a number of identified ITS (Intelligent Transport Systems) and studying enabled Bus-Priority Measures strictly dedicated to public transport usage. This will also improve the fuel efficiency of buses by allowing them to run free of traffic congestion.

9.4.2. Fiscal Incentives to Reduce Fuel Consumption and Pollution

In 2011 Government established registration tax measures for commercial vehicles, depending on their Euro engine class, with the aim of reducing the number of older, more polluting vehicles on our roads.

A scrappage scheme for private cars was introduced in November 2010 to encourage the scrapping of old polluting cars and their replacement with new EURO IV or better class vehicles. This scheme led to the scrappage of 2,602 cars (older than 10 years) over a 13 month period. This scheme was so effective Government extended it into 2012.

The fiscal regime that taxes vehicles at first registration based on size and CO_2 emissions has seen a number of smaller, more efficient vehicles appear on the road. However, this is undermined by the EU free market rules that have seen a significantly greater increase in larger, older, second hand vehicles also registered in Malta. As manufacturers make more hybrid vehicles available, more registrations are noted.

9.4.3. Traffic and Congestion Management

The Maltese Government is taking measures to improve accessibility into the capital city, Valletta, reduce traffic congestion and improve the environment. Such measures include the introduction of a controlled vehicle access (CVA) system and the park and ride scheme. These efforts have resulted in a substantial drop in traffic in and around Valetta in normal peak hours. A 22% drop in the total number of individual cars visiting Valetta every day for any length of time has been recorded. There has also been a 60% drop in car stays by non-residents of more than eight hours, but there has been a marked increase of 34% in non-residential cars visiting the city for an hour or less.[35]

Transport Malta is also in the process of deploying a state-of-the-art Intelligent Traffic Management System, which is intended to centralise and improve traffic management. This aims to reduce traffic congestion, clear traffic-generated bottlenecks as well as reduce overall journey times. The ITMS will also assist the public transport operator to make bus journey times more efficient, improving on fuel efficiency and encouraging a modal shift.

[35] [http://www.eltis.org/index.php?id=13&study_id=1610].

9.4.4. Green Travel Plans to University and Colleges

The University of Malta completed its first Green Travel Plan (GTP) in early 2011 and launched the initiative in September 2011. The GTP showed high usage of public transport by students and more car dependence for staff.

A potential modal shift is expected due to non-academic staff having fixed working hours (requiring travel at peak times) and the limitations of parking within and around the campus. Short, medium and long term measures have been identified and the recent progress report demonstrates some of the actions taken so far (http://www.um.edu.mt/isd/greentravel).

The Malta College of Arts, Science and Technology GTP aims to phase in a series of measures to address the transport needs of the major redevelopment and expansion in capacity planned by 2015. The GTP intends that the travel needs of staff and students are met in a way that promotes greener, cleaner travel choices.

The MCAST GTP envisages a modal shift of 17% of staff and 64% of students by 2015 (compared to 2008).

9.4.5. Green Travel Plans in the Public Sector

Government has also introduced green travel plan in order to ensure a reduction in the use of public sector cars and integrate travel to and from meetings. This measure started out as a pilot project at OPM and this year has been expanded to other Ministries. This Plan is managed and spearheaded by the head of the public service.

9.4.6 .Education Campaigns

More public education campaigns are required to change attitudes and influence behaviour in transport use as well as basic driving tips (such as tyre pressure) which impacts fuel consumption and CO_2 emissions. The provision of advisory services on energy efficient driving is also planned. This will be combined with an information campaign to educate the general public on energy efficiency measures in general. The action will take advantage of existing energy efficiency directives (for example: labelling of vehicles, labelling of tyres). Consultation with all stakeholders will be required.

9.4.7. Electric Vehicles

Government has also been promoting the purchase of electric cars for personal use through grant schemes. The uptake is still slow and the number of private electric vehicles currently stands at 26.[36] The low uptake can be attributed to the relatively higher capital cost compared to fuel driven vehicles. The choice is limited to a few models and their size does not make them suitable to replace family cars. Electric vehicles depend on batteries with a limited mileage range and relatively high replacement costs. The competitiveness of electric vehicles depends greatly on the price charged for electricity.

[36] NSO, News Release, Motor Vehicles: Q4/2011, February 2012. Available from: http://www.nso.gov.mt/statdoc/document_file.aspx?id=3239 [Accessed on 2 February, 2012]

Electric vehicles are, in general, relatively more environmentally sustainable than conventional vehicles when the electricity is produced from high efficiency plants or decarbonised sources. 'Challenge 2050' counts on the contribution of electric vehicles to reduce GHG emissions because so far it appears to be easier to decarbonise electricity generation rather than fossil fuel-driven road transport.

Electric vehicles reduce localised emissions attributed to traffic and have the advantage over conventional vehicles of no emissions when idle. Some manufactures are selling fossil fuel drive vehicles equipped with start-stop system that automatically shuts down and restarts the internal combustion engine to reduce the time the engine spends idling, thereby reducing fuel consumption and emissions.

The Government of Malta has set an indicative target of 5,000[37] plug-in electric vehicles (EV) uptake by 2020. The main aim of the Strategy is to increase the uptake of EV as an alternative to fossil fuel powered cars while decoupling increased transportation requirements from vehicle generated emissions. Only through the use of RES for electricity can EV fully contribute to a future where no fossil fuels are used and hence no gases are emitted.

The Strategy's recommendations address financial incentives as well as soft measures in line with the local requirements, and which would need to be reviewed over time depending on the uptake of EV. The recommendations are considered practical, reasonable and implementable. Several are based on good practice adopted in other EU member states. However, some recommendations may require legal changes and policy reviewing to be put in effect.

Besides incentives for the purchase of EV, the Strategy establishes the need for the technical infrastructure to provide the essential ancillary services for the safe and reliable operation of vehicles. This would include accessible and intelligent charging points, as well as servicing. It is expected to install charging points around Malta in parallel to other projects intended to put more EV on the roads.

Assuming the cleanest electricity dispatch (100% RES) for the target of 5,000 plug-in electric vehicles (EV) in 2020, the best case scenario envisages a reduction of around 7.7 k tonnes of CO_2 equivalent annually from Malta's emissions, contributing to around 1% of the 2020 renewable energy sources transport target in line with current plans as indicated in the National Renewable Energy Action Plan.

A worst case scenario for the year 2020 of an average travelled distance of 11,600 km[38] annually by a vehicle, assumes that a typical 0.14 kWh is required for an EV to travel 1 km with 4% added to make up for grid distribution losses and also assumes that all charging electricity derives from the conventional power plants with an estimated self-consumption of 3.8%[39] per unit dispatched. In which case a 5,000 strong EV fleet in 2020 would contribute to a 0.32% electricity demand[40] for vehicle charging of the total electricity demand. Assuming the extreme case where 5,000 EVs will be charged at the same time with a 3kW charger, during the peak demand hour, the maximum capacity requirement would increase to 472 MW from the maximum expected peak demand of 457 MW in

[37] Malta National Reform Programme under the Europe 2020 Strategy – April 2011 (MFEI
[38] A study of an Electric Transportation Systems for Malta – July 2007 (MRRA EVM Ltd).
[39] National Renewable Energy Action Plan Report – June 2010 (MRRA).
[40] Electricity demand as per National Renewable Energy Action Plan Report – June 2010 (MRRA).

2020. In theory, as estimated from Enemalta, projections like this will still be sufficient, even assuming that conventional capacity is the only one available.

9.5. Biofuels and Bioliquids

It is understood that biofuels and bioliquids are only beneficial if they are produced in a sustainable manner – without inducing food scarcity and without interfering unduly with the wider environment. This is a preoccupation at international level and is reflected in EU directives and local legislation. Market players are being obliged to verify and audit according to criteria established by law[41] the biofuel and bio-liquids being put on the market to ensure they originate from sustainable sources.

According to the NREAP, the 10% renewable energy in road transport by 2020 target is expected to be reached mainly from biofuels with a limited contribution from electric vehicles, given that in Malta there is no rail transport.

At present, the only renewable energy source used in road transport is biodiesel. The biodiesel now being placed on the market is produced locally from recycled waste, cooking oil and other products that are imported and blended locally with fossil fuel. The amount of biodiesel blended in 2011 was over 1 million litres. The amount of biodiesel that may be used in vehicles is currently limited to 7%, according to the relevant standards. At present, some 30 petrol filling stations in Malta and Gozo retail a B100 product, that is, pure biodiesel. Enemalta is purchasing biodiesel to EN14213 from the European market and blending locally with EN590 diesel prior to supplying the petrol filling stations. The blend ratio is currently 3.5% on average although this may fluctuate and this ratio will increase over the coming years.

The consumption of biodiesel decreased between 2007 and 2010. The steady decrease in fossil oil prices in 2008 and the increase in the costs of raw material used to produce biofuel resulted in a lower price margin between the two products, causing a substantial decrease in the amount of biofuels placed on the market in 2008. This trend continued in 2009 and 2010, despite the increase in the prices of petroleum products. Hence, to boost the use of biofuels a 'substitution obligation'[42] was introduced for importers/wholesalers of automotive fuels. These market players are now obliged to import a minimum of biofuel content calculated as a percentage of the total automotive fossil fuels they import. The percentage was set at 1.5% for 2011 but will be increasing gradually in annual steps to reach 10% in 2020.

Discussions are under way between MEPA, Environmental Health Unit and the MRA on the introduction to the market of a renewable fuel substitute for petrol that is both environmentally and financially sustainable.

Consultation is also on-going with major operators in the transportation industry which includes operators of public buses, coaches and heavy vehicles to increase the share of biodiesel these vehicles use beyond the 7% limit envisaged in the EN590 standard, possibly by 2013.

9.6. Aviation Transportation

[42] The substitution obligation was introduced by LN L.N. 68 of 2011 amending the Petroleum for the Inland (Wholesale) Fuel Market (Amendment) Regulations, 2011, (LN 278 of 2007).

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Although technology may reduce the need to physically be at a business meeting – this will not lessen the number of flights that will be required in and out of the country, especially because aviation is crucial to sustain tourism activity in Malta, which is estimated to contribute, directly and indirectly, to a sizeable part of the Gross Domestic Product. It is therefore imperative that efficiencies are gained at a flight level, rather than at a passenger level. The quick implementation of the Single European Sky (SES) initiative aimed at reducing the distances and provides flight routes at optimum altitudes is a policy direction that Malta will rigorously pursue.

9.7. National Navigation

As at 2011, the share of energy consumption for national navigation (inter-national navigation, water taxis, pleasure boats, fishing boats) stood at 1.40% of total energy consumption. The application of policy measures in this regard will not lead to any significant impacts. MRA and Gozo Channel Ltd are nevertheless discussing potential conversion of the Company's vessels onto bio-diesel – where-in discussions are underway with the engine manufactures.

Table 9.7.1: Summary of Main Issues and Measures Related to the Transport Sector

Issues	Measures
Road transport is the second major consumer of fuels after electricity generation. Transport fuels suffer from international market price volatility, reflected in the price consumers pay. Fossil fuels are not environmentally friendly.	Carry out in-depth survey on transport use to understand better the land transportation sector.
There is limited diversification in automotive fuels because those used in Malta are mainly diesel and petrol with a small share of biofuels and some autogas. Biofuels are environmentally friendly if originating from sustainable sources and the use of autogas in transport would reduce the emissions from this sector.	Measure RES-9 included in Chapter 8.
Preference for private cars rather than mass transportation increases the demand for fuel imports and hence has a negative impact on security of supply. Private car use is inefficient in terms of fuel use and other parameters not directly connected to energy (such as parking facilities) compared to public transport. Avoidable and excessive use of fuel is not environmentally friendly.	Green travel plans at university and colleges as well as with other employers, include the Public Service. Promotion of e-work or tele-working. Promotion of Green travel plans by other employers.

Issues	Measures
The private vehicle fleet is old and there is a tendency to import cheap second hand cars. While these are cheap to buy, they may be very inefficient in fuel consumption compared to modern vehicles, and hence have higher running costs. Increased consumption of fuels has a negative impact on security of supply because it increases the need to import of fuels. Higher fuel consumption has a negative impact on the environment and hence is to be discouraged.	Limit scrappage schemes to new energy efficient replacement vehicles.
Public transport reform has not yet achieved a sufficient level of public approval and acceptance. Significant effort is required to inform and educate the public to change attitudes and to provide public transport systems that match or surpass the level of convenience people experience using private cars. The already high level of ownership of private cars does not help.	Understand lessons learnt from initial phase of public transport reform. Continue to create incentives to encourage a shift towards public transport by providing a public transport service that meets the public's aspirations.
Traffic management has to be improved in order to reduce traffic congestion which causes avoidable fuels wastage and increased emissions.	Traffic congestion reduction in the capital city. More effective traffic management in common node areas. Assessment of traffic congestion on strategic parts of the road network.
Public transport has to be more efficient. A more efficient public transport will reduce journey time, encourage a modal shift and improve fuel efficiency.	Ensure (through regulatory means) that the public transport operator provides a fuel efficient service. Intelligent Transport Systems (ITS)-enabled bus priority measures.
There is low uptake of electric vehicles mainly due to relatively high vehicles prices. These could contribute to the reduction of fuel imports if the electricity is generated from renewable sources. Electric cars reduce localised emissions attributed to traffic. However their contribution to overall emissions reduction depends on the electricity source.	Build the necessary infrastructure to facilitate the uptake and use of electric vehicles and raise awareness through the Life + project. Create incentives for the purchase and use of electric vehicles.
Induce uptake of cleaner energy source than fuel oil and diesel.	Assess potential markets instruments to induce drivers to shift to more clean energy sources.
There is no effective competition in the fuel handling at Malta International Airport, despite the legislative framework being in place.	Analysis of future expansion of fuel storage facilities with due regard to enhanced security of supply for local consumption, efficient of existing facilities to foster competition with due regard to the environment.
There is currently no bio-petrol which can be used as a substitute to petrol.	Reach agreement amongst stakeholders on an environment and health acceptable bio-petrol substitute.
Bio-diesel (and when, if in use, potentially, bio-petrol) mix component very low.	Apply legislation to incrementally increase bio-diesel (in future bio-petrol) blend at importation source.
Single European Sky agreement still to be reached.	Pursue rigorously.

Issues	Measures
Increasingly encourage / incentivise economic operators and individual users of sea vessels to substitute, if applicable, to bio-diesel.	Educate and incentivise as appropriate.

9.8. Programmes and Measures for the Transport Sector

Table 9.8.1: Action Plan for the Transport Sector

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-1	Continue to create incentives to encourage a shift towards public transport by improving a public transport service that better meets the public's aspirations. Underline lessons learnt of public transport reform, and further action required to secure a successful modal shift away from private vehicles to public transport Work with public transport operator to introduce Green Travel plans.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Number of bus passengers per annum Post implementation assessment and presentation of lessons learnt Number of designated shuttle schemes introduced	2015 2014 2014	Lead – TM Public transport operator MITC

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-2	Ensure (through regulatory means) that the public transport operator provides a fuel efficient service: including the exploration of use of bio-diesel as an energy source.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Fuel consumption by public buses	2015	Lead – TM Public transport operator MITC MRA

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-3	Introduce measures directed to achieve by 2030 up to a 35% improvement in fuel efficiency among private transport users by adopting measures that include but are not limited to the following: Public awareness campaigns on issues such as eco-driving. Increase the registration fee of heavy fuel consuming private vehicles. Support the vehicle scrapping scheme directed to incentivise the replacement of the old vehicle by a brand new (and not second hand) vehicle that is fuel efficient and which has a low carbon footprint. (iv) Introduce as a mandatory requirement for all heavy commercial vehicles to be equipped with remote telemetry devises which measure CO_2 emissions on a constant basis, whereby heavy commercial vehicles which surpass an agreed threshold of CO_2 emissions will not be allowed to remain on the road unless works are performed on the vehicle to bring CO_2 emissions in line within the maximum threshold, or the maximum load allowed for the vehicle is reduced	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	35% Number of campaigns 25% Reduce pre-2000 private vehicles to 10% Intelligent remote CO_2 emissions monitoring of commercial vehicles	2030 Ongoing Incrementally up to 2025 2018 2018	Lead - TM MRA MITC MFEI MEPA MHEC

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-4	Traffic congestion reduction in Malta through measures which include but are not limited to the following: (i) Discussions with stakeholders to stagger the opening of schools in order to alleviate the moving grid lock experienced daily during the scholastic terms. (ii) Introduce CVA frameworks supported by park and ride facilities site in strategic areas. Introduce under the 2014-2020 EU Partnership agreement, a programme for road infrastructural development directed to remove network congestion bottlenecks.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Stagger opening time of schools Introduce at least two CVA and Park and Ride Facilities in strategic areas Redevelop road networks including to remove bottleneck congestion spots.	2014 2015 2020	Lead - TM MITC MEDE MUT PPCD

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-5	More effective traffic management.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Traffic management improvements introduced	On-going	LEAD – TM MITC
T-6	ITS-enabled bus priority measures.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Number of measures implemented Average bus journey time Fuel used by public transport per km	On-going	Lead – TM MITC

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-7	Green travel plans at university and colleges. Support measures that aim to achieve greater energy efficiency from the transport sector and influence behavioural change, including car sharing schemes. Support the use of the water taxi service system to secure a sustained inner harbour modal form of transport to the use of a private vehicle affordable and attractive	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Percentage modal shift achieved (staff and/or students) Percentage modal shift achieved (workers, private use, etc) Percentage modal shift achieved (workers, private use, etc)	2015 2015 2015	Lead - TM

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-8	Promotion of e-work or tele-working	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Percentage workers on tele-working	On-going	Lead – OPM (Government) Private Sector
T-9	Build the necessary infrastructure to facilitate the uptake and use of electric vehicles and raise awareness through the Life + project.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Status Number of measures implemented	On-going	Lead – TM MRRA Enemalta MTCE

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-10	Create incentives for the purchase and use of electric vehicles as well as plug-in hybrids.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Number of electric cars in use Number of electric cars registered annually Fuel saved annually Annual reduction in road transport emissions due to EV use 5000 EV by 2020	2012-2020	Lead – MRA MFEI MITC
T-11	Carry out in-depth survey on transport use to understand better the land transportation sector.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Status	2013	Lead – TM MRA MITC

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-12	Comply with fuel ground handling directive	Policy area 5: Delivering energy economically, efficiently and effectively.	At least two fuel operators at the airport.	2013	Lead -MRA MCCAA MFEI Enemalta MITC

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-13	Conclude discussions with MEPA, Environmental Health Unit and the MRA on the introduction to the market of a renewable fuel substitute for petrol that is both environmentally and financially sustainable All diesel vehicles owned or leased by Government will reach a bio diesel blend of 15% (bio-petrol vehicles will be placed on same baseline should a bio-petrol that meets health and environment standard be identified). Diesel vehicles of contractors working for Government will incrementally reach a bio-diesel blend of 15% (bio-petrol vehicles will be placed on same baseline should a bio-petrol that meets health and environment standard be identified). Assess market incentive options to encourage substitute to biodiesel (bio-petrol vehicles will be placed on same baseline should a bio-petrol that meets health and environment standard be identified). Bio-diesel blend for private vehicles and pleasure sea vessels boards will be statutory increased to 15% (bio-petrol vehicles will be placed on same baseline should a bio-petrol that meets health and environment standard be identified)	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Agreement on bio-petrol standards 15% bio diesel blend 15% bio-diesel blend Assess market incentive options 15% bio-diesel blend	2014 2022 2022 2015 2030	Lead – MRA TM MEPA MHEC MFEI

Programme Measure number	Description	Implementation			
		Contribution Towards the Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
T-140	Escalate efforts for the introduction of the Single European Sky.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Propel and work for the ratification of the Single European Sky Framework	2016	Lead – TM MRA

10. HYDROCARBON EXPLORATION

10.1. Introduction

Currently Malta is not exploiting indigenous fossil fuel sources. Although exploration for petroleum has been on-going since 1958, no commercial discovery has yet been made. It is worth persevering because of the potential high generation of revenue that can be introduced in the Maltese economy and direct contribution to security of supply in Malta should natural gas be discovered. If crude oil is exploited in commercial quantities, it would eliminate dependence on foreign crude with only refining services needed.

Over the years, numerous prospects have been identified and 12 exploratory wells have been drilled. Several drillable prospects remain to be tested. Most exploration activity is carried out offshore. Malta's offshore acreage is divided into several areas/blocks covering an area of over 70,000 km^2.

At present, two exploration and production licences are in force. Heritage Oil International Malta Ltd has been awarded a PSC over Area 2 and Area 7 and Malta Oil Pty Ltd has another PSC in Blocks 4, 5, 6 and 7 of Area 4. Hydrocarbon exploration and production activity in Malta is regulated by the Petroleum (Production) Act, the Continental Shelf Act, the Petroleum (Production) Regulations and EU Directive 94/22/EC.

10.2. Contractual Framework for Hydrocarbon Exploration

Under Maltese legislation, subsoil natural petroleum resources belong to the Government. In accordance with the Petroleum (Production) Act, Government may award licences to oil companies to explore for and produce petroleum under two types of licences:

- An exploration licence
- An exploration licence and production licence

An exploration licence is awarded under an Exploration Study Agreement and an exploration and production licence is granted under a Production Sharing Contract. Production Sharing Contracts between oil companies and the Government are deemed to be favourable for both parties.

Moreover, specific incentives exist for exploration in water depths greater than 200m. In the past, Government has awarded oil exploration licences both through bid rounds and direct negotiations. Under Directive 94/22/EC, Malta is required to publish its procedure for granting awards in the *Official Journal of the EU*.

Several petroleum systems that have been producing hydrocarbons for several decades in offshore Sicily, Tunisia and Libya are known to extend into Maltese acreage, making exploration opportunities in Malta competitive and attractive.

10.3 Environmental Impact of Hydrocarbon Exploration

Government and licensees are fully aware that offshore operations may cause some impact on the environment. To minimise risks of possible negative impact on the environment, under a PSC the contractor is bound to:

- conduct operations in a manner likely to promote the conservation of the natural resources of Malta and the protection of the environment in accordance with best international practice and in a way that may be required under international obligations entered into by Government;
- employ the best techniques for preventing environmental damage and minimising the effect of such operations on neighbouring areas.

Moreover, the contractor is required to carry out an environmental impact assessment before starting production operations to measure any effect on the environment, people and marine life.

Under a PSC, the contractor is liable for and shall make good any loss or damage to the Government and to third parties. The contractor is obliged to procure third-party liability insurance cover in respect of environmental damage for the duration of the contract. In case of a major accident, the contractor is obliged to take the actions required in accordance with best industry practice and international obligations that Government is a party to.

10.4 Conclusion

Table 10.4.1: Summary of Main Issues and Measures in Hydrocarbon Exploration

Issues	Measures
Hydrocarbon exploration in Malta has a long history, but little success. The possibility of making a commercial discovery in the future is realistically good. This activity can potentially contribute directly to security of supply in Malta if natural gas is discovered.	Government will continue to intensify hydrocarbon exploration by oil companies and to negotiate with neighbouring countries, where disputed boundaries exist, to enable oil exploration to take place in currently disputed areas.
Contractual terms are attractive to exploration companies. This should encourage the exploitation of marginal discoveries. Timeframes for granting authorisation are in line with industry expectations. Under current legislation, the process of granting exploration and production authorisations is short and compatible with the decision-making process of oil and gas companies.	Such practices will continue.
There are concerns about environmental impact through the normal operations linked with hydrocarbon exploration and also possible major accidents, as demonstrated by disasters overseas, the most severe of which was the recent incident in the Gulf of Mexico. Government is aware of this risk and ensures that the highest environmental standards are followed in hydrocarbon exploration and exploitation operations.	Government will ensure that exploration operations are carried out in an environmentally acceptable and safe manner, consistent with the best international industry practice and as required by local and international legislation.

10.5 Programme and Measures in Hydrocarbon Exploration

Table 10.5.1: Action Plan in Hydrocarbon Exploration

Programme Measure number	Description	Implementation			
		Contribution Towards the Main Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
HE-1	Government will continue to intensify hydrocarbon exploration by oil companies.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply	Number of companies doing hydrocarbon exploration	On-going	Lead - MRRA OPM MRA
HE-2	Government will continue to negotiate with neighbouring countries, where disputed boundaries exist, to enable oil exploration to take place in currently disputed areas.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply	Status	On-going	Lead – MRRA OPM MFA MRA
HE-3	Government will ensure that exploration operations are carried out in an environmentally acceptable and safe manner, consistent with the best international industry practice and as required by local and international legislation.	Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply		On-going	Lead - MRRA OPM MRA

11. ENVIRONMENTAL IMPACT OF THE ENERGY SECTOR

11.1 Introduction

A major concern that runs horizontally through the energy sector is environmental sustainability.

Government is addressing the environmental impacts of the energy sector:

- air quality improvement through a decrease in pollutants emitted from fossil fuel combustion;
- climate change impacts through the reduction of greenhouse gas (GHG) emissions.

Other impacts mainly related to the release of heated water into the sea and waste disposal also need to be monitored and controlled. Regulatory procedures to address these impacts are already in place. These are mainly environmental permitting that addresses potential environmental impacts arising from operational processes.

11.2 Air Quality

Air quality is a measure of presence and level of pollutants in the air, arising both from human activities and natural sources. The adverse effects of air pollution on air quality and, consequently, on human health and the environment, emphasise the need for better control on the activities that lead to such emissions.

The burning of fuels in electricity generation, transport, heating and industrial processes, together with the activities related to petrol distribution, contributes to the presence in the environment of certain air pollutants. These are mainly sulphur dioxide (SO_2), nitrogen oxides (NOx), ozone (O3), non-methane volatile organic compounds (NMVOC), ammonia (NH3), heavy metals, persistent organic pollutants (POPs) and microscopic particulate matter (PM), suspended solid or liquid particles. Some of these pollutants may also occur through activities other than those related to fuel, while others occur naturally.

Electricity generation and transport (in particular from diesel vehicles) are the main emitters of sulphur dioxide (SO_2) in Malta. The use of fuels such as gasoil and thin fuel oil for heating and industrial processes also contribute to SO_2 emission. National annual average sulphur dioxide concentrations fell by 20% between 2008 and 2009,[43] in line with trends over the past years.

The introduction of low sulphur fuel for electricity generation since April 2004 brought a drastic reduction in SO_2 emissions from this sector. The heavy fuel oil used in the two power stations for electricity generation contains 0.7% sulphur while the gasoil used for electricity generation has a sulphur content of less than 0.1%. The decrease in electricity generation in recent years is also deemed to have contributed to the decrease in SO2 emissions.

[43] The environment report indicators 2009, dated December 2011 published by the Malta Environment and Planning Authority in partnership with the National Statistics Office.

The sulphur content of automotive diesel imported for consumption in the local market (mainly transport) has been reduced to 0.001% and this has brought a drastic reduction in SO_2 emitted by road transport.

The emissions of NO_2 and NMVOC attributed to electricity generation have remained more or less at the same levels since 2003, whereas transport-related emissions of these two pollutants have decreased since 2003.[44]

The burning of fuels primarily in transport and electricity production also contributes partly to the emission of particulate matter (PM) and the formation of ozone (O_3). Both PM and O_3 have a trans-boundary nature.

Air quality is an area where the EU has been very active in recent years. The policy aim has been to develop an overall strategy through setting up long-term air quality objectives. A series of legislative instruments were enacted at EU level to control the levels of certain pollutants and monitor their concentrations, including those that can result from fuel combustion. The adoption of these instruments resulted in national legislation on emission control and monitoring, among them the Integrated Pollution Prevention and Control (IPPC) permits for fuel combustion installations of a certain size, in particular electricity generation plants issued by MEPA. The monitoring of air pollution levels and reporting is also done by MEPA.

EU emission limits requirements have already had an impact on electricity generation. In the case of the Marsa Power Station steam plant, Enemalta chose the 20,000 hours operation limit ending not later than 2015, an option in the Large Combustion Plant Directive (LCPD)[45] for existing plants, in order for them to be exempted from compliance with the emission limit values as provided in the same directive.

The Delimara Power Station steam plant had to undergo modifications to reduce the NOx emissions as a requirement of the LCPD. Enemalta is also procuring heavy fuel oil with a sulphur content of 0.7% in order to reduce the SO_2 emissions from this plant.

The Directive on industrial emissions (IED)[46] is particularly relevant to electricity generation plants in Malta. It has established stricter emission levels for SO_2, NO_2, CO_2 and dust from these plants. The stricter compliance requirements of this directive on the existing generation plant in Malta will apply from 2020. It will apply to both plants when operated continuously and operated on reserve, although in the latter case the limits on emission levels are less stringent.

Apart from the monitoring and control of emissions resulting from combustion of the fuel by fixed installations, a lot of work has also been done at EU level on the control of air pollution from transport. As a result, legislative instruments have been enacted aimed at monitoring and controlling the quality of fuels used in transport and hence their impact on air quality. The reduction of the contribution of transport fuels to climate change and air pollution rests also on a greater use of biofuels. As mentioned earlier in this policy document, the monitoring and enforcement of quality of transport fuels is done by the MRA.

[44] NEC inventory on MEPA website accessed on 29th December 2011.
[45] Large Combustion Plant Directive
[46] Directive 2010/75/EU (IED) entered into force on 6 January 2011 and has to be transposed into national legislation by 7 January 2013. The IED replaces the IPPC Directive and the sectoral directives as of 7 January 2014, and LCPD with effect from 1 January 2016.

At present, discussions are under way at EU level to introduce more stringent overall national emission caps for air pollutants. No specific emission targets for these air pollutants have been proposed so far. However, stricter emission ceiling levels are expected from 2020. The publication of such targets will probably necessitate a revision of certain measures in the Energy Policy to ensure that they can deliver the necessary emissions reduction.

11.3 Climate Change Impacts – GHG Emissions

Malta monitors trends in GHG emissions by collating and regularly submitting annual GHG emissions and removals inventories to the European Commission and the United Nations Framework Convention on Climate Change (UNFCCC). This is an obligation arising both from EU legislation and from being a Party to the (UNFCCC).

GHG Inventory data shows that the local energy sector is the main contributor to national emissions. For 2010, the energy sector represents around 90% of total GHG emissions, of which electricity production represents nearly 75%, energy for transport (road, civil aviation and sea) 20%, and the remaining 5% is distributed between energy uses in the industrial, commercial, agricultural and domestic sectors. The total national GHG emissions increased by 51% between 1990 and 2010.

The general trend has been a gradual and continuous growth in GHG emissions, though there are signs of a slow reversal over recent years. Major improvements are expected when the Delimara Power Station extension and the submarine interconnector to Sicily come into operation. The increase in generation efficiency will reduce emissions per unit of electricity produced and help to reduce the total national GHG emissions.

Electricity importation through the cable interconnection with Sicily, planned to be in operation by 2013, will reduce local generation and therefore subsequently reduce emissions on a national level. Imported replacement electricity is likely to be less environmentally costly because it is generated by more efficient large plants, benefiting from economies of scale, in spite of being fossil fuel driven. Other measures that contribute to savings in the end-use of energy and increase the contribution of renewable energy sources will also result in a reduction of GHG emissions.

Although the energy industries sector (i.e. the local power plants) accounts for the greatest share in national GHG emissions, in recent years the trend in total GHG emissions does not always follow the trend in emissions from the energy industries sector. Deviations are mainly attributed to the contribution from transport, which continues to show a steady increase. This could even counteract, to some extent, gains in emission reduction from the energy industries sector.

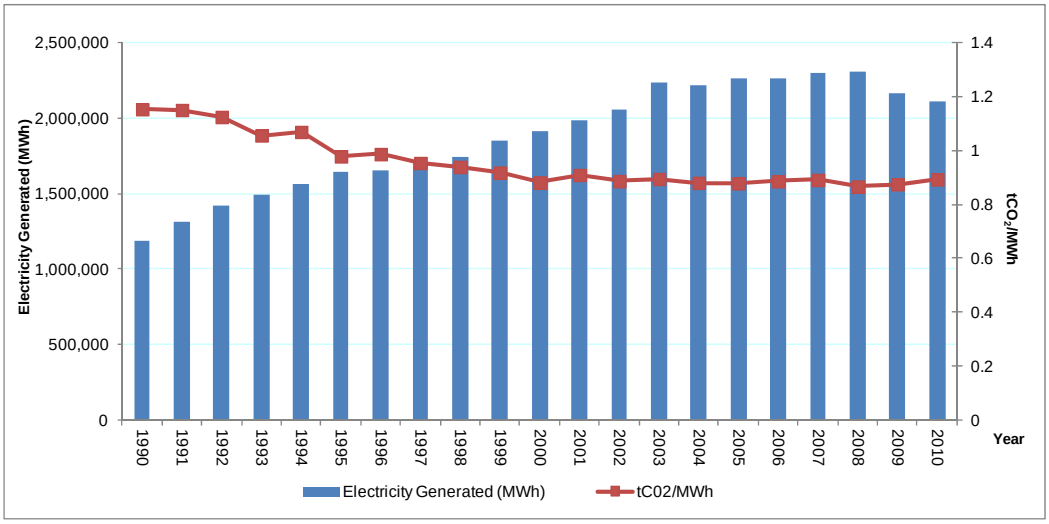
Energy efficiency in the transport sector may be encouraged through support given to initiatives adopted by the EU for more efficient vehicles and fuels. Other measures include: subsidies to incentivise alternative means of transport, such as electric vehicles and bicycles; incentives for the use of biodiesel and autogas; and a public transport reform that conforms to minimum levels of performance standards (Euro V standard engines). Nevertheless, measures targeting the transport sector have not brought about a significant reduction in emissions, and unless further action is required to reverse, the current trend in emissions.[47]

[47] Malta's Biennial Report on Policies and Measures and Projected Greenhouse Gas Emissions, 2011. MRA.

The two main local electricity generation plants, Marsa and Delimara Power Stations, have been fully in compliance with their respective obligations under the EU ETS Directive, including, in particular, their obligations in respect of accounting for CO_2 emissions. Since 2005, when the EU ETS came into effect, the year-to-year trend in CO_2 emissions has varied (though not substantially) as may be seen from Figure 11.3.1, in line with similar variations in electricity generated. Over the same period, the emissions efficiency trend per unit electricity generated shows an overall increase in emissions of CO_2 per unit kWh generated. Although generation efficiency in terms of emissions has decreased to some extent, this trend is expected to improve substantially – and possibly be reversed - as measures already described come into play.

In Malta, GHG emissions resulting from fossil fuel use and other activities (except for CO_2 from electricity generation and civil aviation) fall within the scope of the Effort-Sharing Decision (ESD).[48] Malta has a legally binding target to limit emissions, by 2020, to not more than 5% over 2005 emission levels. Annual legally binding emission allocations shall be determined through a linear trajectory for the period between 2013 and 2020. The emissions covered by the ESD include 52% coming from transport and 18% from other energy uses. Thus nearly 70% of the total emissions covered by the ESD are relevant to this policy.

Figure 11.3.1: Electricity Generation CO_2 emissions trend



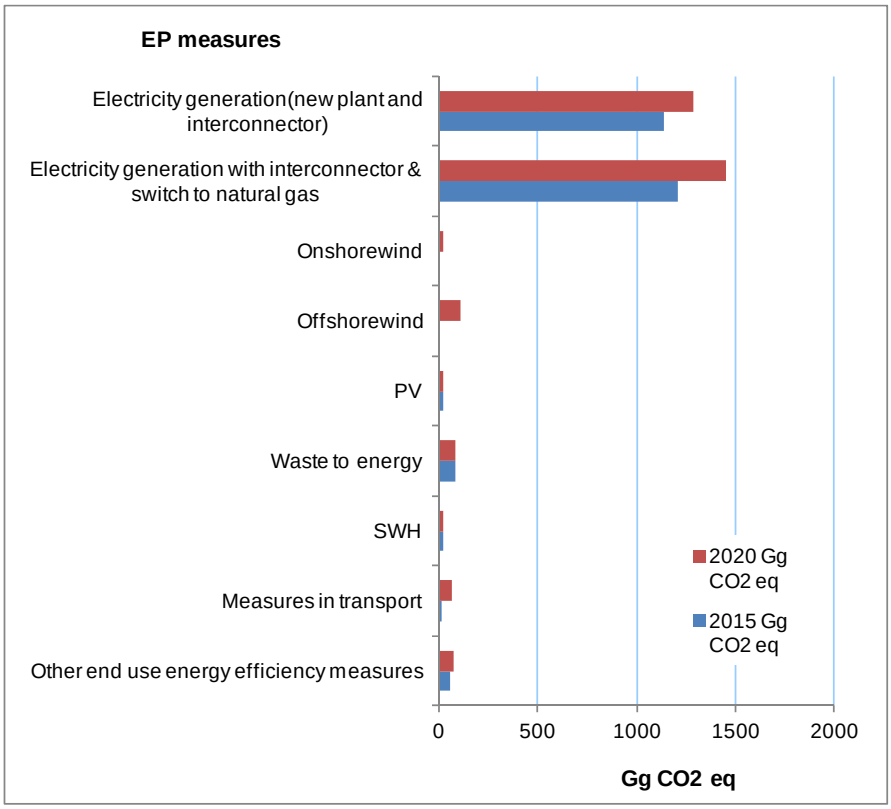
Since 2009, Malta has been reporting on policies and measures being implemented or planned, aiming directly or indirectly to reduce or limit emissions of GHG from local activities, including the energy sector. This biennial reporting integrates the projections for savings in emissions arising from the planned policies and measures in the different sectors, making projections for emission trends up to at least 2020.

[48] Decision 406/2009/EC of the European Parliament and of the Council of 23 April, 2009, on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020.

The emissions of GHG and air pollutants are given adequate consideration in decisions related to the implementation of energy related projects.

Figure 11.3.2 shows the effect on CO_2 savings on a national level of the major measures in this Energy Policy. It is evident that major savings will result from the measures in the electricity sector. These include the commission of new DPS plant and the interconnector and the decommissioning of MPS steam plant. The introduction of natural gas would result in further improvement with respect to CO_2 savings. The calculations of the CO_2 savings are with respect to the replaced electricity from fossil fuel. The waste-to-energy projects include electricity displaced from fossil fuel by electricity generated from biogas produced in the planned MBTs, from manure and sewage treatment plants.

Figure 11.3.2: CO_2 savings from major measures



Even though the measures taken in the electricity sector will have a significant impact on the GHG emissions, it is still believed that abatement technologies aimed at further reducing the CO_2 emissions from electricity generation plants should also be considered.

11.4 Conclusion

Table 11.4.1: Summary of Main Issues and Measures Related to the Environmental Impact of the Energy Sector

Issues	Measures
Environmental care should be integrated in balanced sustainable development. It has become an integral main element of various sectoral policies and decision-making processes, taking into account both benefits and the direct costs to consumers and the economy. Environmental care should be balanced with regard to impact on security of supply. Environmental care may seem to add to the cost of energy if this cost is (incorrectly) understood not to include external costs, such as pollution and social effects. Environmental care delivers health benefits leading to a better quality of life and hence lower healthcare costs. Environmental care has the potential to create a more robust green sector. Non-compliance with Malta's international obligations will lead to higher costs to make up for non-compliance and to pay penalties due. Environmental sustainability implies that the provision of energy is undertaken in a cost-effective manner. This means the development and operation of installations which safeguard human health, make efficient use of natural resources and where biodiversity is not harmed. It is a balancing act that is always dynamic as technologies improve, socio-economic environments change and environmental information is updated. This horizontal activity is specifically directed to ensure environmental sustainability, so it is obviously beneficial. Environmental care has a wide-ranging significance because it covers all emissions and discharges to the environment with multifaceted implications on, but not limited to, biodiversity, air quality, climate change and land use.	Measures taken in Chapters 6,7,8,9 to improve efficiency in consumption of energy, increase share of renewable energy and ensure quality of fuels, and hence reduce emissions to air, all contribute to environmental care. Continue and possibly intensify the monitoring of fuel quality used in the inland market and bunkering. Carry out education campaigns on climate change issues related to energy.

Issues	Measures
The local energy sector is going through a period of transition where new concepts are being introduced and implemented through building the required infrastructure. The transformation of the electricity sector requires intensive investment in infrastructure**,** and compliance with new obligations will increase the cost of energy. In particular, new obligations, such as the purchase of CO_2 allowances, will increase the cost per unit of electricity generated – and in this regard maximum exploitation is to be made through boosting energy generation through RES in particular with regard to PV solutions the costs of which since 2009 have fallen significantly. The supply of energy, including building new infrastructure, should be based on a long-term vision where environmental considerations are taken into account in the initial steps when developing a strategic direction. The cost of environmental degradation can have repercussions not only on natural resources but also on socio-economic activity. The final technological options should be based on a comprehensive set of measures that target a long-term goal, but are flexible enough to enable changes as technology improves and new environmental data is made available. The Strategic Environmental Assessment is specifically directed to assist this decision-making process.	Measures taken in chapters 6,7,8,9 which include new energy infrastructure.
From 2013**,** Enemalta Corporation will have to buy CO_2 allowances equivalent to the emissions resulting from electricity generation. As from 2013, Enemalta Corporation is not entitled to any free allocation of allowances, in line with the relevant legislation. Thus, accounting for emissions will have to be catered for largely through the purchase of allowances from auctions and on the secondary trading market. The cost of the CO_2 allowances would have to be reflected in the electricity costs. Measures taken in the electricity sector also aim at reducing emissions from the sector.	Placing into operation of the new generating plant and interconnector as planned.

Issues	Measures
From January 2012[49], aviation activities in line with Legal Notice 445 of 2010 are required to surrender allowances equivalent to the CO_2 emissions from flights to or from airports in EU territory. CO_2 emissions efficiency in the aviation sector depends on a number of factors including the technology used and the business profile applied (e.g. scheduled passenger carrying versus unscheduled taxi services). The need to acquire allowances to account for emissions could impinge on the cost of service of some aviation operators. A number of operators have acquired free allowances as provided for by the relevant legislation; however, this is often not enough to cover all accounting requirements and any additional allowances required have to be purchased by auction or on the secondary market.	
The emissions from energy use in sectors included in the Effort Sharing Decision must be controlled. The sectors covered in this decision provide a number of sectoral challenges and reaching the set targets cannot be achieved without sound market-based intervention that encourages the shift to more efficient conventional technologies, an increase in the use of low carbon technologies, 'cleaner' fossil fuels and a larger share of sustainable biofuels. Fiscal policy and education have to support this shift. In case of excess emissions, the necessary additional allowances or other allowed units need to be acquired, within the constraints set by the Effort Sharing Decision.	Ensure that the energy-related GHG emissions from the non-EU ETS remain within the limits required by the Effort Sharing decision. Consider revising the substitution obligation targets to aid in the achievement of the ESD targets.
Energy efficiency and the introduction of renewable energy favours environmental care. Remarks in the sections 'Energy Efficiency' and 'Renewable Energy' generally apply here.	Ensure the implementation of measures such as: the new, more efficient generation plant at Delimara Power Station, the electricity interconnector, a switch to natural gas, energy efficiency as per NEEAP, the NREAP, measures in road transport and education campaigns on energy use efficiency. All contribute towards climate change action and improvement in air quality.

[49] Malta notes the Proposal for a Decision of the European Parliament and the of the Council derogating temporarily from Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Union. The Decision would "stop the clock," by temporarily deferring enforcement of the obligations of aircraft operators in respect of incoming and outgoing flights under the European Union's Emission Trading System (ETS). (COM 2012/ 697)

11.5 Programmes and Measures on Climate Change and Air Quality

Table 11.5.1: Action Plan for Climate Change and Air Quality

Programme Measure number	Description	Implementation			
		Contribution Towards the Main Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
EC-1	Ensure the implementation of measures such as: the new, more efficient generation plant at Delimara Power Station, the electricity interconnector, a switch to natural gas, energy efficiency as per NEEAP, the NREAP, measures in road transport and education campaigns on energy use efficiency, since all contribute towards climate change action and improvement in air quality.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Annual emissions by type from electricity sector Annual emissions by type from energy use CO_2 emissions saved by RES	2012-2020	Lead – MRA Enemalta Corporation/ Government/private sector
EC-2	Ensure that the energy-related GHG emissions from the non-EU ETS remain within the limits required by the Effort Sharing decision.	Policy area 4: Reducing emissions from the energy sector	Annual GHG emissions from energy use by sectors covered by the Effort Sharing Decision	On-going	Lead – MRA TM MFEI MRRA BRO

Programme Measure number	Description	Implementation			
		Contribution Towards the Main Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
EC-3	Ensure that the new generation plant is operated in compliance with the applicable emission standards for this.	Policy area 1: Energy efficiency Policy area 2: Reducing reliance on imported fuels Policy area 3: Stability in energy supply Policy area 4: Reducing emissions from the energy sector	Emissions by type per kWh produced Waste produced per kWh	On-going	Lead – MEPA MRA
EC-4	Continue and possibly intensify the monitoring of fuel quality used in the inland market and bunkering.	Policy area 4: Reducing emissions from the energy sector	Number of tests carried out Percentage of samples found non-compliant	On-going	Lead – MRA TM MITC
EC-5	Assess the feasibility of carbon capture technology, transport and suitable carbon storage sites.	Policy area 4: Reducing emissions from the energy sector	Status	By 2015	Lead – MRA
EC-6	Carry out education campaigns on climate change issues related to energy.	Policy area 4: Reducing emissions from the energy sector	Number of events	2012 & on-going	Lead - MRA MRRA
EC-7	Consider revising the substitution obligation targets to aid in the achievement of the ESD targets.	Policy area 4: Reducing emissions from the energy sector	Status	2012	Lead – MRA MRRA MFEI

12. ENERGY POLICY SUPPORTING ACTIONS

12.1 Competition and Regulation

The main legislation that regulates the energy sector in Malta is the Malta Resources Authority Act of 2000 (Cap. 423). The Malta Resources Authority Act establishes the Authority's regulatory functions with respect to the practices, operations and activities relating to energy. From a competition law perspective, the relevant laws are those of the Malta Competition and Consumer Affairs Authority Act of 2011 (Cap. 510) and the Competition Act (Cap. 379). The regulation of the energy sector mainly reflects EU policy and legislation.

12.1.1.Competition Issues in the Energy Sector

In terms of Article 4(1) of the Malta Resources Authority Act, one of the Authority's functions is to ensure fair competition in all practices, operations and activities relating to energy, water and minerals. At law, the MRA also has a role to play in promoting and protecting competition in the energy sector. In performing this function the MRA enforces energy sector-specific regulation and in doing so plays an ex-ante role in this sector.

The national competition authority in Malta is the Office for Competition, which is headed by a Director General. This office forms part of the Malta Competition and Consumer Affairs Authority (MCCAA).[50] Within the Office for Competition a Directorate has been set up to deal with issues that relate to specific sectors, including energy.[51]

The responsibilities of the Office for Competition include the investigation, determination and suppression of restrictive practices, the examination and control of concentrations between undertakings in terms of their effect on the structure of competition on the market, and the exercise of the powers conferred on it under the Competition Act[52] and under the Malta Competition and Consumer Affairs Authority Act.[53] The Director General, in the exercise of his responsibilities under competition law, acts independently.[54] In doing so, however, the Director General is required to ensure that the policies set by the MCCAA Board are implemented and that government policy is put into effect.

The role of the Director General is primarily to deal with ex-post competition issues. The Director General, either on his own initiative, or following an allegation of a breach of the competition rules, may investigate and put a stop to restrictive practices. The Director General has the exclusive competence to apply and enforce the provisions of the Competition Act.[55]

The two core provisions under the Competition Act relating to the protection of competition in the market are Article 5 and Article 9. Article 5 prohibits any agreement/concerted practice between

[50] See Malta Competition and Consumer Affairs Act (Cap. 510 of the Laws of Malta), Article 13 *et seq.* thereof.
[51] *Ibid* see Fourth Schedule to the Act. The Directorate in question also deals with the Communications, Transport and Financial Services Sectors.
[52] Chapter 379 of the Laws of Malta.
[53] MCCAA article 14(1) thereof.
[54] MCCAA article 7(3) thereof.
[55] Competition Act Article 3 thereof.

undertakings and any decision by an association of undertakings which has the object or effect of preventing, restricting or distorting competition in Malta. Article 9 prohibits any abuse by one or more undertakings of a dominant position in Malta. Articles 5 and 9 of the Competition Act are modelled on Articles 101 and 102 of the Treaty on the Functioning of the European Union. The Director General may apply Articles 101 and 102 where the above restrictive practices or abusive conduct have an effect on trade[56] between Malta and another Member State/other Member States.

12.1.2.The Regulatory Framework for the Petroleum Sector

The main piece of subsidiary legislation related to the regulation of the petroleum market is the Petroleum for Inland (wholesale) Fuel Market Regulations LN 278 of 2007 established under the Malta Resources Authority Act. Its scope is to regulate the importation and wholesaling of petroleum for the inland fuel market, primary storage facilities and the bottling of LPG. The implications of these regulations have already been mentioned at different points in the fuel market section.

The pre-2010 legal framework has been replaced with a robust regulatory structure covering fuel distributors, retailers and secondary storage facilities. In 2010, Legal Notice 53/2010 on the Petroleum for the Inland (Retail) Fuel Market Regulations came into force. These regulations aim to safeguard the public interest and safety by requiring the licensed operators to maintain safety standards as prescribed in the authorisation conditions and in line with international practices.

12.1.2.1.Automotive Fuel in Petroleum Filling Stations

All petroleum filling stations and related operations now fall under a licensing regime within the remit of the Malta Resources Authority, in terms of Legal Notice 53/2010. These regulations require petrol stations to promote efficiency in their operational activities within the petroleum market to further protect consumers in terms of the lowest possible prices, combined with the highest quality of petroleum products.

Through the provisions of this Regulation, the MRA issued Decision No. 01/2011/ED on the 'Maximum Retail Mark-up on the Wholesale Price of Petrol and Diesel Sold from Petroleum Filling Stations'. This decision established the maximum retail mark-up for diesel and petrol retailed to the final consumer from a petroleum filling station, on condition that each petrol station carries out an asset replacement programme to improve customer service, safety and environmental protection within ten years (corresponding to the duration of the authorisation for the petroleum filling station).

The monitoring framework for customer issues in petroleum filling stations, such as quality and enforcement of standards of fuels, does not appear to be sufficiently robust. However, under the same legislation, petroleum filling stations owners are submitting inspection audit reports carried out by competent persons to reflect improvements at these sites. These competent persons are warranted engineers, recognised by the MRA as having successfully completed a course specifically tailored to design and certify a petroleum filling station. Monitoring of key parameters is required to ensure customers get value for money, to preserve vehicle performance and to control air pollution.

[56] Regulation 1/2003 article 5 thereof and CA article 5(5) and 9(4) thereof.

12.1.2.2.Other Liquid Fuels

Other fuel types, namely kerosene, gasoil and thin fuel oils, are supplied in bulk to industry, hospitality facilities, commercial outlets and domestic units through a system of fuel distributors, according to the licensing framework established by Legal Notice 53/2010. These regulations also aim to align licensed operators with international safety standards and to promote efficient market operations in terms of pricing and quality products.

12.1.2.3.Liquid Petroleum Gas

The importation, storage, wholesale, distribution and bottling of LPG are regulated by the LPG market regulations Legal Notice 249 of 2008 and require an authorisation from the MRA. At present, Gasco Energy Ltd. holds an authorisation to bottle this gas. There is a pending application for a bottling authorisation from Easygas (Malta) Ltd. A regulation requiring the return of LPG cylinders to the owning company has come into force and action is being taken to enforce it.

LPG storage facilities are licensed by the Authority to safeguard the safety of the operator, the consumer and third parties. Some of these storage facilities have been in existence since the 1970s and a considerable number are not in line with today's codes of practice. Competent persons issue periodic inspection reports and risk assessments on these storage facilities to ensure a minimum level of safety. Storage facilities constructed after October 2008 are built strictly to the codes. Inspections are also carried out at intervals not exceeding two years on storage facilities to ensure that they continue to comply with the codes of practice.

In the meantime, the MRA has upgraded the regulatory framework and the operational aspects of the industry. Among others, it has issued a set of Codes of Practice based on the UK equivalent and appointed warranted engineers as 'competent persons'. These engineers underwent specialised training recognised by the European Registration Scheme (ERS). Their main task is to assess the safety of installations and issue risk assessments in accordance with the Codes of Practice. It is planned to establish the title 'competent installer' for technicians actually constructing the LPG installation. These installers will be subject to a licensing regime similar to that already in place for persons authorised to perform electrical installation works.

At present, there are three small separate pipe networks for the distribution of LPG supplying consumers through a metered gas point. These networks are supplied from dedicated bulk tanks. Another five developers are seeking authorisation to construct similar localised networks, once the planning permit is issued by the relevant competent Authority.

LPG may also be used as an automotive fuel and it has superior green credentials, efficiency and cost relative to traditional fuels. In consideration of this and the business case put forward by Liquigas, the MRA has completed the legal and technical framework for the introduction of autogas in Malta. The Authority received three applications for autogas filling stations and gave its clearance from an operational point of view. The relevant applications have been filed with MEPA and one operator has been granted permission.

12.1.3.The Regulatory Framework of the Electricity Sector

Since Malta is a member of the European Union, the electricity sector has to conform to EU legislation enacted to regulate this sector, the main legislation being Directive 2009/72/EC on common rules for the internal market in electricity. This aims to ensure the creation of a fully operational internal market in electricity in Europe in which fair competition prevails, and to achieve benefits of efficiency gains, price reductions, higher standards of service and increased competitiveness in favour of consumers.

Malta has reached agreement with the European Commission for a derogation from the obligations arising from certain articles of the Directive:

Article 9: unbundling of transmission system and transmission system operation

Article 26: unbundling of the distribution system operators

Article 32: third party access

Article 33: market opening and reciprocity

The derogations from Articles 9 and 26 are justified by the fact that, in line with accepted definitions, the Maltese electricity network is currently considered to be a distribution system and there is no transmission system. The derogations from Articles 32 and 33 arise because the Maltese market is small and isolated and cannot sustain a level of efficient competition that benefits consumers. The derogations provided by Directive 2009/72/EC are not conditional on Malta retaining the present isolated status.

On 3 March 2011, the two "Gas and Electricity Directives"[57] had to be transposed into national law by Member States and the three Regulations became applicable: one on conditions for access to the natural gas transmission networks; one on conditions for access to the network for cross-border exchanges in electricity; and one on the establishment of the Agency for the Co-operation of Energy Regulators, ACER.

ACER's overall mission is to assist national energy regulatory authorities (NRAs) to perform their duties at EU level and to co-ordinate their actions whenever necessary. Its main functions are to support European market integration, advise EU institutions on trans-European Energy infrastructure issues and monitor the energy market with specific responsibility for oversight of wholesale energy trading.

ACER co-operates closely with NRAs, EU institutions and European associations of stakeholders and market participants, especially the European Networks of Transmission System Operators (ENTSOs). Its purpose is to deliver a series of instruments for the completion of a single EU energy market. The MRA is a member of ACER.

[57] Although the internal market in natural gas Directive 2009/73/EC was transposed by LN 167 of 2011, this directive is not relevant to the Maltese situation, given that we have no natural gas.

On 25 October, 2011, Regulation 1227/2011(EU)[58] was enacted, aiming at ensuring the transparency and integrity of wholesale energy markets. This regulation will apply to Malta once it is interconnected with the European energy grid.

Directive 2009/72/EC concerning the implementation of the electricity market was transposed into national law in 2011 through amendments to the Malta Resources Act and by the Electricity Market Regulations (LN 166 of 2011).

A number of provisions concerning the composition and functions, responsibilities and tenure of the electricity regulatory board were included in the Malta Resources Act.

The Electricity Market Regulations mainly establish:

- the licensing of electricity generation, distribution and supply activities, and criteria for authorisation of construction of new generation capacity, both conventional and renewable energy;
- the obligations of the distribution system operator for the maintenance and development of the distribution system, connection of users to the network, the obligation for priority of dispatch of generators producing electricity from renewable energy and the maintenance of a non-discriminatory network code to ensure interoperability of the distribution system;
- the obligation for the provision of information to consumers;
- the responsibility of the MRA in approving or fixing tariffs for electricity generation, distribution and supply, or their methodologies;
- the role of the MRA on cross-border issues;
- the publication of an objective and non-discriminatory Network code to ensure the interoperability of systems.

12.2. Research and Innovation

Research and innovation are essential to ensure that the sector meets the challenges ahead, especially now when a high level of decarbonisation is set as an essential target. The EU has a number of initiatives that could financially support such demonstration projects and the introduction of new technology. In Malta there is a need for a structured approach for research in energy.

The Malta Council for Science and Technology (MCST) is the government body responsible for research policy, promoting scientific research and the management of the national research funding programme. It is the national contact point for the EU Research Framework Programme (FP). Part of the MSCT responsibilities include research in environment and energy resources, with a focus on solar, wind and bio energy, together with energy efficiency technologies. It also includes water, desalination, waste rehabilitation technologies, and soil and marine management.

In December 2011, the Council presented the draft National R&I Strategic Plan 2020 and is in the process of finalising this plan. This Plan builds on previous plans and is directed at enabling more public and private enterprises to invest in research and innovation in the delivery of more innovative, eco-efficient products and services. The Plan seeks to achieve its objectives and vision

[58] Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October, 2011, on wholesale energy market integrity and transparency.

through a number of measures clustered on six pillars, each of which represents a fundamental component of a healthy R&I ecosystem. These are:

- Policy design to action;
- Human resources;
- Research infrastructures;
- International co-operation;
- Innovation;
- Funding.

The Council also provides state financing in the form of grants for research, development and innovation in science and technology through the National R&I Programme. Its focus is applied research involving academia and industry with a specific emphasis on the four priority sectors identified in the National R&I Strategy 2007-2010, namely: Environment & Energy Resources, ICT, Value-Added Manufacturing and Health & Biotechnology.

Project proposals submitted for support should typically have a duration of between one and three years. However, projects with different timeframes may be considered at the discretion of the Council. The Council is looking to fund projects of between €50,000 and €200,000. In addition, the Council has recently launched a Commercialisation Programme which aims at supporting technology towards reaching a market and generating wealth. This can then be recycled into R&I investment, making it sustainable. The first invitation has funded 3 applications, amounting to a total of €200,000.

Projects funded by the National R&I Programme related to energy include the following:

- desalination of sea/brackish water by decentralised solar energy units (Project No. R&I-2006-027);
- solar hot water controller designed to automatically control electrical energy consumption through the use of back-up heater in inclement weather, thereby reducing energy;
- consumption and CO_2 release (Project No. R&I-2008-026);
- design and analysis of an innovative offshore wind turbine support structure for deep water
- water applications in the Maltese Islands (Project no. R&I-2009-003);
- converting wave energy into electrical energy - focusing on Mediterranean region and climate (Project No.R&I-2010-024);
- development of a family of augmented lift - self adjusting - vertical axis wind turbines (VAWTs) for urban wind context (Project No. R&I-2011-011).

The Malta Intelligent Energy Management Agency (MIEMA) is Malta's first energy agency It was set up in June 2007 with the support of the IEE Programme and a wide array of public institutions, including: the Ministry for Tourism and Culture, the Ministry for Rural Affairs and the Environment, the Parliamentary Secretariat for Small Business and the Self Employed in the Ministry for Competitiveness and Communications, Local Councils, the Malta Resources Authority and the University of Malta.

Its goals are in line with those of other IEE supported energy agencies. As such, it aims to be a protagonist of the European effort towards a more intelligent use of energy resources. This entails

promoting awareness initiatives and contributing to define incisive and targeted proposals and policies of intervention which will optimise the use of conventional energy resources and development of renewable sources.

The Agency's activities are initially focused on local needs, such as the energy practices of the tourism industry, while building on local success stories, like that of the use of biofuels. MIEMA is also planning to co-ordinate and provide training to installers of photo-voltaic and similar intelligent energy systems and to organise seminars and information days. It intends to foster and conduct research in the field, through collaboration with the University of Malta, and to disseminate information and raise awareness on the importance of managing energy.

This sort of synergistic networking is designed ensure the success of the Agency and will be another step to ensuring that Malta reaches its target commitments for the use of greener energy sources. Activities planned for the next three years include:

- Energy planning;
- Green certificates;
- Energy certification of buildings;
- Energy saving on public lighting;
- Studies to address the energy needs of industrial parks and micro-enterprises;
- Studies to address the energy needs of tourism establishments;
- Promotion of the use of biofuels and related projects (e.g., marine algae project);
- Dissemination of information about renewables at local and national levels.

Apart from local projects, MIEMA is currently acting on eight trans-national projects in the energy sector. These include research on renewable sources, energy efficiency, biofuels and transport. In particular, MIEMA is carrying out studies on the full potential of photovoltaics in Malta, the production of biodiesel from micro algae, the adaptation of traditional boats to switch to electric-powered motors and the retro-fitting of traditional buildings to increase their energy efficiency.

The University of Malta (UoM), as part of its daily academic work, is also involved in research. The Engineering Faculty, through the Department of Mechanical Engineering and the Department of Industrial Electric Power Conversion, hosts a number of research activities at undergraduate and postgraduate level. The latter cover both Masters and Doctorate level programmes.

Also forming part of the UoM is the Institute for Sustainable Energy (ISE). The institute aims to assist in the development of national energy plans through studies in the use of new and renewable energy sources and methods of energy conservation. The Institute also organises and participates in teaching programmes and research projects in the field of energy technology. Throughout the years that the Institute has been operating, certain energy topics were studied including:

- Energy Management;
- Local Manufacturing of Solar Water Heating Devices;
- Weather Monitoring;
- Performance Analysis of a Vertical Grid Connected Photovoltaic (PV) System;
- Energy Use in Buildings;
- Wind;

- Solar Photovoltaic Tracking Systems;
- Wind Resource Assessment.

The MRA and the UoM are discussing a Memorandum of Understanding (MOU) for further cooperation in research in these areas.

12.3. Training

The achievement of Energy Policy objectives also requires a skilled workforce. Education is essential for people to maintain and develop energy systems that provide a high quality supply. To optimise the yield and lifetime of renewable energy hardware, a system of training and certification of installers was introduced in 2011. The renewable energy sources Directive 2009/28/EC requires that, from 2012 onwards, a certification scheme for installers of RES should be available.

The Buildings Regulations Office (BRO) organises training courses for people who wish to become assessors of energy performance in buildings used for dwellings.

12.4. Green Jobs Creation

The National Environmental policy already advocates a strategy to be prepared by 2013 to promote green jobs. The measures proposed in the NEEAP concerning end-use efficiency, energy performance certificates and the implementation of the NREAP will all help to create new green jobs. It is worth noting with some satisfaction that such jobs have increased during the past four years.

12.5. International Cooperation

Malta supports the projects and initiatives related to the Mediterranean Solar Plan amongst others because they can help in the diversification of energy supply in the EU – in particular the Mediterranean area – and will contribute very significantly towards a low-carbon economy. This energy could be tapped, if it becomes available, when Malta is connected to the European grid. Malta is closely monitoring developments and is interested in feasible scenarios, where such interconnections could pass through our territory and territorial waters. Malta will study such scenarios, taking into consideration its security of supply and sustainability issues.

Malta is also a ratified member of the International Renewable Energy Agency (IRENA) founded on 26 January, 2009, with 75 signatory countries. Today 236 countries are either signatories or members. The objective of IRENA is to work throughout the world to close the gap that exists between the enormous potential of renewables and their current relatively low market share in energy consumption. The agency is considered to be the first worldwide organisation to focus solely on the issues related to renewable energy, targeting both the industrialised and the developing world.

The main work of IRENA will be to advise its members on creating the right frameworks, building capacity and improving financing, and the transfer of technology and know-how for renewable energy.

Malta also participates in the Association of Mediterranean Regulators for Electricity and Gas (MEDREG) and includes the following countries around the Mediterranean basin: Albania, Algeria, Bosnia-Herzegovina, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Jordan, Malta, Montenegro, Morocco, Palestinian Authority, Portugal, Slovenia, Spain, Tunisia and Turkey.

The main objective of MEDREG is to promote a transparent, stable and harmonised regulatory framework in the Mediterranean region and foster co-operation, information exchange and assistance among members, providing a permanent discussion framework. Mediterranean Energy Regulators aim to carry out their activities through a strong cooperative process with energy stakeholders in the region, aiming to create the conditions for the establishment of a future Mediterranean Energy Community.

The Association benefits from the support of its members, the European Union and the Council of European Energy Regulators (CEER).

12.6 Programmes and Measures in Energy Policy Supporting Actions

Table 12.6.1: Action Plan for the Energy Policy Supporting Actions

Programme Measure number	Description	Implementation			
		Contribution Towards the Main Six Policy Areas	Indicators	Timelines and Trajectories	Entity Responsible for Implementation
SA-1	Ensure a proper regulatory oversight in the market both in regard to competition and also enforcement of regulations related to safety.	Policy area 6: Ensuring that the energy sector can deliver	Drafting of Standards	On-going	Lead – MRA MCCAA
SA-2	Continue to streamline the regulatory function while ensuring that the right regulatory oversight on the market is maintained, and avoidable burdens on the operators are removed, while safeguarding consumer interests. Reduce the burden on the operators and consumers so they may benefit from a better service.	Policy area 6: Ensuring that the energy sector can deliver	Drafting of Standards	On-going	Lead – MEU BRU MRA MCCAA
SA-3	Ensure that a certification scheme for RES installers is in place.	Policy area 6: Ensuring that the energy sector can deliver	Certification Standards	2012	Lead – MRA MRRA
SA-4	State financing in the form of grants for research, development and innovation in science and technology through the National R&I Programme.	Policy area 6: Ensuring that the energy sector can deliver	Number of energy related R&D projects financed by the state	On-going	Lead – MCST MFEI

Programme Measure number	Description	Contribution Towards the Main Six Policy Areas	Implementation		
			Indicators	Timelines and Trajectories	Entity Responsible for Implementation
SA-5	Promotion of, and participation in, the EU Research Framework Programme (FP).	Policy area 6: Ensuring that the energy sector can deliver	Number of energy related R&D FP projects	On-going	Lead – MCST OPM PPCD
SA-6	Increased participation in national and transitional research projects.	Policy area 6: Ensuring that the energy sector can deliver	Number of energy related research projects	On-going	Lead – MCST & UoM
SA-7	Increased research on the adaptation of technologies to the local market, especially in the case of RES.	Policy area 6: Ensuring that the energy sector can deliver	Number of new research projects on adaptation of technologies	On-going	Lead MCST & UoM
SA-8	Training of the workforce at different levels for green jobs related to the uptake of renewable energy sources technology.	Policy area 6: Ensuring that the energy sector can deliver	Number of training programmes by type Number of trained workforce each year	On-going	Lead – ETC UoM MCAST CDRT
SA-9	Conclude MOU between MRA and UoM.	Policy area 6: Ensuring that the energy sector can deliver	N/A	2012	Lead MRA & UoM MEDE MRRA

13. ENERGY ROADMAP 2050

13.1. The Energy Sector Transformation

At the conclusion of this Energy Policy document it becomes evident that Malta needs to plan into the future for the energy sector. The global energy sector is undergoing a major transformation. This is driven primarily by concerns that the type and scale of current operations based on burning fossil fuels are causing irreversible environmental damage that will have a serious impact on human life and well-being. Other concerns are security of supply of energy and the general economic competitiveness of the European Union, given that the Union is very much a net importer of energy.

The main facet of this transformation can, for practical purposes, be described by the EU's proposed objective of 'Decarbonising the Energy Sector by 85-90% by 2050'. The European Commission has published a 'Communication to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions' entitled 'Energy Roadmap 2050'. This is accompanied by a document covering a model-based impact assessment of the decarbonisation proposal.

This note provides a summary at a very high level of the main messages of the communication and the conclusions of the Commission's analysis. It also includes some early qualitative ideas and comments on the impact the proposed decarbonisation of the energy sector will have on the Maltese Islands. This note draws heavily from the Commission's documents insofar as the general global European impacts and conclusions are concerned.

13.2. High Level Objective of the Commission's Impact Analysis

The model-based analysis for the decarbonisation of the economy by 2050 is based on the analysis of potential scenarios to reach 80% GHG reductions by 2050, taking into account also energy security and competitiveness.

The "Business as usual" scenario in this model considers that:

(i) Only half the emission reductions needed are achieved.
(ii) Energy import dependence will increase, in particular for natural gas.
(iii) Electricity prices and energy costs will continue to rise.

The following four main decarbonisation routes have been identified

(i) Energy efficiency
(ii) Renewable Energy
(iii) Nuclear energy
(iv) Carbon Capture and Storage (CCS)

The following conclusions emerge from the model-based analysis

(i) 85% to 90% decarbonisation by 2050 is feasible.
(ii) It can be achieved through various combinations of the above routes.

(iii) Costs are affordable.

13.3. The Main Messages of the Communication 'Energy Roadmap 2050'

The main messages of the Communication 'Energy Roadmap 2050' are given in the table with comments regarding implications in the Maltese context. The projects and measures described in other sections of this document are in line with the future direction contemplated in Challenge 2050.

Table 13.3.1: Implications of the EU Energy Roadmap 2050 on the Maltese Energy Sector

'Challenge 2050' Message	Implications in Maltese Context
More aggressive exploitation of cost-effective efficiency measures.	Energy efficiency measures adoption depends on public acceptance and behaviour. Education has an important role to play. More efficient building envelopes are particularly critical for Malta.
To reach the 80-95% GHG reduction targets by 2050, a fully decarbonised power sector is necessary, taking on itself a share of key sectors like passenger transport and some heating in buildings.	It is highly unlikely, given its size, population density and other characteristics, that Malta could achieve the 'Challenge 2050' targets relying solely on indigenous RES and other technologies. As well as taking advantage of new and/or improved technologies as they develop and come on the market, connections to European grids and importing energy will have to be intensified over what is envisaged today. Significant exploitation of wind energy will have to follow commercialisation of deep-offshore technology. Micro generation, (e.g. PVs) will as trends today indicate be cheaper and more efficient and will have to take on a greater role than envisaged – though they will be constrained by physical and planning considerations; unless marine based solar energy sources are conceived and brought to market. Carbon capture, perhaps with disposal overseas, will have to be assessed as well as any other emerging RES solution that could contribute to a diversified energy system. Energy storage, (e.g. via hydrogen through RES sources) might fund application on a large scale, not least in transport and to manage load demand.
A reliable, affordable, near-zero emissions power sector by 2050 is feasible with the development of existing technology. Technological breakthroughs deliver faster and cheaper results.	Practically all the ideas expressed above rely on current technology, but technological breakthroughs, as they happen, could enable faster and cheaper delivery of energy produced locally which would reduce dependency on imported energy. Developments in existing technologies, or new technologies, will be adopted subject to their cost-effectiveness and reliability. It is, therefore, imperative to continuously monitor new technologies.
A wide range of pathways can deliver the target (including 80% RES).	Well researched policies and action plans are required to identify the most appropriate, reliable and cost-effective pathways suitable for Malta. Thus underlines the importance that Malta's energy policy is flexible.
Base load demand can be met reliably with a mix of dispatchable and intermittent sources.	The electrical interconnection with the European grid will contribute in this regard.
A certain quantity of nuclear and Carbon Capture and Storage plant.	This of course remains at each Member State's discretion. While Malta rules out nuclear power stations on its territory, it can import electricity generated from

	nuclear power stations or from zero emissions carbon capture generating stations. Capture of CO_2 emissions from local fossil fuel generation for export to storage overseas could also be a possibility to consider.
Recommend retirement of low efficiency plant in time to stimulate market demand for new low-carbon generating capacity.	While Malta's electricity demand is too small to affect the market, the age of all local generating plant is such as to allow planned retirement and replacement according to the circumstances and in time to meet the set targets. In the meantime, natural gas could provide the cleanest practical fossil fuel.
A large amount of new trans-European transmission is required.	Malta would connect to such infrastructures in line with options chosen from time to time. Cost is a major parameter that has to be considered.
Investment in load shaping capability for transmission optimisation and system balancing.	The Smart-meter project is a first basic step towards this objective.

13.4. Implications for Future Policy-Making

Some conclusions of the assessment have implications for future policy-making. These implications are briefly commented on below from a Maltese perspective. The proposed Energy Policy and current action programmes are consistent with the current thinking on future direction.

Table 13.4.1: Future Implications of the EU Energy Roadmap 2050

EU Energy Roadmap 2050 message	Assessment against Malta's Current Policy Objectives
Certainty for investment is needed.	Clear policies are required to ensure that the necessary investment by the private sector in low carbon technologies occurs. Currently, Enemalta Corporation is fully owned by Government. Government will have the choice of financing mechanisms for new investments, including but not limited to self-financing and private participation. Regulators have an important role to play in this respect.
Stability in Pricing	With regard to industrial and commercial users, it is important that economic providers operate within a well established system of energy pricing that, to the extent possible, ensures that such economic operators are generally assured about the consistency and stability of the energy bills. The competent authorities will work with economic operators to identify mechanisms that could be reduced in this regard.
The building of infrastructure needs to be supported by regulation and public funding.	Significant investments are required to achieve the robust and intelligent grid systems required, in order to integrate effectively and efficiently low carbon energy sources to meet the Energy 2050 objectives. These investments would have an implication on the cost and security of supply of imported fuel or through energy interconnections. Future-proofing the minimum efficiency standards for building components (windows, insulation etc.) which have to be met when renovating buildings, relative to future challenges will have a positive impact on energy saved. Additionally Government should target that Malta's standards are among the best in Europe and that they make the maximum practical contribution to achieving CO_2 emission targets. ACER has an important role to play regarding cross-border issues. The objectives of Challenge 2050, to which the infrastructure described in this paragraph refers, are eminently environmentally friendly in terms of emissions and action against climate change and its negative effects.

EU Energy Roadmap 2050 message	Assessment against Malta's Current Policy Objectives
Energy efficiency needs to be supported by policy and public funding.	Energy efficiency is a key step towards decarbonisation. The emphasis has to be on the energy end-use sectors that consume most energy, i.e. transport and buildings. The concept of near-zero energy buildings has to be adopted in planning policies. Incentives must be devised to promote the sale of high standard, efficient products, including appliances and vehicles. This will bring about a change in customer behaviour through education and other appropriate means.
Support to R & D & I to bring down costs for low-carbon technologies.	The 80% to 95% decarbonisation objective may be difficult to achieve with current technologies - it would constitute a considerable challenge to be overcome. Research and new technologies can deliver this objective in a shorter period of time. Apart from general participation in technical research, Malta needs to research in-depth policy options and draw up action plans to ensure that the choices made will give the highest value for the investment committed. Particular attention should be given to watching developments and to the adaptation of technology to local circumstances. The faster the prices of low-carbon technologies fall, the cheaper and earlier targets can be reached. Development of marine-based RES technologies should be incentivised due to the very restricted space available on land. Malta is the European nation with the highest ratio of available marine space with respect to land territory, considering the extent of territorial waters up to 12 nautical miles. The seabed slope orthogonal to the coast is however steep around most the Maltese Islands and this poses a constraint on the location of offshore RES installations. Energy from marine-based RES technologies offers realistic opportunities not only from direct benefits deriving from local installations, but also in developing tradable expertise in the related technologies. They offer likely avenues for providing energy security to meet expected reductions in greenhouse gas emissions and air pollution, as well as to achieve international competence in research and related applications at the production and service levels.

EU Energy Roadmap 2050 message	Assessment against Malta's Current Policy Objectives
Due attention to public acceptance of the new scenarios.	Under the new decarbonisation scenarios, infrastructure becomes more visible than today's. While today's infrastructure handles high energy-intensity fuels (e.g. through buried pipelines and secluded harbour arrangements) and power stations produce a high density of electricity from the land occupied, RES infrastructure must be exposed to elements (e.g. to the wind and sun) and requires large areas of land due to the low intensity of the source energy. Electricity is likely to take over a greater share of total energy consumption under a decarbonised energy scenario because, from a European perspective, it is practical to generate electricity through RES in large-scale (mostly offshore) farms, and control GHGs in concentrated power production from fossil fuels (e.g. through carbon capture and use of biofuels). Given Malta's size and other parameters (e.g. population density and the absence of large open spaces) the right balance between indigenous RES production and collateral environmental impacts is difficult and raises public acceptance issues. Hence, the current interest in deep offshore technology for electricity generation from wind. In any case, the local potential for indigenous RES is limited. Be that as it may, Malta must continue to monitor offshore wind technology development as this is technology that could exploit Malta's vast sea territory. Connection to the European grids gives the flexibility that enables Malta to optimise situations and balance various existing options including indigenous production, various options to purchase electricity and its impact on the quality of life.
Social impacts – shifts to more highly skilled jobs, support to vulnerable customers – need to be given attention.	The decarbonisation process is expected to create some shifts even in the Maltese context. Hence the requirement of training. Support to vulnerable consumers will have to continue. Government policies already emphasise education and social security. These policies need to continue to be responsive to changes in circumstances.

EU Energy Roadmap 2050 message	Assessment against Malta's Current Policy Objectives
Improved mechanisms for social affordability	The Energy Benefit Subsidy is a recurrent expenditure based social support instrument that provides an incentive to the consumer to change his or her behaviour to remain within the benefit thresholds set. Within the thresholds set, it constitutes a recurrent expenditure cost and the continued implementation of this policy will have longer term financial fiscal impacts, with no real returns to society other than that of ensuring a safety net for persons who may be in danger of fuel poverty – that is, where a person is not in a position to afford his or her basic energy needs. In this regard the Government will work with constituted bodies on the possible introduction of mechanisms that will address affordability issues by rendering the electricity footprint of those at risk through RES and energy efficiency capital investment as against recurrent benefits.
Increased Energy Performance in Transportation	There are strong indications that in 2035 many more energy services than today will come through electricity. Transport can be electrified by converting cars and to a certain extent buses and lorries to electricity. This should provide massive efficiency improvements as combustion motors typically waste four-fifths of the energy, while only one-fifth is lost in electric motors. However this is obviously very dependent on the overall efficiency in the generation of electricity. It must also be noted that electric vehicles have the ability to change their fuel mix over time, and therefore become less CO_2 intensive as the electricity they consume comes from greener technologies. Electric cars will probably be an important transport technology of the future, but today it is not possible to predict exactly the comparative roles and advantages of, for example, electric cars, plug-in hybrids or fuel-cell cars, in 2035.
A flexible approach is needed in view of uncertainty on the future.	It is advisable for Malta to keep its options open, and be flexible to respond to changes.
Impact on energy suppliers – fuel export revenues, production and energy transport investments – should be dealt with proactively.	Some third countries are dependent on revenues from export and trade of energy. Other areas of co-operation and trade – e.g. in RES in desert spaces – could be found. Malta's imports are too small to have impacts at this level. Malta relies on EU foreign relations on these matters. Malta's own foreign policy is one of co-operation with all countries. New co-operation mechanisms are already being developed through initiatives such as the Mediterranean Solar Plan and the Desertec Project.

EU Energy Roadmap 2050 message	Assessment against Malta's Current Policy Objectives
Without action at a global level, carbon leakage might be a problem.	Unless global environmental arrangements are in place, special provisions must be made for energy-intensive industry in the EU to avoid its loss of competitiveness and hence moving away to third countries with no high environmental standards. Malta should continue to decouple energy consumption and GDP. Actually, the circumstances discourage energy-intensive industry setting up in Malta. Energy-intensive industry moving away to third countries with no high environmental standards is self-defeating, and worse.

14. STRATEGIC HOLISTIC APPROACH TO THE ATTAINMENT OF THE ENERGY POLICY

The growing complexity and strategic importance of energy to Malta's social and economic well being calls for a focal point of energy policy coordination that secures a holistic approach across government. This stems from the recognition that energy is all pervasive and transcends individual ministerial portfolios. Additionally, an Energy Policy is strongly intertwined with climate change, both of which are in turn subject to technological, economic, health, environmental and social complex dynamics that are subject to a broader national strategic framework as well as EU and international commitments,

The Energy Policy, thus, presents the need for the setting up of a continuous policy review and implementation coordination mechanism directed to ensure that the programmes and measures presented in this policy are .not cast in stone but rather reflect changes as they occur as well as that they are implemented.

The following are seen as important aspects of a strategic holistic approach to the attainment of this Energy Policy.

1. Responsibility for the coordination of the implementation of the Energy Policy and its continuous iterative review is placed with the Strategic Policy Secretariat within the Office of the Prime Minister.

2. Political consensus on the strategic approaches to energy policy should be obtained to ensure policy continuity in view of the ever present challenges that Malta will face. A Parliamentary Committee on Energy and Climate Change should be constituted, with alternating chairpersons from different political parties represented in the House of Representatives with a mandate to conduct broad consultations so as to effectively monitor and assess implementation and to report to the House and the Government of the day on progress, issues, and action required.

3. The Strategic Policy Secretariat working with the Malta Resources Authority as well as the appropriate ministries and competent authorities will review the programmes, measures and actions within the Energy Policy every three years to account for changes in circumstances such as technology which reviewed policy will be tabled at the House of Representatives for discussion through the afore proposed Parliamentary Committee for Energy and Climate Change.

4. The Strategic Policy Secretariat together with the competent Ministry responsible for energy, the Permanent Representation in Brussels, the Ministry of Foreign Affairs and appropriate competent Ministries and authorities will work to:

    - Continue to pursue efforts in the EU with regard to the Single Electricity Market and, ideally on the basis of a common national position agreed across the political spectrum, establish a structured, maintained and aggressive approach to ensure that Malta's and Southern Europe's energy needs are addressed and met;

    - Maintain Malta's position within the EU that the implementation of a gas supply infrastructure should be financed through the EU's Connecting Europe Fund in order to end Malta's isolation from the European Gas networks;

- Negotiate with the EU to prioritise, in the immediate term, an increase in funding for local research, development and demonstration in the energy area related to Island States;

- Secure a Power Purchase Agreement for energy transmitted over the interconnector that is cost effective to Malta;

- Strengthen the relationship between the EU and non-EU southern Mediterranean countries with regard to the design and implementation of a Mediterranean Basin Energy Strategy.

5. The Ministry of Foreign Affairs, in conjunction with the Ministry of Finance and other competent ministries and authorities will escalate efforts with regard to political negotiations with other countries to secure a purchase agreement with regard to energy sources with strategically set prices.

6. The Malta Resources Authority will continue to be strengthened to allow it to exercise a far stronger regulatory and governance role with regard to:

   - Evaluate the progress achieved in market restructuring in accordance with the legal regulation;

   - Evaluate the efficiency of functioning and competitiveness of the market;

   - Supervise positions of the dominant participants, identify potentially anti competitive behaviour or abuse of dominant position;

   - Ensure that the interconnection link with mainland Europe is resulting in the appropriate savings to consumers;

7. The Malta Resources Authority will, with the appropriate support from the Economic Policy Division within the Ministry of Finance, design an energy demand and supply economic model that will allow for macro and micro understanding of the dynamics, impacts of policy options with regard to international and EU targets, strategic choices, etc. This will lead towards the improvement of the basis for performing socio-economic analyses within the climate change and energy policy sectors.

8. The Malta Resources Authority will continue to work with the Malta Environment and Planning Authority continue to undertake the necessary studies on the identification of potential shore and on-shore sites – which will be subject to future SEA review - on which large conventional generation and RES plants or farms can be developed. This pro-active planning process will ensure that:

   - Government places itself in a state of play where it can plan and subsequently act fast if it is to undertake conventional generation or RES projects.

   - Government presents a state of play that allows private investors to make reasonable decisions with regard to investing in conventional generation or RES projects on pre-determined sites without the risk of having the application turned

down after experiencing significant costs up-front cost in relation to studies such as EIAs.

- Enemalta Corporation can undertake appropriate pre-planning on capital investment that would be required on the grid and in the distribution network to allow for increased generation of energy from different technologies as well as potentially for the intermittent supply of such technology.

9. The National Budget should as from 2014 be re-structured so that the holistic economic and financial impacts of energy onto the national economy are identified and assessed.

10. The Malta Resources Authority together with the sectoral competent authorities will assess any initiative relating to energy – conventional; energy efficiency; renewable etc - on the basis of a cost benefit analysis.

11. The Malta Resources Authority will carry out a technology review every three years setting out how technologies are evolving and their potential impact on Malta's policy decisions with regard to the short, medium and long term.

12. The Malta Resources Authority together with the Ministry of Finance will carry out every other year an evaluation of the effect of market instruments deployed in order to ensure adequate progress towards the goal of fossil fuel independence, greenhouse gases reductions, etc and to ensure cost-effectiveness in overall efforts, including developing an analysis tool which can help clarify security of supply issues.

13. The Enemalta Corporation will be reformed and as part of this reform the Government will give strategic consideration to the separation of the generation part of the Corporation from the transmission and distribution part.

14. The prices and accounts relating to the interconnector will be unbundled and presented separately.

15. The performance of ARMS Ltd will be re-assessed with regard to the implementation of the Smart Meters, the measures undertaken to reduce theft and administrative losses, and the measures undertaken to educate consumers with regard to consumption behaviour.

16. With particular view of the EU's 2050 Roadmap to de-carbonise Europe's energy system between 80% to 95% by 2050, Malta, as from today, will start assessing the cost benefits of applying Article 9 of the RES 2009 Directive with regard to cooperation projects with other countries.

17. The Government will adopt a holistic approach directed to assist investors to obtain the necessary permits from different Government entities for large RES as well as RES R&D&I micro generation projects (MRA, MEPA, TM, MCA, AFM, Enemalta, OED, Civil Protection Department, and Department of Health, amongst others). This will reduce existing bureaucracies for private investors and implementation timeframes which renders it difficult for private local and foreign investors who seek to invest in private generation through conventional technology.